Primary Care Handbook

Independent Study Project

April 2010
Contents

I  Diagnostic criteria and treatment of select chronic medical conditions  1
  1  Diabetes  3
  2  Hypertension  11
  3  Dyslipidemia  21
  4  Osteoporosis  27
  5  Asthma  33
  6  Depression  47
  7  Obesity  59

II  Health maintenance  63
  8  Immunization Schedules  65
  9  AAFP Recommended Preventative Services  71
  10  Well Child Checks  75
  11  Routine Prenatal Care  81

III  Developing a differential, working up, and treating common medical complaints  87
  12  Urinary Complaints  89
  13  Upper Respiratory Infection  99
  14  Abdominal Pain  103
  15  Headache  113
  16  Musculo-Skeletal Pain  117
  17  Fatigue  143
  18  Chest Pain  149
  19  Dermatologic Complaints  155
  20  Ophthalmology Complaints  167
Part I

Diagnostic criteria and treatment of select chronic medical conditions
Chapter 1

Diabetes: Based on recommendations from the American Diabetic Association (ADA)

Screening:

- Begin by testing fasting plasma glucose (FPG) or 2 hour oral glucose tolerance test (OGTT) at age 45, if normal repeat every three years. If impaired fasting glucose, repeat yearly. A HbA1C of >6.0 or >6.5 is also being considered for screening, but has not been formally accepted by the American Diabetic Association (ADA).[98]

- In adults of any age who have body mass index (BMI) greater than 24.9 and one or more additional risk factors (see below). In overweight children (BMI greater than 85th percentile or weight greater than 120% of ideal weight for height) plus 2 or more additional risk factors.
  - Risk factors: family history, ethnicity (African American, Latino, Asian, Pacific Islander, or Native American), hypertension, acanthosis nigricans, dyslipidemia, and PCOS.
  - In addition to above, risk factors for children include: maternal gestational diabetes mellitus (GDM) and small for gestational age.

- Women with gestational diabetes mellitus (GDM) 6-12 weeks postpartum.

Diagnosis

Diabetes (any of the following confirmed on a subsequent day by the same or other):

- Fasting plasma glucose (FPG) 126 mg/dl or greater (fasting is defined as no caloric intake for 8 hours or greater) and
  At least one symptom of diabetes (classically: polyuria, polydipsia, and unexplained weight loss) and a casual plasma glucose of 200 mg/dl or greater.

- 2 hours plasma glucose of 200 mg/dl or greater during an oral glucose tolerance test (Oral GTT: glucose load of 75 g glucose dissolved in water).
  Recent recommendations from the ADA have suggested that a HbA1C of 6.5 or greater can be used to diagnose diabetes, but it remains to be seen if this will be widely adopted.[103, 98, 6]

Impaired fasting glucose:

- FPG between 100 and 125 mg/dl or
- 2 hour plasma glucose of 140-199 mg/dl.
CHAPTER 1. DIABETES

Metabolic syndrome (at least three of the following):
- Waist measurement of 40 inches or more for men or 35 inches or more for women.
- Triglyceride level of 150 mg/dl or greater.
- High density lipoprotein (HDL) level less than 50 for women or less than 40 for men.
- Blood pressure of 130/85 mmHg or greater.
- Fasting blood sugar of 100 mg/dl or higher.

85% of people with DM2 have metabolic syndrome, but the 15% of people who have DM2 without metabolic syndrome have a much lower risk of heart disease.

Treatment of Diabetes

Goals of treatment based on 2009 ADA Guidelines:
- HbA1C
  - Below or around 7% in most non-pregnant adults.
  - Can have goal of less than 7% in pts with long life expectancy, no significant CVD, and no significant hypoglycemia.
  - Can have less stringent goal in people with history of severe hypoglycemia, advanced complications, and extensive comorbid conditions.
- Blood Pressure
  - In adults, less than 130/80 mmHg.
  - If pt has greater than 1 g of proteinuria, then a more aggressive goal of 125/75 mmHg is advocated.
  - In children, less than 90th percentile, or less than 130/80 mmHg, whichever is lower.
- LDL
  - Less than 100 mg/dl for most patients.
  - Less than 70 mg/dl for patients with cardiovascular disease (CVD).
  - If patient cannot reach above goals with maximum therapy, a reasonable goal in 30-40% decrease from baseline.

Labs:
- HbA1C:
  - Every 3 months in pts with changes in therapy or who are not meeting glycemic goals.
  - Twice a year in pts who are meeting treatment goals.

Microvascular complications reduced by 25% when HbA1C is 7% compared to 7.9%

- Blood pressure: measure at every visit.
- Fasting lipids: annually. If at goal, may repeat every two years. In children, if family history is concerning for CVD or unknown, check at age 2, otherwise at age 10. If abnormal in children, check annually. If LDL <100, check every 5 years until adulthood.
- Urine microalbumin/creatinine ratio: annually for DM2 and annually starting 5 years after diagnosis for DM1.
- Serum creatinine: annually.
- In children with DM1: as above and, screen for Celiac disease with tissue transglutaminase or antientdomysial antibodies, check thyroid peroxidase and thyroglobulin antibodies to screen for hypothyroidism. Check Thyroid Stimulating Hormone (TSH) annually.
**Eye/Foot Care:**

- Retinopathy Screening: annually for DM2 and annually starting 5 years after diagnosis for DM1 in children 10 years or older. May consider decreasing frequency to every 2-3 years after one normal exam.
- Foot Care: annual comprehensive foot exam (inspection, assessment of pulses, monofilament testing, and one of the following- vibration, pinprick, or ankle reflexes).

**Lifestyle Modifications:**

- Diet changes: decrease saturated fat, trans fat, and carbohydrate intake.
- Weight loss of at least 5-10% body weight.
- Increasing physical activity to 150 minutes per week moderate aerobic exercise.
- Resistance training 3 times per week.
- Refer to dietitian for Medical Nutrition Therapy.
- Smoking cessation.

**Immunizations:**

- Influenza vaccine annually to all diabetic patients >6 months old.
- Pneumococcal vaccine to all diabetic patients greater than 2 years old and then with one time booster for patients greater than 64 years old who have not received vaccine in greater than 5 years.
### CHAPTER 1. DIABETES

**Pharmacotherapy [16, 43, 55, 104]:**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Medication</th>
<th>Mechanism of Action</th>
<th>Time and Dose</th>
<th>Side Effects</th>
<th>Δs in HbA1C</th>
<th>Contraindications</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfonylureas</td>
<td>Glimepiride (Amaryl)</td>
<td>-Stimulate the pancreas to release more insulin</td>
<td>1 or 2 times a day</td>
<td>-Hypoglycemia</td>
<td>1%-2%</td>
<td>-Use with caution in people with renal insufficiency</td>
<td>-Glicipide is the drug of choice from this class in people with renal insufficiency</td>
</tr>
<tr>
<td></td>
<td>Glipizide (Glucotrol)</td>
<td></td>
<td>20-30 mins before a meal</td>
<td>-Upset stomach -Skin rash or itching -Weight gain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glyburide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biguanides</td>
<td>Metformin (Glucophage)</td>
<td>-Improve insulin’s effectiveness -Lowers the amount of sugar made by the liver</td>
<td>2-3 times a day, XR once a day</td>
<td>-Upset stomach (nausea, diarrhea) -Metallic taste in mouth</td>
<td>1%-2%</td>
<td>-Kidney damage (cre &gt; 1.4 for women, 1.5 for men)</td>
<td>-No weight gain, possible weight loss -No hypoglycemia -Beneficial effects on LDL and triglycerides</td>
</tr>
<tr>
<td></td>
<td>Glucophage XR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alpha-</td>
<td>Acarbose (Glyset) and</td>
<td>-Block enzymes that help digest starches slowing the rise in blood sugar.</td>
<td>Take before each meal</td>
<td>-Stomach upset (gas, diarrhea, nausea, cramps) -Small chance of incr transaminase</td>
<td>0.5%-0.8%</td>
<td>-IBS -Cirrhosis</td>
<td>-Effects are glucose dependent. High sugars make you release insulin -No weight gain</td>
</tr>
<tr>
<td>Glucosidase</td>
<td>Miglitol (Precose)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inhibitors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>Example Drugs</td>
<td>车身代号</td>
<td>Uses &amp; Side Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------</td>
<td>--------</td>
<td>---------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiazolidinediones</td>
<td>Rosiglitazone (Avandia), Pioglitazone (Actos)</td>
<td>- Improve insulin’s effectiveness  - Lowers the amount of sugar made by the liver  - Elevated liver enzymes  - Liver failure  - Respiratory infection  - Headache  - Fluid retention (swelling)  - Weight gain</td>
<td>Once daily with or without food  0.5-1.4%  - Heart failure  - Abnormal liver function (5x normal is criteria for stopping)  - Use cautiously in those with risk factors for heart failure  - May take 6 weeks for max effect  - Requires periodic blood testing of liver function  - Pioglitazone reduced the risk of heart attack, stroke, and acute coronary syndrome  - Improves HDL and triglycerides  - Rosiglitazone may incr risk of MI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meglitinide</td>
<td>Repaglinide (Prandin), Nateglinide (Starlix), Mitiglinide</td>
<td>- Stimulates the pancreas to release more insulin  - Hypoglycemia  - Stomach upset  - Weight gain</td>
<td>5-30 minutes before meals  1-1.5%  - Use with caution in people with heart failure or liver disease  - Short-acting.  - May be a good choice for people with kidney problems as safer at higher serum levels than sulfonyureas.  - Expensive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPP-4 Inhibitors</td>
<td>Januvia</td>
<td>- Stimulates the pancreas to release more insulin  - Lowers the amount of sugar released by the liver</td>
<td>100 mg once a day  0.5-1%  - Increases insulin secretion when blood sugars are high  - No weight gain  - Expensive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incretin Mimetics</td>
<td>Byetta Injectable</td>
<td>- Stimulates the pancreas to release more insulin  - Slows digestion</td>
<td>10 mcg  - Inject within an hour of AM and PM meals  - Used in combination with oral antihyperglycemics such as metformin or a sulfonylurea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-hyperglycemic</td>
<td>Pramlintide (p) Exenatide (e) Injectable</td>
<td>(p): Synthetic form of amylin. (e): GLP-1 analog slows gastric emptying, decr appetite, decr glucagon</td>
<td>Inject before major meals</td>
<td>-Hypoglycemia</td>
<td>0.3% (p) 1% (e)</td>
<td>-Meant for pts who take insulin but still have difficulty controlling their glucose levels. -Weight loss -Expensive</td>
<td></td>
</tr>
</tbody>
</table>
Insulin [56]:

- Regular Insulin:
  - Action: Onset 30-60 minutes, peak effect 2-3 hours, lasts 8-10 hours.
  - Administered: 30 minutes before meal.
  - Problems: Can produce hyperglycemia after meal and then hypoglycemia hours later.
  - Advantages: Low Immunogenicity, low cost.

- Rapid/Short Acting Insulin Analogs (Lispro/Aspart/Gulisine):
  - Action: Lispro/Aspart: Onset 5-15 minutes, peak effect 30-90 minutes, lasts 4-6 hours. Glulisine acts very rapidly and can be administered after a meal.
  - Administered: With meals.
  - Problems: Price.
  - Advantages: Less post-prandial hypoglycemia.

- Inhaled Insulin:
  - Action: onset 5-15 minutes, peak effect 30-90 minutes, lasts 8-10 hours.
  - Administered: With meals.
  - Advantages: Does not require injection.

- Intermediate and Long Acting Insulin Analogs (Glargine/Detemir):
  - Problems: Price. Glargine may have burning sensation in skin.
  - Advantages: Low risk of hypoglycemia.

- NPH:
  - Action: Onset 2- hours, peak effect 4-10 hours, lasts 10-16 hours.
  - Administered: May be given 2-3 times a day or in the mornings in combination with boluses of rapid/short acting insulin.
  - Advantages: Price.

Surgery:

- Bariatric surgery should be considered for adult pts with BMI >34.9 kg/m², esp if difficult to control with lifestyle and pharmacotherapy alone.
CHAPTER 1. DIABETES

Other therapies:

- For Hypertension:
  - In adults, if blood pressure (bp) 130-139/80-89 mmHg, then may attempt lifestyle modifications for 3 months. If bp still elevated, continue lifestyle modifications and add pharmacotherapy.
  - In children, if blood pressure is in the 90-95th percentile attempt lifestyle modification for 6-12 months. If continues to be elevated or was >95th percentile originally, continue lifestyle modifications and add ACE inhibitor.
  - ACE inhibitor/ARB is considered first line. Thiazide diuretic should be added if GFR >30 and blood pressure is not well controlled with ACE Inhibitor/ARB. If GFR <30, then a loop diuretic should be added.

- For Dyslipidemia:
  - A statin should be added in adults.
  - In children, after the age of 10 years add a statin if cholesterol >160 or >130 and at least one other CVD risk factor.

- Antiplatelet: For people with diabetes and at least one other risk factor for CVD including being >40 yo age, family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria start on DAILY low-dose aspirin. Aspirin therapy is not recommended in patients younger than 30 years of age.

- Nephropathy: Use an ACE Inhibitor/ARB in non-pregnant adults. [56]

Treatment of Impaired Fasting Glucose:

- Weight loss of 5-10% body weight
- Increasing physical activity to 150 minutes per week moderate exercise (eg walking)
- Refer to dietitian for Medical Nutrition Therapy

Unless otherwise noted, all information is from [16]
Chapter 2

Hypertension

All information unless specifically noted otherwise is from the Seventh Report of the Joint National Committee (JNC) on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure [3]

Screening

- Should begin at age 18. If values normal, can repeat every two years. If BP 120/80-139/99 mmHg, then check at least annually. If 140-159/90-99 mmHg, confirm in at least two months. If >159/99 mmHg, evaluate in one month. If >180/110 mmHg evaluate and treat within one week with two drug regimen.

Diagnosis

Based on an average of two or more properly measured\(^1\) blood pressures on two or more office visits.

- Normal: Systolic <120 mmHg, diastolic <80 mmHg
- Prehypertension: Systolic 120-139 mmHg, diastolic 80-89 mmHg
- Stage 1 Hypertension: Systolic 140-159 mmHg, diastolic 90-99 mmHg
- Stage 2 Hypertension: Systolic >159, diastolic >99
- Diabetes or Chronic Kidney Disease: blood pressure goal <130/80 mmHg

Patients with SBP 130-139 mmHg have twice the risk of developing htn as patients with lower values. For patients aged 40-70, each increment of 20 mmHg SBP or 10 mmHg DBP doubles the risk of CVD for BPs ranging from 115-185/75-115.

Initial Laboratory Evaluation

- EKG
- Urinalysis
- Blood glucose
- Hematocrit

\(^1\) Blood pressure is accurately measured in chair rather than on exam table. Patient should be seated quietly for at least five minutes. Appropriate sized cuff should be used, bladder encompassing at least 80% of the arm in adults and 100% in children.[112] with blood pressure cuff at heart level. At least two measurements should be made and the results averaged. No caffeine, exercise, or smoking at least 30 minutes prior to measurement. Cuff should be deflated at no more than 2-3 mmHg/s. [111]
• Serum potassium
• Serum creatinine
• Calcium
• Fasting lipid panel
• Three emerging labs: high sensitivity C-reactive protein (HS-CRP), homocysteine, and elevated heart rate.
• More extensive testing should be considered in patients whose blood pressures remain uncontrolled (usually defined as adhering to maximum of an appropriate three drug regimen including a diuretic).

Evaluation of Patient with Hypertension

• Assess for lifestyle risk factors:
  – Cigarette smoking.
  – Physical Inactivity.
  – Obesity (BMI >30 kg/m²).
• Assess for cardiovascular risk factors:
  – Cigarette smoking.
  – Dyslipidemia: elevated LDL or low HDL.
  – Diabetes Mellitus.
  – Microalbuminuria or GFR <60 ml/min.
  – Age (older than 55 for men, 65 for women).
  – Obesity (BMI >30 kg/m²).
  – Family History of premature CVD (men <55 yo, women <65 yo).
• Assess for presence or absence of target organ damage:
  – Heart: Left ventricular hypertrophy, angina, MI, prior coronary revascularization, heart failure.
  – Brain: Stroke or TIA.
  – Chronic kidney disease (CKD).
  – Peripheral Artery Disease.
  – Retinopathy.
• Reveal identifiable causes of hypertension:
  – Sleep Apnea: suspect based on history of snoring or fatigue. Follow up with sleep study with O₂ saturation.
  – Drug induced causes: Nonadherence, inadequate doses, NSAIDs, Cox 2-inhibitors, decongestants, OCPs, adrenal steroids, cyclosporin and tacrolimus, epo, licorice, ephedra, bitter orange, or ma Huang. Diagnose by urine drug screen or history.
  – Chronic Kidney Disease: suspect in pts with elevated creatinine or abnormal UA. Follow up with estimated GFR and renal ultrasound.
  – Primary Aldosteronism: suspect with hypokalemia.
  – Coarctation of the aorta: suspect in pts with decreased BP in lower extremities or delayed/absent femoral pulses. F/U with CT angiogram.
– Renovascular disease: suspect in pts with onset of htn before age 30 esp without family history of htn, in pts with abdominal bruit, accelerated htn, htn that was easy to control and now is resistant, recurrent flash pulmonary edema, or renal failure in absense of proteinuria. Follow up with MR Angiogram and Doppler flow study.

– Cushing’s syndrome: suspect in pts with truncal obesity, glucose intolerance, and purple striae. F/U with dexamethasone suppression test.

– Chronic steroid therapy: suspect based on history. Follow up with dexamethasone suppression test.

– Pheochromocytoma: suspect in pts with labile or paroxysmal htn accompanied by headache, palpitations, perspiration, or pallor. Follow up with 24 hour metanephrine and normetanephrine collection.

– Hyperthyroid: follow up with TSH.

– Parathyroid disease: suspect in pts with hypercalcemia. Follow up with parathyroid hormone (PTH) levels.

**Follow Up**

- Return to doctor every month until blood pressure is optimized for adjustment of medication. Once BP is stable at goal, follow up every 3-6 months.

- Serum creatinine and potassium should be monitored 1-2 times/year.

- Consider low dose aspirin **only** in patients that have BP **controlled** as it increases the risk of hemorrhagic stroke.

**Treatment**

- Prehypertension: Treat with lifestyle modifications alone.

- Stage 1 hypertension without compelling indications: lifestyle modifications, and initial drug therapy.

- Stage 2 Hypertension w/o compelling indications: lifestyle modifications and two drug combination initial therapy.

- Hypertension with compelling indications: see pharmacologic treatment chart.

  – Compelling indications: Heart failure, post-MI, high coronary disease risk, diabetes, CKD, history of stroke.

**Lifestyle Modifications:**

- DASH (Dietary Approached to Stop Hypertension) eating plan: Diet rich in fruits, vegetables, and lowfat dairy products with a reduced content of saturated and total fat. Decreases SBP **8-14 mmHg**.

- Reduce sodium in diet: no more than 100 mmol per day (2.4 g sodium or 6 g sodium chloride). Decreases SBP by **2-8 mmHg**.

- Physical Activity: 30 minutes of brisk walking most days of the week. Decreases SBP **4-9 mmHg**.

- Weight Reduction in overweight and obese: Decreases SBP **5-20 mmHg/10 kg weight loss**.

- Moderation of Alcohol Consumption: No more than 2 drinks per day in men and 1 drink per day in women. Decreases SBP by **2-4 mmHg**.
“Lifestyle modifications reduce BP, enhance antihypertensive drug efficacy, and decrease cardiovascular risk. For example, a 1,600 mg sodium DASH eating plan has effects similar to single drug therapy. Combination of two (or more) lifestyle modifications can achieve even better results than pharmacotherapy alone.”[3]

**Pharmacologic Treatment:**
<table>
<thead>
<tr>
<th>Class</th>
<th>Drugs</th>
<th>Special Indications</th>
<th>Side Effects</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiazide Diuretics</td>
<td>Chlorothiazide (Diuril) Chlorthalidone (generic) HCTZ (Microzide, Hydrodiuril) Indapamide (Lozol) Metolazone (Mykrox) Metolazone (Aaroxolan)</td>
<td>Should be considered <strong>first line for most patients</strong> unless other medication indicated. First line in elderly as well.</td>
<td>-Use with caution in pts with gout or history of hyponatremia -Hypokalemia -Diabetes insipidus -Hypercalcemia -Impotence</td>
<td>-Can cause hyperglycemia, but usually effect is small -May slow osteoporotic changes</td>
</tr>
<tr>
<td>Loop Diuretics</td>
<td>Bumetanide (Bumex) Furosemide (Lasix) Torsemide (Demadex)</td>
<td>Usually necessary in <strong>advanced renal disease</strong> to control hypertension</td>
<td>-Hypernatremia -Hypokalemia -Gout -Postural hypotension -Rarely, ototoxicity</td>
<td>-Often used to control volume retention in heart failure, but no evidence of preventing progression of disease</td>
</tr>
<tr>
<td>Potassium Sparing Diuretics- ENa channel blockers</td>
<td>Amiloride (Midamor) Triamterene (Dyrenium)</td>
<td></td>
<td>-Hyperkalemia -Hyponatremia -Kidney stones</td>
<td></td>
</tr>
<tr>
<td>Aldosterone Receptor Blockers</td>
<td>Eplerenone (Inspra) Spironolactone (Aldactone)</td>
<td>-Indicated in Stage C heart failure 2 w/ACE-I and BB -Conn’s syndrome -Hirsutism -Acne</td>
<td>-Hyperkalemia (use only in pts w/cre &lt;2.5) -Gynecomastia -Menstrual irregularities</td>
<td>-Monitor K closely in pts on medication</td>
</tr>
</tbody>
</table>

2 Patients with structural abnormality and symptoms of heart failure such as shortness of breath or fatigue.
### Beta-Blockers

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indications</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atenolol (Tenormin) Betaxolol (Kerlone) Bisoprolol (Zebeta) Metoprolol (Lopressor, Toprol- XL) Propanolol</td>
<td>First line in pts with stable or unstable angina, post MI, or with stable heart failure. -Useful to treat htn in pregnancy -Indicated w/ACE-I in stage B heart failure(^3) once patient is euolemic. -First line in <strong>diabetes with known CAD</strong> -Can be useful in treating migraines, tremor, atrial tachyarrhythmias/ fibrillation</td>
<td>-Avoid in pts with <strong>asthma or 3rd degree heart block</strong> -Do not use in pts with cocaine or alpha adrenergic stimulant overdose -Bradycardia</td>
</tr>
<tr>
<td>Acebutolol (Sectral) Penbutolol (Levatol) Pindolol (generic)</td>
<td>May be more helpful in pts w/severe bradycardia on BB</td>
<td>-Can worsen insulin sensitivity, and mask sx of hypoglycemia. However, diabetes is not a contraindication as these problems are easily managed.</td>
</tr>
<tr>
<td>Combined Alpha and BBs</td>
<td>Carvedilol (Coreg) Labetalol (Normodyne, Trandate)</td>
<td>-Orthostatic hypotension -Carvedilol: edema</td>
</tr>
</tbody>
</table>

\(^3\)Patients have structural abnormality, but are asymptomatic. Abnormalities may include left ventricular hypertrophy or dilatation, asymptomatic valvular heart disease, or a previous heart attack.
| ACE-Inhibitor | Benazepril (Lotensin)  
Capotril (Capoten)  
Enalapril (Vasotec)  
Fosinopril (Monopril)  
Lisinopril (Prinivil, Zestril)  
Moexipril (Univasc)  
Perindopril (Aceon)  
Quinapril (Accupril)  
Ramipril (Altace)  
Trandolapril (Mavik) | -Indicated for **diabetic and non-diabetic** nephropathy (CKD) to reduce albuminuria.  
-First line in diabetics w/htn  
(works better when combined with HCTZ)  
-Indicated in HF | -Angioedema  
(risk incr 2-4x in African Americans)  
-Cough  
-Hyperkalemia  
-Contraindicated in renal artery stenosis  
-Use with caution in pts with impaired renal function | -Contraindicated in pregnancy.  
Avoid in women who are likely to become pregnant  
-Decr rate of recurrent stroke in combo with HCTZ (a rise of serum cre to ~35% above baseline is acceptable unless hyperkalemia develops)  
-Most reduc in LVH. |
| Angiotensin II receptor antagonists | Candesartan (Atacand)  
Eprosartan (Teveten)  
Irbesartan (Avapro)  
Losartan (Cozaar)  
Olmesartan (Benicar)  
Telmisartan (Mircardis)  
Valsartan (Diovan) | -Slows progression to macroalbuminuria in **diabetic and non-diabetic** renal disease | -Contraindicated in pregnancy.  
Avoid in women who are likely to become pregnant  
-Generally, can be substitute for ACE-I in pts who are intolerant of ACE-I. |
| CCBs non Dihydropyridines | Diltiazem (Cardizem, Dilacor, Tiazac) | -Fluid buildup in legs  
-Can decrease heart rate |  |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CCBs Dihydropyridines</td>
<td>Amlodipine (Norvasc), Felodipine (Plendil), Isradipine (Dynacirc), Nicardipine (Cardene), Nifedipine (Adalat, Procardia), Nisoldipine (Sular)</td>
<td>-Short acting have potential to increase mortality esp in setting of acute MI</td>
<td></td>
</tr>
<tr>
<td>Alpha 1 Blockers</td>
<td>Doxazosin (Cardura), Prazosin (Minipress), Terazosin (Hytin)</td>
<td>-BPH</td>
<td>-Orthostatic hypotension</td>
</tr>
<tr>
<td>Alpha 2 blockers and other centrally acting drugs</td>
<td>Clonidine (Catapres), Methyldopa (Aldomet), Reserpine, Guanfacine (Tenex)</td>
<td>-Methyldopa: useful to treat htn in <strong>pregnancy</strong></td>
<td>-Rebound hypertension with withdrawal (esp in clonidine and methyldopa)</td>
</tr>
<tr>
<td>Direct Vasodilators</td>
<td>Hydralazine (Apresoline), Minoxidil (Loniten)</td>
<td>-Useful to treat htn in <strong>pregnancy</strong></td>
<td>Not to be used with documented LVH</td>
</tr>
</tbody>
</table>
Chapter 3

Dyslipidemia [115, 2]

Screening

- Adult Treatment Panel (ATP) III recommendations (2001 updated in 2004): Begin screening with fasting lipoprotein profile (FLP) at age 20. If values are normal, recheck every 5 years. See diagnosis section for normal values for LDL.
  
  - Total cholesterol: <200 is desirable. 200-239 is borderline high. ≥240 is high.
  - HDL cholesterol (so called “good” cholesterol): <40 is low for men. <50 is low for women.
  - Triglycerides: <150 mg/dl is normal. 150-199 mg/dl is borderline-high. ≥200-499 is high. >499 is very high. (>150 is one of the criteria for metabolic syndrome on page 4).
  - If screening is non-fasting, only the values for HDL and total cholesterol are usable. In this situation, if total cholesterol is ≥199 mg/dl or HDL <40 mg/dl, then a follow up fasting screening is needed. Direct LDL may be measured, but the recommendations are based on the calculated values and correlation with fasting values is not clear.
  - Assess for risk factors for CHD and CHD/CHD equivalents (see diagnosis section)
- AAFP (American Academy of Family Physicians) recommendations (2009): Periodic fasting lipoprotein profile for men >35 and women >45 for individuals without increased risk for coronary heart disease. If patient is at increased risk (see diagnosis section) for coronary heart disease (CHD), periodic testing beginning at age 20 is recommended for both genders.

Diagnosis:

- Unlike other diseases, a diagnosis of dyslipidemia is based on FLP, CHD risk factors, and presence/absence of CHD or CHD equivalents. Person should have nothing to eat or drink (except for water) 12 hours prior to FLP. The diagnosis is broken down into several categories of risk as defined below.

  - **Very High Risk:** A patient is in this category if they have had a recent heart attack (within last 2 years) or cardiovascular disease and (1) diabetes or (2) other poorly controlled risk factors such as continued smoking or (3) metabolic syndrome (see definition in diabetes diagnosis section). Hyperlipidemia is defined in this group as LDL >100 mg/dl, but therapeutic goal of LDL can be set for <70 mg/dl.

  - **High Risk:** To determine if a patient is in this category, they must either have (1) CHD or (2) CHD equivalent or (3) risk of major coronary event of >20% in 10 years as defined by Framingham risk score. Hyperlipidemia is defined as LDL >100 mg/dl for high risk patients. Medication should be considered if LDL is ≥100 mg/dl. CHD and CHD equivalents are:
    * Diabetes
    * Stable angina
- History of MI
- Evidence of silent MI or myocardial ischemia
- History of unstable angina
- Revascularization procedures (eg. coronary bypass or angioplasty)
- Peripheral arterial disease
- Abdominal aortic aneurysm
- TIA
- Stroke of carotid origin
- >50% obstruction of a carotid artery

- **Moderately High-Risk and Moderate Risk:** Any person with 2+ risk factors CHD risk factors as defined below belongs in this category. Hyperlipidemia is defined as **LDL >130 mg/dl** for patients in this group. Calculate Framingham 10-year risk score for any patient in this category (see charts below). If their 10 year risk of major coronary event in between 10-20%, medication is indicated when **LDL ≥130 mg/dl** (Moderately High-Risk). Optionally, practitioners can set treatment goal as **LDL <100 mg/dl** and may initiate drug treatment at **LDL >100 mg/dl**. If their 10 year risk is <10%, medication should be started if **LDL ≥160** (Moderate Risk). CHD risk factors are:
  
  * Cigarette smoking.
  * Hypertension: BP >139/89 mmHg or on antihypertensive medication.
  * HDL: <40 mg/dl.
  * Family History of premature CHD: in male first degree relatives <55 yo, in female first degree relatives <65 yo.
  * Age: men≥45, women ≥55 yo.

- **Lower risk:** Patients with 0-1 risk factors for CHD (as defined above) have <10% risk of major coronary event in the next 10 years. It is not necessary to calculate Framingham risk score for these patients. Hyperlipidemia is defined at **LDL >160 mg/dl** for patients in this category. If LDL is ≥190 mg/dl, pt should be initiated on medications.

- While LDL is the primary cholesterol target, other forms of dyslipidemia are defined below:
  
  - Total cholesterol: For lower risk patients: <200 is desirable. 200-239 is borderline high. ≥240 is high.
  
  - Non-HDL Cholesterol: For high risk and very high risk patients: <130 mg/dl. For moderate and moderate high risk patients: <160. For lower risk patients: < 190 mg/dl.
  
  - HDL cholesterol (so called “good” cholesterol): <40 mg/dl is low for men. <50 mg/dl is low for women.
  
  - Triglycerides: <150 mg/dl is normal. 150-199 mg/dl is borderline-high. 200-499 mg/dl is high. >499 mg/dl is very high. (>150 mg/dl is one of the criteria for metabolic syndrome).
  
  - Future directions
    
    * Total Cholesterol/HDL ratio: found to have greater predictive value then total or LDL-C.[76]
    * Apolipoprotein B (measure of major protein in LDL-C)/Apolipoprotein A (measure of major protein in HDL-C) ratio.[137, 108]
Treatment

The primary goal of treatment is to get LDL cholesterol to goal (unless triglycerides are $\geq 500$ mg/dl, then LDL becomes secondary). However, once this is achieved, other forms of cholesterol may be targeted. If triglycerides are elevated, they should be targeted next, and then finally HDL.

- **LDL:**
  - Lifestyle modifications: Should be part of every treatment program. If only lifestyle modifications are indicated based on cholesterol levels, they should have close follow up (~every 6
weeks) until their cholesterol is at goal and lifestyle modifications should be reinforced and intensified until goals met.

* Reduced intake of saturated fats (<7% of total calories) and cholesterol (<200 mg per day). Trans fats should be kept as low as possible.
* Weight reduction.
* Increased physical activity.
* Option to increase plant stanols/sterols (foods that contain these: vegetable oil, nuts, legumes, whole grains, fruits, and vegetables. Also look for food labels stating that they are fortified with these 2g/day) and increased soluble fiber (20-30 g/day).

- Medications: Should always be used in conjunction with lifestyle modifications. May be considered in any patient who has not reached LDL goal despite lifestyle modifications for 3 months and may be considered initially for patients who have LDL that is far from goal as defined below. First line therapy is HMG CoA Reductase Inhibitor (statin). Evaluate in 6 weeks, can increase statin if not at goal. Repeat after another 6 weeks, and increase statin if LDL not at goal. If LDL is at goal, can attempt to treat hypertriglyceridemia or low HDL if present.
  * Very High Risk: Can consider medication for LDL >70 mg/dl.
  * High Risk: Can consider medication for LDL >100 mg/dl.
  * Moderately High Risk: Can consider medication for LDL >130 mg/dl (may consider drug options for 100-129 mg/dl).
  * Moderate Risk: Can consider medication for LDL >160 mg/dl.
  * Lower Risk: Can consider medication for LDL >190 mg/dl (may consider drug options for 160-189 mg/dl).

- Triglycerides:
  - If 150-199 mg/dl: weight reduction and physical activity are primary treatment.
  - If 200-499: can intensify LDL lowering drugs or add nicotinic acid or fibrate.
  - If >500 mg/dl: it is important to prevent acute pancreatitis.
    * Very low fat diet (≤15% of caloric intake).
    * Weight reduction.
    * Increase physical activity.
    * Usually a medication will be required: fibrate or nicotinic acid.

- HDL: There is currently no goal for raising HDL cholesterol beyond 40 mg/dl for men and 50 mg/dl for women. Pharmaceutical treatment is generally reserved for patients with CHD or CHD risk equivalents.
  - Lifestyle modification recommendations: decrease weight to normal range, increase physical activity,(though will at most only increase by 3-9% given change from sedentary to brisk aerobic exercise most days of the week), quit smoking, decrease carbohydrate intake (<60% of calories), increase alcohol intake to no more than 2 drinks a day. [15]
  - Certain drugs may also decrease HDL: beta-blockers, anabolic steroids, and progesterational agents.
  - Medications: If lifestyle modifications are ineffective (as they generally are), a fibrate or nicotinic acid should be considered.
<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Drugs</th>
<th>Lipid effects</th>
<th>Side Effects</th>
<th>Contraindications</th>
<th>Clinical Trial Results</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMG CoA Reductase Inhibitors</td>
<td>Lovastatin, Pravastatin, Simvastatin, Fluavastatin, Atorvastatin, Cerivastatin, Rosuvastatin</td>
<td>-LDL ↓18-55% -HDL ↑5-15% -TG ↓7-30%</td>
<td>-Myositis/ rhabdomyolysis (esp when given with gemfibrozil or cyclosporin or severe renal insufficiency). -Inc lipid enzymes.</td>
<td>Absolute: -Active or chronic liver dx Relative: -Concomitant use of certain drugs (cyclosporin, macrolides, antifungals, P-450 inh).</td>
<td>Reduced major coronary events, CHD deaths, need for coronary procedures, stroke, and total mortality.</td>
<td>-Atorvastatin and rosuvastatin are the most potent decreasing LDL around 60% and decreasing triglycerides more.[120]</td>
</tr>
<tr>
<td>Bile Acid Sequestrant</td>
<td>Cholestyramine, Colestipol, Colesevelam</td>
<td>-LDL ↓15-30% -HDL ↑3-5% -TG no change or increases</td>
<td>-GI distress. -Constipation. -Decreased absorption of other drugs.</td>
<td>Absolute: - Dysbeta-lipoproteinemia -TG &gt;400 mg/dl Relative: -TG &gt;200 mg/dl</td>
<td>Reduces major coronary events and CHD deaths</td>
<td></td>
</tr>
<tr>
<td>Nicotinic Acid</td>
<td>Nicotinic Acid, extended release nicotinic acid (Niaspan), sustained release nicotinic acid</td>
<td>-LDL ↓5-25% -HDL ↑15-35% -TG ↓20-50%</td>
<td>-Flushing. -Hyperglycemia. -Hyperuricemia (or gout.) -Upper GI distress. -Hapatotoxicity.</td>
<td>Absolute: -Chronic liver disease -Severe gout Relative: -Diabetes -Hyperuricemia -Peptic ulcer disease</td>
<td>Reduces major coronary events and possibly total mortality</td>
<td></td>
</tr>
<tr>
<td>Fibric Acid</td>
<td>Gemfibrozil, fenofibrate, and clofibrate</td>
<td>-LDL ↓5-20% -HDL ↑10-20% -TG ↓20-50%</td>
<td>-Dyspepsia. -Gallstones. -Myopathy.</td>
<td>Absolute: -Severe renal disease -Severe hepatic disease</td>
<td>Reduced major coronary events</td>
<td>-Unexplained non-CHD deaths in WHO study</td>
</tr>
</tbody>
</table>

Pharmacotherapy
| Cholesterol Absorption Inhibitors | Ezetimibe (e) Neomycin (n) [120] | -LDL ↓5-20%  
-HDL/TG no change (e)  
-LDL ↓20-25%  
-HDL/TG no change (n) | -Increases transaminases when combined with statins(e)  
-Ototoxicity, nephrotoxicity (n) | -(e) Can be effective in decreasing amount of statin required to achieve cholesterol goal. |
|---------------------------------|---------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|

Chart modified from[119]
Chapter 4

Osteoporosis

Screening as based on USPSTF recommendations[140]

- All women ≥65 years old and all men ≥70 years old should have a central DEXA scan to screen for osteopenia/osteoporosis. A peripheral DEXA (measuring BMD in heel, finger, and forearm) can be used, but they do not correlate well enough with central DEXA results to be used for diagnosis and will need follow up with central DEXA.

- Women with increased fracture risk should begin screening at 50-64 years of age.

  - AAFP recommends using Simple Calculated Osteoporosis Risk Estimation (SCORE) to calculate need for screening in postmenopausal women between 50-64 years of age. If SCORE is greater than or equal to 6 in a postmenopausal woman, they should be screened:
    * Race not black: 5 points
    * Rheumatoid arthritis present: 4 points
    * History of fracture at wrist, hip, or rib: 4 points each
    * Age: 3 times first digit of age (ex: if age is 69, that is 18 points, if pt is 59, that is 15 points)
    * Estrogen therapy never used: 1 point
    * Weight: -1 times weight in lbs/10

*Older men have a higher mortality from hip fractures than women, but have lower frequency of screening and treatment.*

Diagnosis

Osteoporosis: Diagnosis can be made clinically or radiographically.

- Clinically: based on history or low impact fractures (from a fall below or at standing height) or fractures that occur spontaneously.

- Radiographically: T score of -2.5 of lower as determined by central DEXA scan of total hip, femoral neck, or lumbar spine. Can also be measured by CT scan, but limited due to higher cost and increased radiation exposure. However, osteophytes can lead to a falsely elevated BMD in the lumbar spine, in such cases femoral neck readings should be relied upon.[142]

  - Primary osteoporosis: results of bone loss related to declining gonadal function with aging.
  - Secondary osteoporosis: results from chronic diseases, exposure, or nutritional deficiency that impact bone metabolism. Approximately 50% of men and pre and perimenopausal women with osteoporosis have a secondary cause. In these groups, additional evaluation is warranted.
Osteopenia:

- Spinal or hip BMD between 1 and 2.5 standard deviations below the mean.

Treatment: Based on recommendations from the National Osteoporosis Foundation[54]

- There is disagreement about whether labs should be performed in postmenopausal women where there is not initial concern for secondary osteoporosis. However, below are reasonable labs to be performed at diagnosis and should certainly be performed in groups suspicious for secondary osteoporosis:
  - Alkaline phosphatase (high levels in Paget’s disease and immobilization), calcium (low in vitamin D deficiency or malabsorption, high levels in hyperparathyroidism), BUN and Creatinine (kidney disease), liver enzymes (liver disease), CBC (bone marrow malignancy or malabsorption), TSH (hyperthyroidism), total testosterone (only for men: hypogonadism) and 25-hydroxy vitamin D (vitamin D deficiency).

- If there is clinical suspicion for secondary osteoporosis, evaluated for the following conditions
  - Chronic diseases/systemic diseases: ankylosing spondylitis, COPD, HIV/AIDS, IBD, liver disease, multiple myeloma, renal insufficiency or renal failure, rheumatoid arthritis, and SLE.
  - Nutritional deficiencies: alcohol (>2 drinks per day), anorexia, Celiac disease, gastric bypass or gastrectomy, and vitamin D deficiency.
  - Look for medications that may be causing osteoporosis/osteopenia: anticonvulsants (phenobarbital, phenytoin), drugs that cause hypogonadism (parenteral progesterone, methotrexate, GnRH agonists), glucocorticoids, heparin, immunosuppressants (cyclosporin, tacrolimus, methotrexate), lithium, and thyroid hormone excess.

- Lifestyle modifications:
  - Fall prevention:
    * Evaluate for vision deficits, balance and gait abnormalities, cognitive impairment, and dizziness.
    * Home hazard assessment: improve lighting, remove loose rugs, add grab bars near bathtubs, toilets, and stairways.
    * Formal home safety evaluation and physical therapy can be useful.
    * Eliminate or minimize medications that may affect balance or alertness.
  - Increase intake of calcium (1,200 mg per day). May be recommended for all postmenopausal women with inadequate calcium intake. Special considerations:
    * For optimal absorption: a single dose should have 500 mg of Ca or less (often requiring multiple dosings).
    * All calcium supplements can cause GI upset and constipation.
    * Calcium supplements can interfere with absorption of many medications including: levothyroxine, fluoroquinolones, tetracycline, phenytoin (Dilantin), angiotensin-converting enzyme inhibitors, iron, and bisphosphonates. These medications should be given several hours after calcium supplementation.
    * Calcium Carbonate: least expensive and must be taken with meals (requires acid for absorption).
    * Calcium Citrate: more expensive but does not need to be taken with meals.
  - Vitamin D (at least 700-800 IU per day). Recommended for all people 50 years or older. Supplementation is often required to achieve level.
* If patient has demonstrated Vitamin D deficiency: 50,000 IU weekly of ergocalciferol for 8 weeks is usually effective. This should be followed with 50,000 IU of ergocalciferol every 2-4 weeks or 1,000 IU oral cholecalciferol daily. Continue follow up treatment until 25-hydroxyvitamin D level is greater than 30 ng/ml.

- Pharmacotherapy: Recommendations for who should get medication for osteoporosis vary. Bisphosphonate is first line treatment for osteoporosis. See table below for specific on medication. Based on the National Osteoporosis Foundation, the following patients should receive medication:
  - Postmenopausal women with a personal history of hip or vertebral fracture
  - Men with a personal history of hip or vertebral fracture
  - Pts with a T-score of -2.5
  - Pts with low BMD (T score between -1 and -2.5) and 10 year probability of hip fracture of at least 3% or risk of any major fracture of at least 20% as calculated based on FRAX(WHO risk assessment).
<table>
<thead>
<tr>
<th>Indication</th>
<th>Medication</th>
<th>Class</th>
<th>Dosage/Route</th>
<th>Fracture type</th>
<th>Contraindications</th>
<th>Side effects</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention</td>
<td>Estrogen w/ or w/o progesterone</td>
<td>Hormone</td>
<td>0.625 mg daily/oral</td>
<td>hip, vertebral, nonvertebral</td>
<td>Pts at incr risk for: MI, stroke, invasive breast cancer, pulmonary emboli, and deep vein phlebitis</td>
<td>Incr risk of: MI, stroke, invasive breast cancer, pulmonary emboli, and deep vein phlebitis</td>
<td>Only for women w/ moderate or severe vasomotor symptoms. Use for shortest term possible b/c of risk Non-estrogen therapy should be considered carefully first</td>
</tr>
<tr>
<td>Prevention and Treatment</td>
<td>Alendronate (Fosamax)</td>
<td>Bisphosphonate</td>
<td>70 mg weekly/oral</td>
<td>hip, vertebral, nonvertebral</td>
<td>-History of esophageal strictures or other cause of delayed esophageal emptying.</td>
<td>-May cause osteonecrosis of jaw -May cause gastric ulcers</td>
<td>Must be taken on empty stomach first thing in the morning. Wait 30 minutes before eating -Remain upright for 1 hour after taking</td>
</tr>
<tr>
<td>Prevention and Treatment</td>
<td>Ibandronate (Boniva)</td>
<td>Bisphosphonate</td>
<td>150 mg monthly/oral</td>
<td>vertebral</td>
<td>-History of esophageal strictures or other cause of delayed esophageal emptying.</td>
<td>-May cause osteonecrosis of jaw -May cause gastric ulcers</td>
<td>Must be taken on empty stomach first thing in the morning with water. Wait 60 minutes before eating. -Remain upright for one hour after taking</td>
</tr>
<tr>
<td>Prevention and Treatment</td>
<td>Risedronate (Actonel)</td>
<td>Bisphosphonate</td>
<td>35 mg weekly/oral</td>
<td>hip, vertebral, nonvertebral</td>
<td>-History of esophageal strictures or other cause of delayed esophageal emptying.</td>
<td>-May cause osteonecrosis of jaw -May cause gastric ulcers</td>
<td>Must be taken on empty stomach first thing in the morning with water. Wait 60 minutes before eating. -Remain upright for one hour after taking</td>
</tr>
<tr>
<td>Prevention and Treatment</td>
<td>Raloxifene (Evista)</td>
<td>Selective Estrogen Receptor Modulator</td>
<td>60 mg daily/oral</td>
<td>vertebral</td>
<td>-History of thromboembolic disease</td>
<td>-Reduc risk of invasive breast cancer -Incr hot flashes</td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>Ibandronate</td>
<td>Bisphosphonate</td>
<td>3 mg every 3 months for 4 doses/IV</td>
<td>Incr BMD, have not evaluated bone fracture end point</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>---------------</td>
<td>-----------------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>Zoledronic acid (reclast)</td>
<td>Bisphosphonate</td>
<td>5 mg annually for three doses/IV</td>
<td>Hip, vertebral, nonvertebral</td>
<td>SE: arthralgia, headache, myalgia, fever (occur in 1/3 of pts after first dose, 7% after 2nd dose, and 3% after third dose)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>Calcitonin (Miacalcin)</td>
<td>Anti-resorptive agent</td>
<td>200 IU daily/nasal</td>
<td>Vertebral</td>
<td>Approved only for women ≥5 years postmenopause</td>
<td>SE: Rhinitis and rarely epistaxis. -Some analgesic effects</td>
<td>Not considered first line: bisphosphonates more effective</td>
</tr>
<tr>
<td>Treatment</td>
<td>Teriparatide (Forteo)</td>
<td>Recombinant human parathyroid hormone</td>
<td>20 mcg daily for up to 2 years/SubQ</td>
<td>Vertebral, nonvertebral</td>
<td>-Paget’s disease (b/c of incr risk of osteosarcoma seen in rats) -Prior radiation therapy of skeleton -Bone metastases -Hypercalcemia -History of skeletal malignancy</td>
<td>-Leg cramps</td>
<td>-Consider in pts who fail bp therapy -Safety and benefit have not been demonstrated in pts beyond 2 yrs of treatment -Common to follow treatment with teriparatide with bisphosphonate -VERY expensive</td>
</tr>
</tbody>
</table>
• Follow up: Recheck BMD in no less than 24 months. May be appropriate to recheck more often if accelerated bone loss is suspected (in glucocorticoid usage). If repeat BMD is decreased: suggests noncompliance, insufficient calcium and Vitamin D supplementation, secondary cause of osteoporosis, or treatment failure. Use clinical judgment to determine next steps.[54]
Chapter 5

Asthma: Based on recommendations from National Asthma Education and Prevention Program Expert Panel Report 3

Diagnosis

- To establish a diagnosis of asthma, clinician should establish that the following are present/considered:
  - Symptoms of recurrent episodes of airflow obstruction or airway hyperresponsiveness.
  - Airflow is at least partially reversible as established by spirometry.
    - increase in FEV1 of >200 ml and 12% from baseline measurement after inhalation of short acting beta-2 agonist. This should be tested in all patients ≥5 years of age.
  - Alternate diagnoses are excluded (esp if there is no response to initial therapy). Differential may include:
    - For Infants and Children:
      - Upper airway diseases: allergic rhinitis and sinusitis.
      - Obstructions of large airways: foreign body in trachea or bronchus, vocal cord dysfunction, vascular rings/laryngeal webs, laryngotracheomalacia/tracheal stenosis/broncho-stenosis, enlarged lymph nodes or tumor.
      - Obstructions involving small airways: viral bronchiolitis/obliterative bronchiolitis, cystic fibrosis, bronchopulmonary dysplasia, and heart disease.
      - Other: recurrent cough not due to asthma, aspiration from swallowing mechanism dysfunction or GERD.
    - For Adults: COPD, CHF, pulmonary embolism, mechanical obstruction of the airways, pulmonary infiltration with eosinophilia, cough secondary to medications, and vocal cord dysfunction.
  - Asthma should be considered as a possible diagnosis when:
    - Wheezing is present.
    - History of cough (esp. worse at night), recurrent wheeze, recurrent difficulty breathing, and/or recurrent chest tightness.
    - Symptoms worse in the presence of exercise, infection, allergens (fur. hair, mites, mold, pollen), irritants (tobacco, smoke, airborne chemicals), changes in weather, strong emotions, stress, and menstrual cycles.
    - Symptoms occur or worsen at night, awakening the patient.
**Initial Evaluation:**

- Assess for:
  - Comorbid conditions: chronic sinusitis, vocal cord dysfunction, gastroesophageal reflux, ongoing allergic stimulation.
  - Psychosocial complications (especially in children): anxiety about attacks, fear of dying, fear of being rejected for being “different,” financial consequences, sleep deprivation, sibling resentment of “special” status.
  - Inciting stimuli (exercise, allergens).

- Physical Exam abnormalities to assess for:
  - Acute exacerbation: tachypnea, hypoxia, wheezing/no wheezing if poor air movement, use of accessory muscles, retractions, and prolonged expiratory phase.
  - Chronic: Decreased air entry or wheezing, prolonged expiratory phase, dry cough, signs of sinusitis/rhinitis (inflamed nasal mucosa, discharge, sinus tenderness, dark circles under eyes, transverse nasal crease due to itching, halitosis), eczema/atopic dermatitis, nasal polyps (may be associated with asthma and aspirin sensitivity in adolescents and in younger patient should lead to prompt evaluation for cystic fibrosis).[123]

- Diagnostic studies:
  - Spirometry if patient ≥5 years old: FEV1 less than 80% predicted value and an FEV1/FVC ratio less than 0.8 (80%). Should be performed before and after administration of bronchodilator. An increase in FEV1 of ≥12% in adults and >9% in children after administration of a SABA is considered significant reversibility.
  - Sweat chloride test: There should be a low threshold for performing sweat chloride testing in young patients. Complaints about recurrent diarrhea, pneumonia, and failure to thrive concurrent with respiratory complaints should receive testing.
  - Allergy testing: can be helpful in very young child who appears to have clear environmental triggers to help formulate avoidance strategy. It is not indicated to do any food allergy testing.
  - If patient’s history is suggestive of asthma, but spirometry is normal or near normal and treatment fails, consider bronchoprovocation testing. Provocation can be done with metacholine, histamine, cold air, or exercise. If test is negative, asthma is ruled out.
  - Chest X-ray/CT scan: not necessary for the initial evaluation of asthma, but if there is concern for congenital abnormality (vascular ring, cystic fibrosis, etc) may be helpful. Will also possibly show radiographic hallmarks of asthma: hyperinflation, peribronchial thickening, and mucoid impaction with atelectasis.
  - Barium Swallow: may be helpful in patients with symptoms of reflux or in infants with problematic asthma. May show swallowing dysfunction, tracheoesophageal fistulas, or gastroesophageal reflux.[123]

**Treatment: Four Components of Care**

- Assessment and Monitoring:
  - Assess asthma severity to initiate therapy:
    * Has your asthma awakened you at night or in the early morning?
    * Have you needed your quick acting relief medication more than usual?
    * Have you gone to the ER for your asthma or urgent care?
    * Have you been able to participate in activities as desired?
    * If monitoring peak flow, has it been lower than personal best?
* Any side effects to medication?

– Assess asthma control to monitor and adjust therapy
  * Patient should be instructed to monitor asthma control either by peak flow monitoring or symptom control. Daily peak flow monitoring should be considered in patients with history of severe exacerbations or with worsening asthma.
  
– Schedule followup care:
  * 2-6 week intervals for patients just starting therapy or who are stepping up therapy.
  * 1-6 months for controlled asthma, or 3 months if step down is anticipated.

• Education
  
– Provide self-management education: understanding of asthma triggers, how to use inhalers properly, devising methods to improve compliance.
  
– Develop a written asthma action plan with patient.
  
– Integrate education into all points of care where the health professionals interact with patients.

• Control Environmental Factors and Comorbid Conditions
  
– Recommend control of exposure to allergens and pollutants or irritants.
  
– Treat comorbid conditions: e.g. sinusitis, rhinitis, GERD, OSA, obesity, stress or depression.

• Medications:
  
– Select medication and delivery devices to meet the patient’s needs and circumstances:
  * Initiate therapy based on asthma severity.
  * Adjust therapy based on asthma control.
  * Initiating therapy varies based on the age of the patient as described below.

– Ages 0-4 years old
  
  * Consider long term control therapy: for patients with ≥4 episodes of wheezing in the past year that last >1 day and either:
    · One of the following: (1) parental history of asthma or (2) diagnosis of eczema or (3) sensitization to Aeroallergens.
    · Or two of the following: (1) sensitization to foods or (2) ≥4% blood eosinophilia or (3) wheezing apart from colds.
    · Also consider for: children consistently requiring short acting beta agonist (SABA) treatment >2 days per week for >4 weeks or children who have two exacerbations requiring oral steroids within 6 months.
  
  * Adjust treatment if:
    · No response in 4-6 weeks: if adherence is satisfactory, stop treatment and consider alternate therapies and alternate diagnoses.
    · If the patient is having a response, but is not well controlled (see chart below) the patients medications should be stepped up.
    · If patient has clear benefit for at least 3 months: consider discontinuing daily therapy. Children at this age have high spontaneous remission rates.
  
– For patients >4 years old, refer to the charts below regarding the use of medications.
### Asthma severity in patient 5-11 years old

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Intermittent</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impairment</td>
<td>Symptoms</td>
<td>≤ 2 days/week</td>
<td>&gt; 2x/week, but not daily</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Throughout the day</td>
</tr>
<tr>
<td></td>
<td>Nighttime</td>
<td>≤ 2x/month</td>
<td>3-4x/month</td>
<td>&gt;1x/week but not nightly</td>
</tr>
<tr>
<td></td>
<td>Awakenings</td>
<td></td>
<td></td>
<td>Often 7x/week</td>
</tr>
<tr>
<td></td>
<td>Short-acting</td>
<td>≤ 2 days/week</td>
<td>&gt; 2x/week, but not daily</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>beta2-agonist use for symptom control (not prevention of EIB)</td>
<td></td>
<td></td>
<td>Several times throughout the day</td>
</tr>
<tr>
<td></td>
<td>Interference with normal activity</td>
<td>None</td>
<td>Minor limitation</td>
<td>Some limitation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Extremely limited</td>
</tr>
<tr>
<td></td>
<td>Lung Function</td>
<td>- Normal FEV1</td>
<td>-FEV1 ≥ 80% predicted</td>
<td>-FEV1= 60-80% predicted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>between exacerbations</td>
<td>-FEV1/FVC &gt;80%</td>
<td>-FEV1/FVC= 75-80%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-FEV1/FVC &gt;85%</td>
<td></td>
<td>-FEV1 &lt;60% predicted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-FEV1/FVC &lt;75%</td>
</tr>
<tr>
<td>Risk</td>
<td>Exacerbations requiring oral corticosteroids</td>
<td>0-1x/year</td>
<td>≥2 in 1 year</td>
<td></td>
</tr>
</tbody>
</table>

- Level of severity should be determined by recall from the past 2-4 weeks and spirometry.
- Assign severity to the most severe category in which any feature is present.
- Consider severity and interval since last exacerbation.
- Frequency and severity may fluctuate over time for any severity category.
- Relative annual risk of exacerbations may be related to FEV1.

### Recommended Step Therapy

- **Step 1**: Consider short course of oral systemic corticosteroids.
- **Step 2**: Medium dose ICS option and consider short course of oral systemic corticosteroids.
- **Step 3**: Medium dose ICS option or step 4 and consider short course of oral systemic corticosteroids.
### Control of asthma in patients 0-11 years old

<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Assessing Asthma Control and Adjusting Therapy in Children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Well Controlled</td>
</tr>
<tr>
<td></td>
<td>Ages 0-4</td>
</tr>
<tr>
<td>Impairment: Symptoms</td>
<td>≤2 d/week but not more than 1x/d</td>
</tr>
<tr>
<td>Nighttime Awakening</td>
<td>≤1x/month</td>
</tr>
<tr>
<td>Interference w/ normal activity</td>
<td>none</td>
</tr>
<tr>
<td>SABA for use of symptom control (not prevention of EIB)</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Lung Function: -FEV1 (predicted) or peak flow personal best (FEV1/FVC)</td>
<td>NA</td>
</tr>
<tr>
<td>Exacerbation requiring oral systemic corticosteroids</td>
<td>0-1x/year</td>
</tr>
<tr>
<td>Risk</td>
<td>Reduction in lung growth</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Treatment related adverse effects</td>
<td>Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.</td>
</tr>
<tr>
<td>Rec’d action for tx</td>
<td>Maintain current step. Regular f/u every 1-6 months. Consider step down if well controlled for at least 3 months.</td>
</tr>
<tr>
<td></td>
<td>Before step up: Review adherence to medication, inhaler technique, and environmental control. If alternative treatment was used, discontinue it and use preferred treatment for that step. Re-evaluate the level of asthma control in 2-6 weeks to achieve control; every 1-6 months to maintain control. Children 0-4 years old: if no clear benefit is observed in 4-6 weeks, consider alternative diagnosis or adjusting therapy. Children 5-11 years old: Adjust therapy accordingly. For side effects, consider alternative treatment options.</td>
</tr>
</tbody>
</table>
Severity of asthma in patients ≥12 years old

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Classification of Asthma Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intermittent</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
</tr>
<tr>
<td>Impairment</td>
<td>Symptoms</td>
</tr>
<tr>
<td></td>
<td>Nighttime symptoms</td>
</tr>
<tr>
<td></td>
<td>SABA use for symptom control (not prevention of EIB)</td>
</tr>
<tr>
<td></td>
<td>Interference with normal activity</td>
</tr>
<tr>
<td>Normal FEV1/FVC</td>
<td>Lung function</td>
</tr>
<tr>
<td>-8-19y 85%</td>
<td>-FEV1/FVC normal</td>
</tr>
<tr>
<td>-20-39y 80%</td>
<td>-40-59y 75%</td>
</tr>
<tr>
<td>Risk</td>
<td>Exacerbations requiring oral systemic corticosteroids</td>
</tr>
<tr>
<td>Rec’d step for starting tx</td>
<td>Step 1</td>
</tr>
</tbody>
</table>
|                        | In 2-6 weeks, evaluate level of asthma control.
Control of asthma in patients ≥ 12 years old

<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Well Controlled</th>
<th>Not well controlled</th>
<th>Very poorly controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impairment Symptoms</td>
<td>≤ 2 d/week</td>
<td>&gt;2 d/week</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime Awakening</td>
<td>≤ 2x/month</td>
<td>1-3x/week</td>
<td>&gt;4x/week</td>
</tr>
<tr>
<td>Interference</td>
<td>None</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td>Interference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with normal activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SABA use for symptom</td>
<td>≤ 2d/week</td>
<td>&gt;2 d/week</td>
<td>Several times per day</td>
</tr>
<tr>
<td>control (not EIB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prophylaxis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEV1 or peak flow</td>
<td>&gt;80% predicted/</td>
<td>60-80% predicted/</td>
<td>&lt;60% predicted/</td>
</tr>
<tr>
<td></td>
<td>personal best</td>
<td>personal best</td>
<td>personal best</td>
</tr>
<tr>
<td>Validated</td>
<td>≥ 20</td>
<td>1-2/16-19</td>
<td>3-4/1 ≤ 15</td>
</tr>
<tr>
<td>questionnaires</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATAQ/ACT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exacerbations</td>
<td>0-1/year</td>
<td>≥ 2 year</td>
<td></td>
</tr>
<tr>
<td>requiring oral systemic corticosteroids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progressive loss of lung function</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation requires long term follow up care.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td>Medication side effects can vary in intensity.</td>
<td></td>
</tr>
<tr>
<td>related to adverse effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rec’d action for tx</td>
<td>-Maintain current step</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Regular follow up at 1-6 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Consider step down if controlled for at least 3 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Step up 1 step.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Re-evaluate in 2-6 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-For side effects, consider alt treatment options</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Consider short course of oral systemic corticosteroids</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Step up 1-2 steps</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Reevaluate in 1-2 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-For side effects consider alt treatment.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Stepwise approach to asthma treatment

**Intermittent Asthma**
- Consult with asthma specialist if step 4 care or higher is required. Consider consult at step 3.

**Step 1**
- Preferred: SABA PRN
- Alternative: Cromolyn, LTRA, Nedocromil, or theophylline

**Step 2**
- Preferred: low dose ICS
- Alternative: Medium dose ICS + LABA
- Alternative: Low dose ICS + LTRA, theophylline, or Zileuton

**Step 3**
- Preferred: Medium dose ICS + LABA
- Alternative: Medium dose ICS + either LTRA, theophylline, or Zileuton
- Consider Omalizumab for patients who have allergies

**Step 4**
- Preferred: High dose ICS + LABA
- AND
- Consider Omalizumab for patients who have allergies

**Step 5**
- Preferred: High dose ICS + LABA
- AND
- Consider Omalizumab for patients who have allergies

**Step 6**
- Preferred: high dose ICS + LABA + oral corticosteroids

Each step: Patient education, environmental control, and management of comorbidities.

Step 2-4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma.

Quick relief medication for all patients: SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments of 20 minute intervals. Use of SABA >2 days/week for symptom relief (not for prevention of EIB) generally indicates inadequate control and need to step up treatment.
### Pharmacotherapy

#### Asthma

<table>
<thead>
<tr>
<th>Class</th>
<th>Medications</th>
<th>Use</th>
<th>Adverse Effects</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-2 agonists</td>
<td>Short acting:</td>
<td>Short acting should be used for:</td>
<td>In high doses:</td>
<td>Regular use may lead to tolerance.</td>
</tr>
<tr>
<td></td>
<td>- Albuterol (Ventolin, Proventil)</td>
<td>- prophylaxis for</td>
<td>- Palpitations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Pirituberol (Maxair)</td>
<td>Exercise induced</td>
<td>- Tremor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Terbutaline</td>
<td>bronchospasm</td>
<td>- Tachycardia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Bitolterol (Tornalate)</td>
<td>- symptomatic relief for</td>
<td>- Hypokalemia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long acting:</td>
<td>acute symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Salmeterol (Serevent)</td>
<td>Long action</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Formoterol</td>
<td>- useful for moderate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and severe asthma as</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>adjunct to steroid therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhaled Glucocorticosteroids</td>
<td>- Bclomethasone (Vancerli, Beclovent)</td>
<td>- Regularly, twice daily regimens</td>
<td>- Sore throat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Budesonide (Pulmicort)</td>
<td>- During exacerbations, might</td>
<td>- Hoarseness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Flunisolide (Aerobid)</td>
<td>dose four times daily</td>
<td>- Oropharyngeal candidiasis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fluticasone (Flovent)</td>
<td>- May take days for</td>
<td>At high doses and prolonged use:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Triamcinolone (Azmacort)</td>
<td>improvement in symptoms</td>
<td>- Hypothalamic-pituitary-adrenal suppression</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Decreased bone density</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Decreased growth in kids</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Glaucoma/ cataracts/ dermal thinning in elderly.</td>
<td></td>
</tr>
</tbody>
</table>

#### Notes:
- Regular use may lead to tolerance.
| Oral glucocorticosteroids | Prednisone | -A short term (5-10 day) course of high dose prednisone (40-60 mg/d) should be prescribed promptly when attack does not respond to inhaled steroids and bronchodilators | -Hypothalamic-pituitary-adrenal suppression<br>-Decreased bone density<br>-Decreased growth in kids<br>-Glaucoma/cataracts/dermal thinning in elderly. |  |
|--------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|  |
| Cromolyn                | -Cromolyn (Intal)<br>-Nedocromil (Tilade) | -Can be used for prophylaxis prior to exposure or for chronic daily use | -Minimal side effects | -Expensive |
| Leukotriene modifiers   | -Montelukast (Singulair)<br>-Zafirlukast (Accolate)<br>-Zileuton (Zyflo) | -Prophylaxis of EIB<br>-Control of mild to moderate persistent disease | -Hypersensitivity reaction has been noted when used with steroids<br>-Impairs warfarin metabolism<br>-Requires transaminase monitoring | -Expensive<br>-Long term efficacy and safety have not been established<br>-Montelukast has been approved for use in children |
| Anti-cholinergic | Ipratropium | Particularly useful in COPD, much less effective in asthma | | |
|------------------|-------------|----------------------------------------------------------|----------------------------------------------------------|
| Mono-clonal Anti-IgE Antibody | Omalizumab | Monthly injections have been shown to be effective in moderate to severe asthma | Anaphylaxis (1/1000 patients) | Expensive: $10,000 per year |
| Theophylline | Aminophylline | Can be used in patients with moderate to severe asthma with nocturnal exacerbations or with steroid dependant disease | Narrow therapeutic index (10-20 micrograms/ml) | Formulations that are no longer recommended: |
| | Methylxanthine (Slo-bid Gyrocaps) (Uni-Dur) (Theo-Dur) | -There are promising investigations into “low dose” programs as they are inexpensive and allow for decreasing steroid requirements. | -Nausea, vomiting, reflux, diarrhea | -theophylline elixir (expensive, short acting, erratic absorption) |
| | | | -Agitation, tremor, insomnia | -aminophylline suppositories (erratic absorption, unpredictable serum concentrations) |
| | | | -Levels greater than 20 => drug toxicity | -combination preparations (inability to titrate theophylline dose, irrational combination of agents) |
Expected Peak Expiratory flow for adults
Chapter 6

Depression

Screening: Recommendations of the American Academy of Family Physicians[22]

- Should be performed in all adolescents (≥12 years of age) and adults in practices where there are systems in place for accurate diagnosis, effective treatment and followup.
  - Formal screening tools when available may be used (there is not conclusive evidence to recommend one over others), but asking, “Over the past 2 weeks, have you felt down, depressed, or hopeless?” and “Over the past 2 weeks, have you felt little interest or pleasure in doing things?” has been shown to be roughly as effective as other tools for screening.[74]
    * If patient answers positively to either of these questions, a full assessment should be performed (see diagnosis section).
  - It is not clear how often this screening should be performed. Use clinical judgement and screen recurrently in patients with other psychiatric problems or issues with chronic pain.
- There is not enough evidence to recommend screening in children <12 yo at this time.

Diagnosis: Adapted from DSM-IV[74]

Major depressive episode: The acronym SIGECAPS can be helpful to recall the diagnostic criteria. Sleep, Interest, Guilt, Energy, Concentration, Appetite, Psychomotor retardation, Suicidal ideations:

- At least five of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one the symptoms is either 1) depressed mood or 2) loss of interest or pleasure (do not include symptoms that are clearly due to general medical conditions or mood-incongruent delusions or hallucinations).
  - Depressed mood most of the day, nearly every day, as indicated either by subjective report (feels sad or empty) or observation made by others (appears tearful).
  - Markedly diminished interest or pleasure in all, or almost all, activities most of the day nearly every day (as indicated by either subjective account or observations made by others).
  - Significant weight loss when not dieting or weight gain (e.g. a change of more than 5% of body weight in a month) or a decrease or increase in appetite nearly every day.
  - Insomnia or hypersomnia nearly every day.
  - Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down).
  - Fatigue or loss of energy nearly every day.
– Feeling of worthlessness or excessive inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick).
– Diminished ability to think or concentrate, or indecisiveness nearly every day (either by subjective account or as observed by others).
– Recurrent thought of death (not just fear of dying), recurrent suicidal ideations without a specific plan, or a suicide attempt or specific plan for committing suicide.

• Exclusion criteria:

– The symptoms do not meet criteria for a mixed episode.
– The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
– The symptoms are not due to the direct physiological effects of a substance (e.g. a drug of abuse or a medication) or a general medical condition.
– The symptoms are not better accounted for by bereavement. Normal bereavement does not persist for longer than 2 months, is not characterized by marked functional impairment, is not characterized by morbid preoccupation with worthlessness, suicidal ideation, psychotic symptoms, or psychomotor retardation.

Major depressive disorder (MDD), single episode:

• Presence of a single major depressive episode.

• Major depressive episode is not better accounted for by schizoaffective disorder and is not superimposed on schizophrenia, schizophreniform disorder, delusional disorder, or psychotic disorder not otherwise specified.

• There has never been a manic episode, a mixed episode, or a hypomanic episode.

Major depressive disorder, recurrent:

• Presence of two or more major depressive episodes (each separated by at least 2 months in which criteria are not met for a major depressive episode).

• Major depressive episodes are not better accounted for by schizoaffective disorder and is not superimposed on schizophrenia, schizophreniform disorder, delusional disorder, or psychotic disorder not otherwise specified.

• There has never been a manic episode, a mixed episode, or a hypomanic episode.

Melancholia:

• A severe form of MDD with characteristic somatic symptoms. Believed to be particularly responsive to pharmacotherapy and ECT.

Dysthymia:

• Differs from MDD as in between Major Depressive Episodes, there is return to normal functioning. In dysthymia, there is more or less chronic mild depressive symptoms that have been present for at least 2 years. If the disorder appears to have started after a major depressive episode, than it is more accurately diagnosed as MDD in partial remission. Dysthymia can only be diagnosed if full remission has been achieved for at least 6 months after a major depressive episode.
Seasonal Affective Disorder:

- Regular appearance of symptoms between the beginning of October to the end of November and remission beginning in mid-February to mid-April. This diagnosis should not be given unless there is obvious functional deficits such as inability to maintain employment during this time of the year. Patients will often demonstrate hypersomnia and overeating.

Treatment

Initial Evaluation:

- Get a thorough past medical history to evaluate for other comorbid conditions that might be contributing to depression.
- Assess for any previous or current manic symptoms as well as psychotic symptoms.
- History of previous episodes, psychiatric hospitalization, other psychiatric diagnoses, previous suicide attempts, and substance abuse or dependence.
- Evaluate for severity of danger to self or danger to others. Patients with strong homicidal ideations, suicidal ideations, or plans for either should be considered for immediate hospitalization.
- Evaluate for functional impairment (problems with work, relationships, living conditions, health related). Assist patient within your clinical roles (e.g. scheduling absences from work, setting patient up with social worker).

Initial treatment:

- Patient preference should be strongly weighed when making initial treatment decisions.
- Antidepressant medications: can be considered as initial treatment for mild MDD. Should be part of the treatment plan in moderate or severe MDD unless ECT is planned.
  - Patient should be educated when starting antidepressant:
    * May take 2-4 weeks before any difference is noted by the patient.
      - Patient needs to continue the medication even after they start feeling better.
      - The need to consult with doctor before stopping medication (as dosage will likely need to be tapered to avoid any rebound).
- Psychotherapy: can be used alone as initial treatment for patients with moderate MDD. If significant psychosocial stressors intrapsychic conflict, interpersonal difficulties, or comorbid axis II disorder exists, then psychotherapy may be more beneficial.
  - Cognitive Behavioral Therapy and Interpersonal Therapy have been shown to be the most effective.
  - If not shown to be effective after 4-8 weeks, should reevaluate treatment plan.
- Medication + Psychotherapy: can be useful in patients with moderate or severe MDD and significant psychosocial stressors intrapsychic conflict, interpersonal difficulties, or comorbid axis II disorder. Poor adherence to treatment may also indicate need for combined therapy.
- ECT: May be considered in patients with severe functional impairment such as refusing food, imminent suicidality, or psychotic features.
Followup:

- In the initial titration phases: patients should be seen once a week in routine cases and multiple times a week in more complex cases.
- Failure to respond to treatment. If after 6-8 weeks of pharmacotherapy:
  - There is no improvement consider:
    * Changing antidepressant: if patient has only tried one medication from the current class they are taking, they should trial one from the same class and if that fails, move to a different class.
    * Adding or changing to psychotherapy.
    * ECT.
    * Re-evaluating diagnosis, evaluating for other possible medical conditions.
  - There is partial response:
    * Changing dose.
    * Changing antidepressant: to another in the same class if that is the first in the class they have been trialed on, to another class if they have been trialed on at least 2 within the same class.
    * Adding or changing to psychotherapy.
    * ECT.
    * Consider re-evaluating diagnosis, evaluated for other possible medical conditions.
  - There is full response: Patient should be maintained on same dosage of medications required for remission for 16-20 weeks. The need to see the patient during the continuation phase should be based on clinical judgement, but in general every 2-3 months for stable patients is reasonable. Then consider need for maintenance treatment. In general, the amount of psychotherapy visits will be decreased. Medications, if continued, will likely be at the same dosage. ECT has not formally be studied, but can be considered in patients that have had multiple remissions despite medical and psychotherapy. Consider the following features when deciding whether to maintain a patient on maintenance medical therapy:
    * What is the likelihood of recurrence: number of prior episodes, existence of comorbid conditions, residual symptoms between episodes.
    * Severity of episodes: suicidality, psychotic features, and severe functional impairment.
    * Side effects from continuous treatment.
    * Patient preference.

Specific conditions requiring special consideration:

- Psychotic Features: Responds better to combination of antidepressant and antipsychotic. Lithium augmentation can be helpful in patients that have not responded to combination of antidepressant and antipsychotic. ECT is highly effective in patients with this presentation and may be considered first line.

- Catatonic Features: at least two of the following: motor immobility as evidenced by catalepsy or stupor; extreme agitation; extreme negativism; peculiarities of voluntary movements as evidenced by posturing, stereotyped movements, mannerisms, or grimacing; and echolalia or echopraxia. Patient will likely require hospitalization. IV benzodiazepines can give immediate relief of catatonic symptoms. If relief is not achieved, ECT should be considered urgently.

- Atypical features: increased rather than decreased sleep, appetite, and weight; marked mood reactivity; sensitivity to emotional rejection; phobic symptoms; a sense of fatigue that creates leaden paralysis or extreme heaviness of arms and legs. TCAs are generally not as effective. SSRIs, MAOIs, and bupropion are considered more effective.
- **Alcohol or substance abuse or dependence:** programs to assure abstinence should take priority in treatment. It is preferable that the patient be abstinent prior to beginning antidepressant medications. Patients with these conditions should not be given MAOIs. Benzodiazepines should be avoided except in detoxification.

- **Panic or anxiety disorder:** Bupropion should not be used as it has been shown to be ineffective in treating panic disorder. SSRIs and TCAs should be considered first line, but the patient should be informed that they may initially worsen anxiety.

- **Obsessive Compulsive Disorder:** Clomipramine and SSRIs should be considered first line.

- **Dysthymia and Double depression:** Double depression refers to patients who have underlying dysthymia and also suffer more severe and pervasive episodes of MDD. Both conditions can be improved with SSIs or TCAs and psychotherapy.

- **Seasonal Affective Disorder/ Seasonal Major Depressive Disorder:** The full range of treatments for MDD may be employed as well as light therapy.

- **Children and Adolescents:** Children may exhibit behavioral problems such as social withdrawal, aggressive behavior, apathy, sleep disruption, and weight loss. Adolescents may present with somatic complaints, self esteem problems, rebelliousness, poor performance in school, a pattern of engaging in risky behavior, and aggressiveness. Fluoxetine (Prozac) has been approved for use in children.

- **Older age:** Patients who present with depression for the first time in this age group should have consideration as to whether there may be an underlying medical condition contributing. Additionally, medications should be reviewed to assess for possible contribution to depressed feelings. Beta blockers are thought to contribute to feelings of depression. In general, lower doses will be required in the elderly than in young populations. Due to concerns for orthostatic hypotension and cholinergic blockade: fluoxetine, sertraline, bupropion, desipramine, and nortriptyline are frequently chosen rather than amitriptyline, imipramine, and doxepin. Weight loss is often a concern in elderly and therefore choosing a medication that increases weight gain may be advisable.

- **Men:** Trazodone has the risk of priapism.

- **Pregnancy:** Pregnant women either with MDD or in remission should be continued on medications during pregnancy.
<table>
<thead>
<tr>
<th>Name</th>
<th>Class</th>
<th>Initial/ Max dose</th>
<th>Weight gain</th>
<th>ACh</th>
<th>Sedating</th>
<th>Side Effects</th>
<th>Special Indications</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citalopram (Celexa) Escitalopram (Lexapro)</td>
<td>SSRI</td>
<td>10-20 mg Qday/ 60 mg/Qday</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>-Sexual dysfunction -May increase risk of bleeding esp when used with NSAIDs, warfarin, or other anti-coagulants -Serotonin syndrome/ Neuroleptic malignant syndrome</td>
<td>-Diabetic neuropathy -Panic disorder</td>
<td>-Lowest drug interactions. Contraindication: Use within two weeks of using MAO-I’s, pimozide, and thioridazine.</td>
</tr>
<tr>
<td>Fluoxetine (Prozac)</td>
<td>SSRI</td>
<td>10-20 mg / 80 mg/Qday</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>-Sexual dysfunction -May increase risk of bleeding esp when used with NSAIDs, warfarin, or other anti-coagulants -Serotonin syndrome/ Neuroleptic malignant syndrome</td>
<td>-Approved for use in children and teen for depression -Bulimia -OCD -Panic Disorder -Premenstrual dysphoric disorder (PMDD)</td>
<td>-Weekly dosing available. -Most stimulating. -Long half life. -Not to be used with MAO-I’s and until two week washout period complete.</td>
</tr>
<tr>
<td>Fluvoxamine (Luvox)</td>
<td>SSRI</td>
<td>25-50 mg Qday/ 300 mg Qday</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>-Most nauseating, constipating, and sedating –Serotonin syndrome/ Neuroleptic malignant syndrome</td>
<td>-OCD -Panic -Social anxiety disorder -Not approved for depression</td>
<td>Contraindication: Use within two weeks of using MAO-I’s, pimozide, and thioridazine.</td>
</tr>
<tr>
<td>Drug</td>
<td>Classification</td>
<td>Dosage</td>
<td>Side Effects</td>
<td>Contraindications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paroxetine (Paxil)</td>
<td>SSRI</td>
<td>10-20 mg Qday/ 60 mg Qday</td>
<td>++</td>
<td>- Most anti-cholinergic of SSRIs &lt;br&gt;- Short half life, often assoc with withdrawal syndrome &lt;br&gt;- Incr sweating &lt;br&gt;- Serotonin syndrome/ Neuroleptic malignant syndrome</td>
<td>OCD &lt;br&gt;- Panic &lt;br&gt;- PTSD &lt;br&gt;- Social phobia &lt;br&gt;- Generalized anxiety disorder (GAD) &lt;br&gt;- PMDD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sertraline (Zoloft)</td>
<td>SSRI</td>
<td>25-50 mg Qday/ 200 mg Qday</td>
<td>+</td>
<td>- Most male sex dysfxn &lt;br&gt;- Most diarrhea &lt;br&gt;- Few drug interactions &lt;br&gt;- Serotonin syndrome/ Neuroleptic malignant syndrome</td>
<td>OCD &lt;br&gt;- Panic &lt;br&gt;- PTSD &lt;br&gt;- Social Phobia &lt;br&gt;- PMDD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nefazodone (serzone)</td>
<td>SSRI and 5HT2 rec antag</td>
<td>50-100 mg bid/ 600 mg Qday</td>
<td>–</td>
<td>- Hepatotoxicity &lt;br&gt;- Decr BP &lt;br&gt;- Least stimulating serotonergic &lt;br&gt;- Less weight gain &lt;br&gt;- Less sex dysfxn &lt;br&gt;- Orthostatic hypotension &lt;br&gt;- Serotonin syndrome/ Neuroleptic malignant syndrome &lt;br&gt;- Sexual dysfunction</td>
<td>PTSD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contraindication: Use within two weeks of using MAO-I’s, pimozide, and thioridazine.

Contraindication: Use within two weeks of using MAO-I’s and pimozide.

Contraindication: Use within two weeks of using MAO-I’s, pimozide, pts with acute liver disease, pts acutely recovering from MI.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Mechanism</th>
<th>Starting Dose</th>
<th>Side Effects</th>
<th>Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trazodone</td>
<td>SSRI and 5HT2 receptor antagonist</td>
<td>50 mg bid/ 600 mg Qday</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>Amitriptyline (Elavil)</td>
<td>5HT and NE (TCA)</td>
<td>10-25 mg Qday/ 300 mg Qday</td>
<td>+</td>
<td>++++</td>
</tr>
<tr>
<td>Clomipramine (Anafranil)</td>
<td>5HT and NE (TCA)</td>
<td>10-25 mg Qday/ 300 mg Qday</td>
<td>+</td>
<td>++++</td>
</tr>
<tr>
<td>Drug</td>
<td>Mechanism of Action</td>
<td>Dosage</td>
<td>Interactions</td>
<td>Efficacy</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------</td>
<td>-------------------------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td>Doxepin (Sinequan)</td>
<td>5HT and NE (TCA)</td>
<td>10-25 mg Qday/ 300 mg Qday</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imipramine (Tofranil)</td>
<td>5HT and NE effects</td>
<td>10-25 mg Qday/ 300 mg Qday</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desipramine (Norpramin)</td>
<td>NE &gt; 5HT</td>
<td>10-25 mg Qday/ 300 mg Qday</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nortriptyline (Aventyl)</td>
<td>NE &gt; 5HT (2nd generation TCA)</td>
<td>10 mg QHS/ 150 mg Qday</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug</td>
<td>SNRI</td>
<td>Dosage</td>
<td>Nausea</td>
<td>Low weight gain</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------</td>
<td>-------------------------</td>
<td>--------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Venlafaxine (Effexor)</td>
<td>SNRI 5HT and NE (some DA)</td>
<td>18.75-37.5 mg bid/ 375 mg Qday</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Duloxetine (Cymbalta)</td>
<td>SNRI 5HT and NE (some DA)</td>
<td>40-60 mg Qday</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Contraindication: Use within two weeks of using MAO-I’s, drugs that lower seizure threshold, anticoagulants, CNS depressants.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Mechanism of Action</th>
<th>Dosage</th>
<th>Side Effects</th>
<th>Contraindication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bupropion (Wellbutrin)</td>
<td>NDRI, DA and NE</td>
<td>100 mg/450 mg Qd or bid</td>
<td>- Incl sz risk - Low sex dysfxn - Low weight gain - Restlessness or anxiety</td>
<td>Contraindication: pts with seizure disorder, history of anorexia/bulimia, use of MAO-Is in the last 14 days, abrupt discontinuation of ethanol or sedatives</td>
</tr>
<tr>
<td>MAOIs</td>
<td>Monoamine oxidase inhibitor</td>
<td>15 mg bid-tid</td>
<td>- Hypotensive - Dizziness - Suppress REM sleep leading to afternoon fatigue.</td>
<td>Atypical depression</td>
</tr>
</tbody>
</table>

Contraindication: concurrent use w/ SSRIs and TCAs. Pt should be advised to avoid intake of aged cheeses, aged and cured meats, spoiled meats, marmite, sauerkraut, soy sauce, draft beer. Consume in moderation: red or white wines and beer.
| Mirtazapine  (Remeron) | NASSA (5HT and NE) | 15-45 mg Qday | +   | +++ | ++++ | -Dry mouth  
-Sedation  
-Weight gain  
-Rarely, neutropenia/agranulocytosis.  
 Hyperlipidemia  
-Sexual dysfunction | -PTSD | Contraindication: Use within two weeks of using MAO-I’s  
-Use with caution in pts with known sz disorders. |

Adapted from [8, 84]
Chapter 7

Obesity[25]

Screening:

- All patients should be screened by BMI periodically at office visits. Waist circumference should be measured periodically in all patients with BMI <35kg/m² (measure with flexible tape measure placed on horizontal plane at the level of the iliac crest).

Diagnosis:

- Overweight: BMI of 25-29.9 kg/m². No treatment required unless patient has centripetal obesity or associated symptoms. Should always be treated in children.
- Obesity: BMI of 30-34.9 kg/m².
- Severe Obesity: BMI of >35 kg/m².

Evaluation:

- Should assess for other factors that may contribute to cardiovascular risk:
  - Waist Circumference: greater than 88 cm for women and 102 cm for men.
  - Hypertension.
  - Dyslipidemia.
  - Impaired fasting glucose.
  - Family history of premature CHD.
  - Cigarette smoking.
- Evaluation for secondary causes of obesity (Cushing’s, hypothyroidism, medications: antidepressants, oral hypoglycemia, OCPs, anti-psychotics) should only be performed only when clinical suspicion is high.

Treatment:

Lifestyle Modifications:

- Diets:
  - Mediterranean: Moderate-fat, restricted calorie diet, rich in vegetables ad low in red meat with poultry and fish replacing beef and lamb. Restricted to 1500 kcal a day for women and 1800 kcal a day for men with a goal of no more than 35% of calories from fat with main source of fat from olive oil and nuts.
* Weight loss: Weight decreased 4.4 +/- 6.0 kg at 24 months.
– Low carbohydrate: nonrestricted calorie diet with limit of 20 g of carbohydrates per day in the initial phase and then with gradual increase to 120 g per pay to maintain weight loss. Advised to seek vegetarian sources of protein and avoid trans fats.
* Weight loss: Weight decreased 4.7 +/- 6.5 kg at 24 months.
– Low-fat diet: Calorie restricted to 1500 kcal a day for women and 1800 kcal a day for men with 30% of calories from fat, 10% of calories from saturated fat, and an intake of <300 mg of cholesterol a day. Counsel to consume low-fat grains, vegetables, fruits, and legumes.
* Weight loss: Weight decreased 2.9+/− 4.2 kg at 24 months.[129]
– VLCD (Very Low Calorie Diet): Can be used for 8-12 weeks in patients with severe obesity or in moderate obesity if the patient has a disease related to their weight.
* Weight loss: -8.4-15.2% at one year.[146]

**Medications:**

– Can be used as an alternative if conservative therapy has failed and if the patient has a BMI of >30 kg/m² or over 27 kg/m² if patient has diabetes or other weight related disease. In children, pharmacotherapy should only be considered in patients whose BMI is in the 95th percentile and who have an obesity related medical condition.

* Noradrenergic agents: Phentermine (Bontril, Plegine, Prelu-2, X-Trozine) and diethylpropion (Tenuate, Tepanil).
  • Average weight loss: 3-3.6 kg at 12 months.
  • Common side effects: insomnia, dry mouth, constipation, euphoria, palpitations, and hypertension.
  • Comments: Only approved by the FDA for use for ~12 weeks.

* Orlistat (Xenical, Alli): lipase inhibitor.
  • Average weight loss: 2.89 kg greater than placebo over one year.
  • Decreases LDL.
  • Common side effects include fatty or oily stools, fecal urgency, and fecal spotting.
  • Comments: Approved for long term use. Over the counter. May be taken up to one hour after meals.

* Sibutramine (Meridia): serotonin and norepinephrine reuptake inhibitor.
  • Acts as an appetite suppressant.
  • Average weight loss is 4 kg more than placebo at one year.
  • Common side effects include insomnia, nausea, dry mouth, and constipation.
  • Contraindications: Can increase blood pressure and heart rate and thus not recommended for people with CV disease.
  • Comments: Approved for long term use.

* Rimonabant: CB1 receptor blocker. Appetite suppressant.
  • Average weight reduction at one year is 5 kg greater than placebo.
  • Common side effects: nausea, vertigo, diarrhea, anxiety, depression, fatigue, and insomnia.
  • Contraindication: Should not be used in depressed patients.

* Buproprion (Wellbutrin): norepinephrine reuptake inhibitor, serotonin, and dopamine.
  • Average weight loss: 2.77 kg at 6 to 12 months.
  • Common side effects: paresthesia, insomnia, lowers seizure threshold.
  • Contraindications: Seizure disorder.

* Fluoxetine (Prozac): SSRI
  • Average weight loss: 3.15 kg at 12 months.
- Common side effects: agitation, nervousness, nausea/stomach pain.
- Contraindications: Not to be used concurrently with MAOIs or within two weeks of MAOI cessation.

* Topiramate (Topamax): antiepileptic.
  - Average weight loss: 4.77 to 8.25 percent weight loss over 6 months.
  - Common side effects: kidney stones, paresthesias, dizziness, fatigue, metabolic acidosis, and somnolence.
  - Contraindications: Hypersensitivity to topiramate.

* Metformin (Glucophage): inhibits hepatic glucose production and improves sensitivity to insulin.
  - Average weight loss: 1-2 kg weight loss greater than placebo over 12 months.
  - Common side effects: Lactic acidosis, nausea, flatulence, bloating, and diarrhea.
  - Contraindications: Renal insufficiency, congestive heart failure, pulmonary disease, or liver disease.[154]

* Zonisamide: antiepileptic
  - Average weight loss: 9.6% of body weight over 8 months.
  - Common side effects: Somnolence, dizziness, nausea
  - Contraindications: Hypersensitivity to zonisamide or sulfonamides.[154, 146, 24, 133]

- Surgical treatment:
  * Indicated for people between 18 and 60 years with BMI greater than 40 kg/m² or >35 kg/m² if there are comorbid conditions (severe sleep apnea, severe diabetes mellitus, or obesity related cardiomyopathy) and conservative treatment has been attempted. A patient may also qualify if they have failed medical weight control and the absence of medical or psychological contraindication and willingness to comply with postsurgical regimen.
  * Contraindications: Medical or cognitive impairment that limits ability to understand procedure, unstable CAD (coronary artery disease), advanced liver disease with portal hypertension, or other very severe coexisting medical conditions.
  * Risks:
    - Death: (decreased with surgeons who have performed more operations and in hospitals which host more procedures) 0.5% for gastric bypass, 0.1% for gastric banding, and 1.1% for malabsorptive procedures.
    - Perioperative complications: venous thromboembolism, anastomotic leaks, wound infections, bleeding, hernias, small bowel obstruction, and incidental splenectomy.
    - Postoperative complications: Nausea, vomiting, dumping syndrome (facial flushing, light headedness, palpitations, fatigue, and diarrhea- occurs in as many as 70% of pts getting Roux-en-Y), nutritional deficiencies (iron, calcium, folate, Vitamin B12 in procedures with some component of malabsorption such as gastric bypass. In biliopancreatic diversion, can see protein malabsorption, Vitamin A, D, E, and K deficiency).
  * Benefits:
    - Mean BMI decreased from 50 to 32.6 at 2 years post-op.
    - Of the patients requiring diabetes medications pre-surgery, 77% no longer required post-op.
    - Of the patients requiring hyperlipidemia medications pre-surgery, 83% no longer required post-op.
    - Of the patients requiring hypertension medications pre-surgery, 66% no longer required post-op.
  * Types of Surgery:
    - Restrictive: limit the size of the stomach. Include: gastric stapling, adjustable gastric banding, vertical restrictive sleeve gastrectomy.
    - Malabsorptive: bypass portions of the small intestine. Includes biliopancreatic diversion.
    - Combination: Roux-en-Y.[117, 44]
Part II

Health maintenance
# Chapter 8

## Immunization Schedules

### Recommended Immunization Schedule for Persons Aged 0 Through 6 Years—United States • 2009

For those who fall behind or start late, see the catch-up schedule.

<table>
<thead>
<tr>
<th>Vaccine ▼ Age►</th>
<th>Birth</th>
<th>2 months</th>
<th>4 months</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
<th>19–23 months</th>
<th>2–3 years</th>
<th>4–6 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>HepB</td>
<td>HepB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus</td>
<td>RV</td>
<td>RV</td>
<td>RV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diphtheria, Tetanus, Pertussis</td>
<td>DTaP</td>
<td>DTaP</td>
<td>DTaP</td>
<td></td>
<td>DTP</td>
<td>DTaP</td>
<td>DTaP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>Hib</td>
<td>Hib</td>
<td>Hib or Hibb</td>
<td></td>
<td>Hib</td>
<td>Hib</td>
<td>Hib</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>PCV</td>
<td>PCV</td>
<td>PCV</td>
<td>PCV</td>
<td>PCV</td>
<td>PCV</td>
<td>PCV</td>
<td>PCV</td>
<td>PPV</td>
</tr>
<tr>
<td>Inactivated Poliovirus</td>
<td>IPV</td>
<td>IPV</td>
<td>IPV</td>
<td></td>
<td>IPV</td>
<td>IPV</td>
<td>IPV</td>
<td></td>
<td>IPV</td>
</tr>
<tr>
<td>Influenza</td>
<td>MMR</td>
<td>MMR</td>
<td></td>
<td>see footnote7</td>
<td>MMR</td>
<td>see footnote7</td>
<td>MMR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>Varicella</td>
<td>Varicella</td>
<td>see footnote8</td>
<td>Varicella</td>
<td>Varicella</td>
<td>Varicella</td>
<td>Varicella</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>HepA</td>
<td>HepA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal</td>
<td>MCV</td>
<td>MCV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes

- **Hepatitis B vaccine (HepB)**, *(Minimum age: birth)*
  - Administer monovalent HepB to all newborns before hospital discharge.
  - If mother is hepatitis B surface antigen (HBsAg)-positive, administer HepB and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth.
  - If mother’s HBsAg status is unknown, administer HepB within 12 hours of birth. Determine mother’s HBsAg status as soon as possible and, if HBsAg-positive, administer HBIG (no later than 1 age).<br>
  - Infants born to HBsAg-positive mothers should be tested for HBsAg and antibody to HBsAg (anti-HBs) after completion of at least 3 doses of the HepB series, at age 5 to 18 months generally (at the next well-child visit).<br>  - 4-month dose:/Administration of 4 doses of HepB to infants is permissible when combination vaccines containing HepB are administered after the birth dose.<br>

- **Rotavirus vaccine (RV)**, *(Minimum age: 6 weeks)*
  - Administer the first dose at age 6 through 14 weeks (maximum age: 14 weeks 6 days). Vaccination should not be delayed for infants aged 15 weeks or older (i.e., 15 weeks 0 days or older).<br>  - Administer the final dose in the series by age 8 months 0 days.<br>  - If Rotarix® is administered at ages 2 and 4 months, a dose at age 6 months is not indicated.<br>

- **Diphtheria and tetanus toxoid and acellular pertussis vaccine (DTaP)**, *(Minimum age: 6 weeks)*
  - The fourth dose may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose.<br>  - Administer the final dose in the series at age 4 through 6 years.<br>

- **Haemophilus influenzae type b conjugate vaccine (Hib)**, *(Minimum age: 6 weeks)*
  - If PRP-OMP (PedvaxHIB® or Convarix® [Hib-Max]) is administered at ages 2 and 4 months, a dose at age 6 months is not indicated.<br>  - If HibP® (DTP/Hib) should not be used for doses at ages 2, 4, or 6 months but can be used as the final dose in children aged 12 months or older.<br>

- **PCV** is recommended for all children aged younger than 5 years.<br>  - Administer 1 dose of PCV to all healthy children aged 24 through 59 months who are not completely vaccinated for their age.<br>

- **Influenza** *(6 months to 18 years)*
  - Children aged 6 months through 18 years
  - Children aged 5 years or older and non-influenza vaccination (IIV)
  - For healthy nonpregnant persons (i.e., those who do not have underlying medical conditions that predispose them to influenza complications) aged 2 through 49 years, either IAV or IIV may be used.
  - Children receiving IIV should receive 0.25 mL if aged 6 through 35 months or 0.5 mL if aged 3 years or older.
  - Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.<br>

- **Measles, mumps, and rubella vaccine (MMR)**, *(Minimum age: 12 months)*
  - Administer the second dose at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 28 days have elapsed since the first dose.<br>

- **Varicella vaccine**, *(Minimum age: 12 months)*
  - Administer the second dose at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 28 days have elapsed since the first dose.<br>  - For children aged 12 months through 12 years the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.<br>

- **Hepatitis A vaccine (HepA)**, *(Minimum age: 12 months)*
  - Administer to all children aged 1 year (i.e., aged 12 through 23 months).<br>  - Administer 2 doses at least 6 months apart.<br>  - Children not fully vaccinated by age 2 years can be vaccinated at subsequent visits.<br>  - HepA also is recommended for children older than 1 year who live in areas where vaccination programs target older children or who are at increased risk of infection. See MMWR 2006;55(no. RR-7).<br>

- **Meningococcal vaccine**, *(Minimum age: 2 years)*
  - For meningococcal conjugate vaccines (MCV) and for meningococcal polysaccharide vaccine (MPSV)
  - Administer MCV to children aged 2 through 10 years with terminal complement component deficiency, anatomic or functional asplenia, and certain other high-risk groups. See MMWR 2005;54(no. RR-7).<br>  - Persons who received MPSV 3 or more years previously and who remain at increased risk for meningococcal disease should be revaccinated with MCV.
<table>
<thead>
<tr>
<th>Vaccine ▼</th>
<th>Age ▼</th>
<th>7–10 years</th>
<th>11–12 years</th>
<th>13–18 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetaus, Diphtheria, Pertussis (Tdap)</td>
<td>see footnote 1</td>
<td>Tdap</td>
<td>Tdap</td>
<td></td>
</tr>
<tr>
<td>Human Papillomavirus (HPV)</td>
<td>see footnote 2</td>
<td>HPV (3 doses)</td>
<td>HPV Series</td>
<td></td>
</tr>
<tr>
<td>Meningococcal (MCV)</td>
<td>MCV</td>
<td>MCV</td>
<td>MCV</td>
<td></td>
</tr>
<tr>
<td>Influenza (Influenza (Yearly))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal (PPSV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A (HepA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B (HepB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated Poliovirus (IPV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, Mumps, Rubella (MMR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella (Varicella)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This schedule indicates the recommended ages for routine administration of currently licensed vaccines, as of December 1, 2008, for children aged 7 through 18 years. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. Licensed combination vaccines may be used whenever any component of the combination is indicated and other components are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult the relevant Advisory Committee on Immunization Practices statement for details, including high-risk conditions. See <http://www.cdc.gov/vaccines/recs/acip-list.htm>. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at <http://www.vaers.hhs.gov> or by telephone, 800-822-7967.

1. Tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap). (Minimum age: 10 years for BOOSTRIX® and 11 years for ADACEL®):
   - Administer at age 11 or 12 years for those who have completed the recommended childhood 5-DTP/DTaP vaccination series and have not received a tetanus and diphtheria toxoid (Td) booster dose.
   - Persons aged 13 through 18 years who have not received Tdap should receive a dose.
   - A 5-year interval from the last Td dose is encouraged when Tdap is used as a booster dose; however, a shorter interval may be used if pertussis immunity is needed.

2. Human papillomavirus vaccine (HPV). (Minimum age: 9 years):
   - Administer the first dose to females at age 11 or 12 years.
   - Administer the second dose 2 months after the first dose and the third dose 6 months after the first dose (at least 24 weeks after the first dose).
   - Administer the series to females at age 13 through 18 years if not previously vaccinated.

3. Meningococcal conjugate vaccine (MCV):
   - Administer at age 11 or 12 years, or at age 13 through 18 years if not previously vaccinated.
   - Administer to previously unvaccinated college freshmen living in a dormitory.
   - MCV is recommended for children aged 2 through 10 years with terminal complement component deficiency, anatomic or functional asplenia, and certain other groups at high risk. See MMWR 2000; 49(RR-7).
   - Persons who received MPSV 6 or more years previously and remain at increased risk for meningococcal disease should be revaccinated with MCV.

4. Influenza vaccine:
   - Administer annually to children aged 6 months through 18 years.
   - For healthy nonpregnant persons (i.e., those who do not have underlying medical conditions that predispose them to influenza complications) aged 2 through 49 years, either LAIV or TIV may be used.
   - Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.

5. Pneumococcal polysaccharide vaccine (PPSV):
   - Administer to children with certain underlying medical conditions (see MMWR 1997; 46[No. RR-8]), including a cochlear implant. A single revaccination should be administered to children with functional or anatomic asplenia or other immunocompromising condition after 5 years.

6. Hepatitis A vaccine (HepA):
   - Administer 2 doses at least 6 months apart.
   - HepA is recommended for children older than 1 year who live in areas where vaccination programs target older children or who are at increased risk of infection. See MMWR 2006; 55[No. RR-7].

7. Hepatitis B vaccine (HepB):
   - Administer the 3-dose series to those not previously vaccinated.
   - A 2-dose series (separated by at least 4 months) of adult formulation Recombivax HB® is licensed for children aged 11 through 15 years.

8. Inactivated poliovirus vaccine (IPV):
   - For children who received an all-IPV or all-oral poliovirus (OPV) series, a fourth dose is not necessary if the third dose was administered at age 4 years or older.
   - If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of the child’s current age.

9. Measles, mumps, and rubella vaccine (MMR):
   - If not previously vaccinated, administer 2 doses or the second dose for those who have received only 1 dose, with at least 28 days between doses.

10. Varicella vaccine:
    - For persons aged 7 through 18 years without evidence of immunity (see MMWR 2007; 56[No. RR-4]), administer 2 doses if not previously vaccinated or the second dose if they have received only 1 dose.
    - For persons aged 7 through 12 years, the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.
    - For persons aged 13 years and older, the minimum interval between doses is 28 days.
# CHAPTER 8. IMMUNIZATION SCHEDULES

## CATCH-UP IMMUNIZATION SCHEDULE FOR PERSONS AGED 4 MONTHS THROUGH 18 YEARS

*Who Start Late or Who Are More Than 1 Month Behind—United States • 2009*

The table below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child’s age.

### IMMUNIZATION SCHEDULES

#### VACCINE

- **Hepatitis B (HepB)**
  - **Minimum Age for Dose 1**: Birth
  - **Dose 1 to Dose 2**: 4 weeks
  - **Dose 2 to Dose 3**: (and at least 16 weeks after first dose)
  - **Dose 3 to Dose 4**: 8 weeks
  - **Dose 4 to Dose 5**: 8 weeks

- **Rotavirus**
  - **Minimum Age for Dose 1**: 6 weeks
  - **Dose 1 to Dose 2**: 1 month
  - **Dose 2 to Dose 3**: 1 month
  - **Dose 3 to Dose 4**: 2 months
  - **Dose 4 to Dose 5**: 4 months

- **Diphtheria, Tetanus, Pertussis (DTP)**
  - **Minimum Age for Dose 1**: 6 weeks
  - **Dose 1 to Dose 2**: 4 weeks
  - **Dose 2 to Dose 3**: 4 weeks
  - **Dose 3 to Dose 4**: 4 weeks
  - **Dose 4 to Dose 5**: 4 weeks

- **Haemophilus influenzae type b (Hib)**
  - **Minimum Age for Dose 1**: 6 weeks
  - **Dose 1 to Dose 2**: 8 weeks (as final dose)
  - **Dose 2 to Dose 3**: 8 weeks
  - **Dose 3 to Dose 4**: 8 weeks
  - **Dose 4 to Dose 5**: 8 weeks

- **Pneumococcal**
  - **Minimum Age for Dose 1**: 6 weeks
  - **Dose 1 to Dose 2**: 4 weeks
  - **Dose 2 to Dose 3**: 4 weeks
  - **Dose 3 to Dose 4**: 4 weeks

- **Inactivated Poliovirus**
  - **Minimum Age for Dose 1**: 12 months
  - **Dose 1 to Dose 2**: 4 weeks
  - **Dose 2 to Dose 3**: 4 weeks
  - **Dose 3 to Dose 4**: 4 weeks

- **Measles, Mumps, Rubella**
  - **Minimum Age for Dose 1**: 12 months
  - **Dose 1 to Dose 2**: 2 months
  - **Dose 2 to Dose 3**: 2 months

- **Varicella**
  - **Minimum Age for Dose 1**: 12 months
  - **Dose 1 to Dose 2**: 6 months

### CATCH-UP SCHEDULE FOR PERSONS AGED 7 THROUGH 18 YEARS

- **Tetanus, Diphtheria/ Pertussis**
  - **Minimum Age for Dose 1**: 7 years
  - **Dose 1 to Dose 2**: 4 weeks
  - **Dose 2 to Dose 3**: 4 weeks
  - **Dose 3 to Dose 4**: 4 weeks

- **Human Papillomavirus (HPV)**
  - **Minimum Age for Dose 1**: 9 years
  - **Dose 1 to Dose 2**: Routine dosing intervals are recommended

- **Hepatitis A (HepA)**
  - **Minimum Age for Dose 1**: 12 months
  - **Dose 1 to Dose 2**: 6 months

- **Hepatitis B (HepB)**
  - **Minimum Age for Dose 1**: Birth
  - **Dose 1 to Dose 2**: 6 months
  - **Dose 2 to Dose 3**: 8 weeks
  - **Dose 3 to Dose 4**: 8 weeks

- **Inactivated Poliovirus**
  - **Minimum Age for Dose 1**: 12 months
  - **Dose 1 to Dose 2**: 4 weeks
  - **Dose 2 to Dose 3**: 4 weeks
  - **Dose 3 to Dose 4**: 4 weeks

- **Measles, Mumps, Rubella**
  - **Minimum Age for Dose 1**: 12 months
  - **Dose 1 to Dose 2**: 3 months
  - **Dose 2 to Dose 3**: 6 months

- **Varicella**
  - **Minimum Age for Dose 1**: 12 months
  - **Dose 1 to Dose 2**: 3 months
  - **Dose 2 to Dose 3**: 3 months

### Additional Information

1. **Hepatitis B vaccine (HepB)**
   - Administer the 3-dose series to those not previously vaccinated.
   - A 2-dose series (separated by at least 4 months) of adult formulation Recombivax HB® is licensed for children aged 11 through 15 years.

2. **Rotavirus vaccine (RV)**
   - *The maximum age for the first dose is 14 weeks.*
   - Vaccination should not be initiated for infants aged 15 weeks or older (i.e., 15 weeks 1 day or older).
   - Administer the final dose in the series by age 8 months or 6 days.
   - If Rotavirus was administered for the first and second doses, a third dose is not indicated.

3. **Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP)**
   - *The dose is not necessary if the fourth dose was administered at age 4 years or older.*

4. **Haemophilus influenzae type b conjugate vaccine (Hib)**
   - *This vaccine is generally recommended for persons aged 18 months or older.*
   - No efficacy data are available on which to base a recommendation concerning use of Hib vaccine for older children and adults. However, studies suggest good immunogenicity in persons who have sickle cell disease, luesis, or HIV infection, or who have had splenectomy: administering 1 dose of Hib vaccine to these persons is not recommended.
   - If the first 2 doses were PRP-DTP (Pediarix® or Comvax®), and administered at age 11 months or younger: the third (and final) dose should be administered at age 12 through 15 months and at least 6 weeks after the second dose.
   - If the first dose was administered at age 7 through 11 months: administer 2 doses separated by 4 weeks and a final dose at age 12 through 15 months.
   - Administer 1 dose of pneumococcal conjugate vaccine (PCV) in all healthy children aged 2 through 11 months of age who have not received at least 1 dose of PCV or on or after age 12 months.
   - For children aged 2 through 55 months with underlying medical conditions, administer 1 dose of PCV if 2 doses were received previously or administer 2 doses of PCV at least 8 weeks apart if fewer than 2 doses were received previously.

5. **Pneumococcal vaccine**
   - Administer 1 dose of pneumococcal polysaccharide vaccine (PPSV23) to children aged 2 years or older with certain underlying medical conditions (see MMWR 2003;52:RR-3). Include a<sup>1</sup>
   - **Catch-up Immunization Schedule for Persons Aged 4 Months Through 18 Years Who Start Late or Who Are More Than 1 Month Behind—United States • 2009**

   The table below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child’s age.

---

<sup>1</sup> Data about any reactions following immunization are available online at [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines) or by telephone: 1-800-ASK-MMI (1-800-275-6464). Suspected cases of vaccine–associated encephalopathy should be reported to the state or local health department. Additional information, including precautions and contraindications for immunization, is available from the National Center for Immunization and Respiratory Diseases at [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines) or by telephone: 1-800-ASK-MMI (1-800-275-6464).
### Influenza Vaccine

- For children aged 6 months to 2 years: Should receive TIV vaccine (non-live) annually and, if this is first season receiving vaccine, should receive two doses spaced 4 weeks apart.

- For children aged 2-8 years: Should receive LAIV (live attenuated) or TIV vaccine (non-live) annually and if this is first season receiving vaccine, should receive two doses. If child is <5 years old and has respiratory disorder, should only receive TIV.

- For children aged 9-18 years: Should receive TIV vaccine (non-live) annually.

- For patients aged 18-49 and meeting at least one of the following criteria should receive TIV vaccine annually: (1) will be pregnant during influenza season, (2) have chronic pulmonary, cardiovascular (not hypertension), renal, hepatic, hematological, or metabolic disorders (including diabetes), (3) have immunosuppression, (4) have any condition that can compromise respiratory function (cognitive dysfunction, spinal cord injury, seizure disorder, or other neuromuscular disorder) (5) residents of nursing home or other chronic care facility (6) health care personnel (7) household contacts and caregivers of children <5 years of age and adults >50 years of age (8) household contacts and caregivers of persons with medical conditions that put them at high risk for severe complications from influenza.

- For patients aged 18-49 TIV or LAIV can be administered to family members or close contacts of immunosuppressed who do not require protected environment.

- For patients aged 50 and greater: Should receive TIV vaccine (non-live) annually.[51]
Chapter 9

AAFP Recommended Preventative Services[14]
CHAPTER 9. AAFP RECOMMENDED PREVENTATIVE SERVICES

Visual impairment
Fluoride Supplementation
Drug/Alcohol use
STI/STD counselling
Diabetes
Obesity
High Blood Pressure
BRCA 1/2
Pap smear
Gonorrhea/Chlamydia
HIV/Syphilis
Lipid Disorder w/ incr risk
Lipid Disorder w/-incr risk
Lipid Disorder
Lipid Disorder
Mammogram
Aspirin Use
Aspirin Use
Colorectal cancer
Osteoporosis
Abdominal Aortic Aneurysm
Prenatal vitamins

Apply to general population
Apply to specific population
Apply to women
Appplies to men
Recommendation of AAFP and USPSTF conflict

Years of Age
footnote 1: Recommend screening for visual impairment (amblyopia, strabismus, and defects in visual fields) for all patients less than 5 years old.

footnote 2: Recommend fluoridation of drinking water or fluoride supplementation of the diet to prevent dental caries if the water supply has inadequate fluoride (less than 0.6 ppm: San Diego will begin fluoridating its water in November 2010) for patients 6 months to 16 years of age.

footnote 3: All patients >12 years of age should be regularly screened (no clear definition of time interval) for alcohol abuse, tobacco use, and depression. Counseling/treatment should be provided as appropriate.

footnote 4: Recommends high intensity (eg 3 sessions of one hour each or similar) counseling to prevent sexually transmitted infections for all sexually active adolescents and for adults at increased risk for STIs. Little evidence showing casual advice of less than 30 minutes had an effect.

footnote 5: Recommend screening for type 2 diabetes if the patient has sustained blood pressure > 135/80 mm Hg in all patients greater than 18 years of age. ADA recommends routine screening for diabetes beginning at age 45.

footnote 6: Recommend screening for obesity and intensive counseling if found to be obese involving more than one session per month for at least 3 months for all patients greater than 18 years old.

footnote 7: Recommend screening for high blood pressure in all patients greater than 18 years old.

footnote 8: Recommend screening for BRCA1/2 in non-Ashkenazi Jewish population if patient has any of the following: (1) 2 first-degree relatives with breast cancer, 1 of whom received the diagnosis at age 50 years or younger; (2) a combination of 3 or more first- or second-degree relatives with breast cancer regardless of age at diagnosis;(3) a combination of both breast and ovarian cancer among first- and second-degree relatives; (4) a first-degree relative with bilateral breast cancer; (5) a combination of 2 or more first- or second-degree relatives with ovarian cancer regardless of age at diagnosis;(8) a first- or second-degree relative with both breast and ovarian cancer at any age; (7) and a history of breast cancer in a male relative.

footnote 9: For women of Ashkenazi Jewish heritage, screening should be performed if patient has any of the following: (1) any first-degree relative (or 2 second-degree relatives on the same side of the family) with breast or ovarian cancer.

footnote 10: Sexually active women (pregnant or non-pregnant) >24 years old and older if at increased risk recommend screening for gonorrhea and chlamydia.

footnote 11: Sexually active men who have had sex with men, men who have had sex with men after 1975, and men and women having unprotected sex with multiple partners; past or present injection drug users; men and women who exchange sex for money or drugs; partners who do; individuals whose past or present sex partners were HIV-infected, bisexual, or injection drug users; persons being treated for sexually transmitted diseases (STDs); and persons with a history of blood transfusion between 1978 and 1985. Persons who request an HIV test despite reporting no individual risk factors may also be considered at increased risk, since this group is likely to include individuals not willing to disclose high-risk behaviors. There is good evidence of increased yield from routine HIV screening of persons who report no individual risk factors but are seen in high-risk or high-prevalence clinical settings. High-risk settings include STD clinics, correctional facilities, homeless shelters, tuberculosis clinics, clinics serving men who have sex with men, and adolescent health clinics with a high prevalence of STDs.

footnote 12: Recommend screening for lipid disorder in 20-35 year old men who are at increased risk for CHD (see dyslipidemia section for details of CHD risk).

footnote 13: Recommend screening for lipid disorder in 20-45 year old women who are at increased risk for CHD (see dyslipidemia section for details of CHD risk).

footnote 14: Recommend screening for lipid disorders in men >35 years of age.

footnote 15: Recommend screening for lipid disorders in women >45 years of age.

footnote 16: >40 year old women be screened for breast cancer by mammogram every 1-2 years, recent USPSTF guidelines have suggested every 2 years and only in women age 50-74 (not enough evidence to recommend for or against self breast examination).

footnote 17: Recommend use of aspirin (75 mg per day) when the potential risk due to increase in GI hemorrhage is lower than benefit of reduction in MI in men aged 45-79.

footnote 18: Recommend use of aspirin (75 mg per day) when the potential risk due to increase in GI hemorrhage is lower than benefit of reduction in MI in women aged 55-79.

footnote 19: Recommend colorectal cancer screening using fecal occult blood testing (annual), sigmoidoscopy(every 5 years), or colonoscopy (every 10 years) for patients between 50 and 75 years of age. People who have specific inherited syndromes (the Lynch syndrome or familial adenomatous polyposis), those with inflammatory bowel disease, and those with first-degree relatives who have had colorectal adenomas or cancer, although for those with first-degree relatives who developed cancer at a younger age or those with multiple affected first-degree relatives, an earlier start to screening may be reasonable.

footnote 20: Recommend screening for osteoporosis in women greater than 65. See osteoporosis section for information on which women should be screened earlier. USPSTF recommends that men >70 be screened for osteoporosis.

footnote 21: 65-75 year old men who have ever smoked: one time ultrasound screen for abdominal aortic aneurysm.

footnote 22: All sexually active women who are capable of becoming pregnant should be taking 400 mcg of folic acid daily.
Chapter 10

Well Child Checks
## Chapter 10: Well Child Checks

<table>
<thead>
<tr>
<th>Age</th>
<th>Physical Exam</th>
<th>Nutrition</th>
<th>Gross Motor</th>
<th>Fine Motor</th>
<th>Language</th>
<th>Social</th>
<th>Guidance</th>
</tr>
</thead>
</table>
| 2-4d | - Skin\(^1\)  
- Head/Neck\(^2\)  
- Face\(^3\)  
- Eyes\(^5\)  
- CV\(^5\)  
- Abdomen\(^6\)  
- Extremities\(^7\)  
- Neuropath\(^8\)  
- Back\(^9\)  
- Genitalia\(^10\)  
- Growth chart\(^11\) | - Recommend breast feeding\(^12\) or bottle fed every 2-3 hours\(^13\)  
- If breast fed, supplement with vitamin D.  
- Ask about type of formula  
- Req 500-550 kcal/day\(^14\)  
- Adequate stooling/void\(^15\) | - Reacts to pain. | | | | - Sleep on back.  
- Water temp <10 F.  
- No smoking, change clothes before handling baby.  
- No co-sleeping.  
- Infant car seat.  
- Rectal temp, if baby feels warm.  
- Depression.  
- Keep umbilical stump clean and dry (fall off in ~2 wks).  
- Bathe baby about 1x/wk. |

2-4w  
As above except:  
- Vaginal bleeding should be absent at this time.  
- Feeding 7-9 times per day.  
- No solid foods.  
- Responds to noise.  
- Ask about colic.  
- Pacifiers.  
| | | | | | | | |

---

2. Ant/Post fontanelle: bulging or flat. Cephalohematoma (does not cross sutures) Caput succedaneum (crosses sutures). Hydrocephalus. Thyroid enlargement, cysts  
3. Look for cleft lip/palate, microglossa (large tongue), ankyloglossia (tied tongue), Ebstein’s pearls on palate, dysmorphic facial features (wide set eyes, low ears, etc.) Assess for patency of choanae in nares.  
4. Check for red reflex, look for cataracts, white pupil (Leukocoria)  
5. Heart rate, rhythm, quality of heart sounds, presence of murmur, femoral and distal pulses.  
6. Inspect for masses. Look for unusual flatness or excessive fullness. Examine umbilicus carefully for signs of infection, bleeding, or granuloma.  
7. Clavicles in tact, normal pulses  
8. Moro, Babinski, startle, Galant Palmar, Plantar grasp, Rooting reflexes  
9. Look for dimples or tufts of hair.  
10. Girls may have vaginal bleeding and swollen labia. In boys palpate for testicles. Look for hypo/apthesiads in boys.  
11. Age correction should be done for children born more than 2 weeks early until 18-24 months.  
12. “Let down” of milk usually occurs within the first 4 days of the babies life. If delayed, supplementation may be required.  
13. During the first weeks of life, sleeping infant should be woken if they have not fed for 4 hours. Feeding usually lasts 10-15 minutes.  
14. Most formulas contain ~20 kcal per ounce.  
15. One void in first 24 hours, 2-3 in second day, 4-6 during day 3-4, 6-8 on day 5. Meconium (thick dark green stools) should clear in first three days. After day 4, most infants have >3 stools per day stools should be yellow and seedy at this point.
<table>
<thead>
<tr>
<th>Age</th>
<th>As above except:</th>
<th>Feeding ~7 times per day.</th>
<th>Can lift head when lying on belly.</th>
<th>Looks and reaches for faces and toys.</th>
<th>Alert to voices.</th>
<th>Social smile.</th>
<th>-No baby walkers.</th>
<th>-Plans for child care.</th>
<th>-Use sunscreen.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m</td>
<td>-Closure of post</td>
<td>-Able to track objects with eyes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>fontanelle.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Ear exam.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Able to sit when propped</td>
<td>-May begin to initiate solid food (recommend starting with rice cereal, veg, or fruit.)</td>
<td>-Avoid juices.</td>
<td>-Add one new food every 2-3 days: watch for allergic rxs.</td>
<td>-Poly-vi-sol drops for exclusively breast fed infants.</td>
<td></td>
<td></td>
<td>-Teething (low grade temperatures)</td>
<td>-Reading to baby.</td>
</tr>
<tr>
<td></td>
<td>-Hold head up when on belly.</td>
<td>-May begin to initiate solid food (recommend starting with rice cereal, veg, or fruit.)</td>
<td>-Avoid juices.</td>
<td>-Add one new food every 2-3 days: watch for allergic rxs.</td>
<td>-Poly-vi-sol drops for exclusively breast fed infants.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Babinski reflex should be absent (may disappear as early as 2 mos).</td>
<td>-Can begin meats.</td>
<td>-Avoid eggs and milk and things baby can choke on.</td>
<td>-Offer sippy cup.</td>
<td>-May begin juice no younger than 6 mo, but not needed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Assessment for hip dysplasia unnecessary if already performed.</td>
<td>-Can begin meats.</td>
<td>-Avoid eggs and milk and things baby can choke on.</td>
<td>-Offer sippy cup.</td>
<td>-May begin juice no younger than 6 mo, but not needed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 m</td>
<td>As above. Moro and Galant reflexes should be gone. Moro may disappear as early as 3 mos, Galant as early as 2 mos.</td>
<td>-Can begin meats.</td>
<td>-Avoid eggs and milk and things baby can choke on.</td>
<td>-Offer sippy cup.</td>
<td>-May begin juice no younger than 6 mo, but not needed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Can begin meats.</td>
<td>-Avoid eggs and milk and things baby can choke on.</td>
<td>-Offer sippy cup.</td>
<td>-May begin juice no younger than 6 mo, but not needed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Can begin meats.</td>
<td>-Avoid eggs and milk and things baby can choke on.</td>
<td>-Offer sippy cup.</td>
<td>-May begin juice no younger than 6 mo, but not needed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9m</td>
<td>Palmar/planar grasp should disappear (may be gone by 4 months) -Lead screening may be performed\textsuperscript{16}</td>
<td>-May start egg yolks.</td>
<td>-May begin to crawl.</td>
<td>-Babbles, blows bubbles, laughs.</td>
<td>-Reaches for familiar people.</td>
<td>-Fluoride supplementation if water not supplemented (bottled water not supplemented).</td>
<td>-Talking to baby</td>
<td>-Poison control number</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-May start egg yolks.</td>
<td>-May begin to crawl.</td>
<td>-Babbles, blows bubbles, laughs.</td>
<td>-Reaches for familiar people.</td>
<td>-Fluoride supplementation if water not supplemented (bottled water not supplemented).</td>
<td>-Talking to baby</td>
<td>-Poison control number</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-May start egg yolks.</td>
<td>-May begin to crawl.</td>
<td>-Babbles, blows bubbles, laughs.</td>
<td>-Reaches for familiar people.</td>
<td>-Fluoride supplementation if water not supplemented (bottled water not supplemented).</td>
<td>-Talking to baby</td>
<td>-Poison control number</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{16}Esp critical if: living in home built before 1960 with peeling or chipped paint, plumbing with lead pipes, living near a major highway, living near an industrial site, taking home remedies that may contain lead.
<table>
<thead>
<tr>
<th>Age</th>
<th>Developmental Milestones</th>
</tr>
</thead>
</table>
| 12 m | - Startle reflex should be absent.  
  - Ant fontanelle should be closed (may be as early as 7 months).  
  - May initiate egg whites, fish, and whole milk with Vit D.  
  - Offer food only when hungry on predictable schedule, never as punishment or reward.  
  - Beginning to walk.  
  - Throws objects.  
  - Picks up small objects.  
  - Precise thumb and finger grasp.  
  - Understands phrases like no-no and “all gone.”  
  - 1-3 words.  
  - Follows one step commands.  
  - Waves “bye-bye.”  
  - Plays peek-a-boo and patty cake.  
  - Separation anxiety.  
  - Infant car seat must face backward until one year of age and 20 pounds.  
  - Consistent rules.  
  - Begin to brush teeth. |
| 15 m | - As above  
  - Walks without help.  
  - Stands without support.  
  - Begins to stack blocks.  
  - Says mama or dada or similar to parent.  
  - Greets people with “hi.”  
  - Gives kisses or hugs.  
  - Sharing.  
  - Praising positive behavior. |
| 18m | - As above  
  - May introduce 2% milk and honey.  
  - Proper nutrition should be maintained.  
  - 2 yr olds do not need to eat as much as adults!  
  - Walks up and down stairs with aid.  
  - Runs well.  
  - Kicks ball.  
  - Begins to run.  
  - Scribbling with crayon.  
  - Throws ball  
  - Puts up to own toys from standing position.  
  - Able to draw or paint in smaller strokes.  
  - Able to say own name.  
  - 2 word phrases.  
  - 2/4 of language understandable to non parents.  
  - Naming pictures and animals.  
  - Parallel play.  
  - Potty training (be positive, reward baby when they use potty chair properly).  
  - Limits and structure.  
  - Dentist.  
  - Wearing helmets  
  - Swimming pool safety (gates, supervision). |
| 2 y  | - As above  
  - Lead screening may be repeated  
  - Vision screening.  
  - Self dressing.  
  - Able to pedal tricycle.  
  - Builds tower of blocks.  
  - Able to draw circle.  
  - Draw person with 3 body parts.  
  - String beads.  
  - Uses pronouns and prepositions.  
  - Three word sentences.  
  - Plural words.  
  - May share toys.  
  - May enjoy make up games.  
  - Dramatic play.  
  - Knows gender.  
  - Preschool readiness.  
  - Physical activity.  
  - Reading.  
  - Genital exploration/masturbation. |
<table>
<thead>
<tr>
<th>Age</th>
<th>Description</th>
<th>Physical Development</th>
<th>Social and Emotional Development</th>
<th>Academic Development</th>
<th>Other Aspects</th>
</tr>
</thead>
</table>
| 4y  | As above.   | - Puts clothes on properly.  
- Able to hop on one foot.  
- Throws overhand.  
- Able to eat with a spoon and a fork neatly.  
- Can draw square, cross.  
- Draws recognizable pictures.  
- Speech completely understood by others.  
- Understands size relationships.  
- Follows 3 step commands.  
- Tells story  
- Names 4 colors  
- Rhymes and word play | - May begin to play games with rules.  
- Develop friendships.  
- Compare self to others. | - May begin to play games with rules.  
- Develop friendships.  
- Compare self to others. | - School readiness.  
- Family chores.  
- TV limits.  
- Bedtime.  
- Booster seats should be used in car until child is 4 feet 9 inches (usu until 8 yo). |
| 5y  | Complete physical as well as blood pressure, vision screen, hearing screen | - May introduce skim milk, may be introduced earlier if child has consistently very high BMI  
- Balance on one foot.  
- Heel to toe walk.  
- Swings on swing, can pump self.  
- Can make long jumps.  
- Catches a ball.  
- Spreading with a knife.  
- Ability to draw a triangle.  
- Prints first name.  
- Draws a person that has at least three recognizable parts.  
- Some understanding of time concepts.  
- Counts to 10.  
- Knows telephone number.  
- Responds to why questions.  
- Prints a few letters. | - May begin to show leadership among children. | - Teach stranger safety.  
- Reinforce personal hygiene. | - Chores.  
- Impulse control.  
- Friends.  
- School performance. |
| 6 y | As above. | - Skips with alternating feet.  
- Draws a person with 6 parts.  
- Ties shoes.  
- Identifies left and right hand. | - | - | - |
| 8 y | - Assess sexual maturity  
- Screen for scoliosis | - | - | - | - |
| 10 y | - Assess sexual maturity  
- Screen for scoliosis | - | - | - | - |
<table>
<thead>
<tr>
<th>Age Range</th>
<th>Assessments</th>
<th>Screen for</th>
<th>References</th>
</tr>
</thead>
</table>
| 11-14y   | - Assess sexual maturity  
- Breast/ scrotal self exams should be emphasized.  
- Screen for scoliosis | | [106, 107, 68, 63, 124, 135] |
| 15-17y   | - Assess sexual maturity  
- Breast/ scrotal self exams should be emphasized.  
- Screen for scoliosis | | |

Should be done with pt alone:  
- Ask about  
- Home life  
- School  
- Activities  
- Drugs  
- Alcohol  
- Cigarettes  
- Sex  
- Suicide/depression  
- Seat belts  

As above and:  
- Life plans  
- Safe driving
Chapter 11

Routine Prenatal Care Adapted from ICSI Recommendations[12, 136, 88]

First Prenatal Visit (6-8 weeks):

- History: Personal and demographic information, past obstetrical history, personal and family medical history (including information about previous chickenpox, past surgical history, genetic history, menstrual and gynecological history, current pregnancy history, and psychosocial history including assessment for domestic violence, whether pregnancy was planned or unintended, stable housing, mental health and levels of stress, and any use of tobacco, alcohol, or recreational drugs.

- Estimate date of delivery: Do this with pregnancy wheel (most offices will have or Internet version) or can add 7 days to first day of last menstrual period (LMP) then subtract 3 months, and add one year.

- Physical exam: CV, Pull, and abdominal exam should be performed. In addition, uterine size and shape and evaluation of adnexa. Baseline blood pressure, weight, and height should be recorded. BMI should be calculated.

- Diagnostic studies:
  - Ultrasound should be performed to confirm dating and attempt to visualize cardiac motion. Fetal heart tones may be listened for, but not expected until 10 weeks.
  - Edinburgh Depression Screen should be performed.
  - Laboratory testing:
    * Rhesus type (Rh(D)) and antibody screen (Rh(D) negative women should receive anti(D)-immune globulin at 28 weeks and again at time of delivery).
    * HCT/Hgb/MCV.
    * Cervical cytology (but pregnancy is not an indication to change the frequency of cervical cancer screening).
    * Rubella immunity (in non-immune, patient should receive vaccination after delivery).
    * Urinary infection testing (important to treat asymptomatic bacteriuria in pregnant patients).
    * Syphilis testing.
    * Hepatitis B antigen testing.
    * Chlamydia/gonorrhea testing (ACOG and AAFP only recommend testing high risk: more than one sexual partner, history of STD, inconsistent condom use, drug use).
    * HIV testing.
    * Patients at risk for Tuberculosis (health care workers, people with recent travel to endemic areas, patients with family members with history of Tb) should have PPD placed.

- Guidance:
Should take prenatal vitamins with 400 mg of folic acid per day.

Patient may experience nausea and increased fatigue. If nausea becomes severe and patient is unable to tolerate oral intake should contact doctor immediately.

* For mild nausea: Avoid eating spicy or fatty foods. Eat small frequent meals. Drinking ginger teas.
* For more severe nausea: Patient may be given promethazine or metoclopramide.

Heartburn: Occurs in 30% of pregnancies.

* Eliminate spicy/acidic foods. Small frequent meals. Sleeping with head elevated.
* Can give antacids or H2 receptor blockers.

Constipation: Increase intake of high fiber foods, increase liquids, may use metamucil (psyllium containing products). Avoid enemas, cathartics, or laxatives.

Spotting may be normal, but if patient is concerned, if spotting regularly, or if having more than spotting, report to medical attention immediately.

16-18 week visit:

- History: Ask about vaginal bleeding, contractions, feeling any movement (fetal movements not expected until 20 weeks), any pain with urination, fatigue, encourage smoking cessation, continue taking prenatal vitamins.

- Physical exam: blood pressure should be assessed, fetal heart tones and fundal height. Pelvic sonogram is optional.

- Diagnostic studies:
  - Triple screen if patient desires (serum alpha-fetoprotein, estriol, beta-hCG).
  - Nuchal screen if patient desires
  - Urine analysis and culture.

- Guidance: As above. In addition:
  - Patient can expect to feel baby start to move in the next several weeks.
  - Scheduling of anatomical survey can be made for around 20 weeks. Gender can likely be discovered at this time if patient desires to know.
  - Patient may consider taking childbirth classes.

26-28 week visit:

- History: ask about fetal movement (patient should be feeling movement at this time), vaginal bleeding, contractions, pain with urination, signs of elevated blood pressure/preeclampsia (sudden changes in vision, shortness of breath, sudden swelling, and new headaches), continue prenatal vitamins, encourage smoking cessation, and encourage breast feeding.

- Physical exam: fetal heart tones and fundal height.

- Diagnostic studies:
  - Complete blood count.
  - Ab screen.
– Diabetes screen (between 24 and 28 weeks): screen varies between institutions, but in general a one hour glucose screen is performed. AAFP does not feel there is strong evidence to routinely test all patients unless there are compelling risk factors, but in practice, most institutions will test all patients. Patient will drink 50 g carbohydrate drink and have blood sugar evaluated after one hour, a normal test varies between institutions, but in general is less than 130 mg/dl or 140 mg/dl. Patient should not be fasting prior to the test. One third of patients will have an abnormal test and will then go on to have a three hour glucose tolerance test. Patient will go in for this test fasting, and will drink a 100 g carbohydrate drink and have glucose checked every hour for a total of three hours. If more than 2 of the values are elevated, patient is considered to have gestational diabetes.

– Urinalysis/culture.

– Give RhOGAM if nonsensitized Rh negative patient.

• Guidance: As above, in addition:

– Patient may begin to record kick counts. Patient should be counselled to pay attention for one hour a day and time how long it takes to feel 10 fetal movements. If takes longer than one hour, patient should drink a cold/sweet drink, lay on left side, and redo count. If it still takes longer than one hour, patient should seek medical attention.

– Patient should be advised about preterm labor precautions including leaking of fluid, regular painful contractions, and vaginal bleeding.

32 week visit:

• History: kick counts, vaginal bleeding, contractions, pain with urination, signs of elevated blood pressure/preeclampsia (sudden changes in vision, shortness of breath, sudden swelling, and new headaches), continue prenatal vitamins, encourage smoking cessation, and encourage breast feeding.

• Physical exam: fetal heart tones, fundal height.

• Diagnostic evaluation: Urinalysis/culture.

• Guidance: As above. Reinforce preterm labor precautions.

36 week visit:

• History: kick counts, vaginal bleeding, contractions, pain with urination, signs of elevated blood pressure/preeclampsia (sudden changes in vision, shortness of breath, sudden swelling, and new headaches), continue prenatal vitamins, and encourage smoking cessation.

• Physical exam: fetal heart tones, fundal height, and fetal position should be assessed. Cervix may be assessed for dilation/effacement at this time.

• Diagnostic evaluation: urinalysis/culture, Group B step culture should be performed.

• Guidance: As above. Reinforce preterm labor precautions. In addition:

  – Patient should be encouraged to pack bag for hospital.

  – Patient should be instructed to begin thinking about finding a pediatrician.

  – Should be advised that as baby continues to grow, movements may be less strong, but that baby should continue to move 10 times an hour.
38 week visit/ 39 week visit/ 40 week visit:

- History: kick counts, vaginal bleeding, contractions, pain with urination, signs of elevated blood pressure/preeclampsia (sudden changes in vision, shortness of breath, sudden swelling, and new headaches), continue prenatal vitamins, and encourage smoking cessation.

- Physical exam: fetal heart tones, fundal height, and fetal position should be assessed. Cervix may be assessed for dilation/effacement at this time though frequency is controversial.

- Diagnostic evaluation:
  - Urinalysis/culture.

- Guidance: as above. Reinforce preterm labor precautions.

**Medications in Pregnancy**

- Safety ratings are given by class:
  - Class A: No risk in controlled human studies
  - Class B: No risk in controlled animal studies.
  - Class C: Small risk in controlled animal studies
  - Class D: Strong evidence of risk to human fetus
  - Class X: Never to be used in pregnancy, very high risk to human fetus.
    * Lactation safe analgesic medications: Acetaminophen and ibuprofen.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Drug</th>
<th>FDA classification in 1st/2nd/3rd trimester</th>
<th>Use in Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Control</td>
<td>Acetaminophen</td>
<td>B/B/B</td>
<td>Pain reliever of choice</td>
</tr>
<tr>
<td>Pain Control</td>
<td>Aspirin</td>
<td>D/D/D</td>
<td>Not recommended. Incr rate of perinatal mortality, neonatal hemorrhage, decr birth weight, prolonged gestation and labor, possible teratogenicity</td>
</tr>
<tr>
<td>Pain Control</td>
<td>Ibuprofen/Ketoprofen/Naproxen</td>
<td>B/B/D</td>
<td>Use with caution. Avoid in 3rd trimester (associated with oligohydramnios, premature closure of ductus arteriosus, nephrotoxicity, and periventricular hemorrhage)</td>
</tr>
<tr>
<td>Antihistamine</td>
<td>Chlorpheniramine</td>
<td>B</td>
<td>Antihistamine of choice</td>
</tr>
<tr>
<td>Decongestant</td>
<td>Pseudoephedrine</td>
<td>B</td>
<td>Oral decongestant of choice. May incr rate of gastrochisis</td>
</tr>
<tr>
<td>Expectorant</td>
<td>Guaifenesin</td>
<td>C</td>
<td>Possible risk of neural tube defect in first trimester</td>
</tr>
<tr>
<td>Antitussive</td>
<td>Dextromethorphan</td>
<td>C</td>
<td>Appears to be safe in pregnancy</td>
</tr>
<tr>
<td>Category</td>
<td>Example Drug</td>
<td>Effect</td>
<td>Comment</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Anti-diarrheal</td>
<td>Kaolin and pectin</td>
<td>B/B</td>
<td>Anti-diarrheal of choice, does not cross placenta</td>
</tr>
<tr>
<td>Anti-diarrheal</td>
<td>Bismuth subsalicylate</td>
<td>C/C</td>
<td>Not recommended as salicylate is absorbed</td>
</tr>
<tr>
<td>Anti-diarrheal</td>
<td>Loperamide</td>
<td>B/B</td>
<td>Probably safe, possible increase in fetal cardiac malformation with first</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>trimester use.</td>
</tr>
<tr>
<td>Anti-diarrheal</td>
<td>Atropine/diphenoxylate</td>
<td>C/C</td>
<td>Not recommended. Teratogenic in animal studies.</td>
</tr>
<tr>
<td>Antacid</td>
<td>Aluminum hydroxide/magnesium hydroxide</td>
<td>B</td>
<td>Generally regarded as safe</td>
</tr>
<tr>
<td>Antacid</td>
<td>Calcium carbonate</td>
<td>C</td>
<td>Generally regarded as safe</td>
</tr>
<tr>
<td>Anti-flatulent</td>
<td>Simethicone</td>
<td>C</td>
<td>Generally regarded as safe</td>
</tr>
<tr>
<td>Anti-histamine</td>
<td>Cimetidine/Ranitidine</td>
<td>B</td>
<td>Preferred after antacids, generally regarded as safe.</td>
</tr>
<tr>
<td>Anti-histamine</td>
<td>Nizatidine</td>
<td>C</td>
<td>Not recommended. Adverse animal studies.</td>
</tr>
<tr>
<td>Anti-histamine</td>
<td>Famotidine</td>
<td>B</td>
<td>Probably safe, data needed</td>
</tr>
<tr>
<td>Anti-fungal</td>
<td>Butoconazole/ Miconazole</td>
<td>C</td>
<td>Probably safe</td>
</tr>
<tr>
<td>Anti-fungal</td>
<td>Clotrimazole</td>
<td>C</td>
<td>Safe in second and third trimester, first trimester probably safe</td>
</tr>
<tr>
<td>Anti-fungal</td>
<td>Tioconazole</td>
<td>C</td>
<td>Not known. No data</td>
</tr>
<tr>
<td>Hypertension</td>
<td>ACE- Inhibitor/ARB</td>
<td>C/D</td>
<td>Avoid. Causes renal defects, neonatal renal failure</td>
</tr>
<tr>
<td>Anti-biotic</td>
<td>Aminoglycoside</td>
<td>D</td>
<td>Hearing loss, 8th cranial nerve damage, renal defects</td>
</tr>
<tr>
<td>Steroids</td>
<td>Prednisone</td>
<td>B or C</td>
<td>Masculinization of females, advanced genital formation in males</td>
</tr>
<tr>
<td>Anti-epileptic</td>
<td>Carbamazepine</td>
<td>D</td>
<td>Craniofacial and CNS defect, neural tube defects (NTD), microcephaly,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>growth restriction</td>
</tr>
<tr>
<td>Anti-coagulant</td>
<td>Warfarin</td>
<td>X</td>
<td>Craniofacial and CNS defect, growth restriction, spontaneous abortion</td>
</tr>
<tr>
<td>Anti-coagulant</td>
<td>Heparin</td>
<td>C</td>
<td>Does not cross placenta. No adverse effects to fetus. Incr bleeding risk.</td>
</tr>
<tr>
<td>Anti-diabetic</td>
<td>Insulin</td>
<td>B</td>
<td>Does not cross placenta. No adverse effects.</td>
</tr>
</tbody>
</table>
### CHAPTER 11. ROUTINE PREGNATAL CARE

<table>
<thead>
<tr>
<th>Drug Category</th>
<th>Medication</th>
<th>Risk Level</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-diabetic</td>
<td>Glyburide/ Metformin</td>
<td>B</td>
<td>Generally considered safe.</td>
</tr>
<tr>
<td>Anti-depressant</td>
<td>Fluoxetine</td>
<td>C</td>
<td>Generally considered safe. Three studies have shown lower birth weight and increased rate of prematurity.</td>
</tr>
<tr>
<td>Originally approved to prevent miscarriage</td>
<td>Diethylstilbestrol</td>
<td>X</td>
<td>Increased rate of vaginal or cervical clear cell adenocarcinoma, cervical incompetence</td>
</tr>
<tr>
<td>Anti-folate</td>
<td>Methotrexate</td>
<td>X</td>
<td>Nervous system defects, cleft lip/palate, growth restrictions, spontaneous abortion</td>
</tr>
<tr>
<td>Expectorant</td>
<td>Iodine</td>
<td>D</td>
<td>Goiter, cretinism</td>
</tr>
<tr>
<td>Bipolar</td>
<td>Lithium</td>
<td>D</td>
<td>Ebstein’s anomaly, other cardiac defects</td>
</tr>
<tr>
<td>Anti-epileptic</td>
<td>Phenytoin</td>
<td>D</td>
<td>Cardiovascular and nervous system defects, mental retardation</td>
</tr>
<tr>
<td>Anti-biotic</td>
<td>Tetracycline</td>
<td>D</td>
<td>Yellow or brown teeth if exposed in 2nd or 3rd trimester</td>
</tr>
<tr>
<td>Anti-epileptic</td>
<td>Valproic acid</td>
<td>D</td>
<td>NTD, hypospadias, exposure most harmful in 1st trimester</td>
</tr>
<tr>
<td>Anti-acne</td>
<td>Isotretinoin</td>
<td>X</td>
<td>Craniofacial and cardiac defects, thymic agenesis, mental retardation, spontaneous abortion</td>
</tr>
<tr>
<td>Anti-biotics</td>
<td>Penicillin/ Cephalosporin/ erythromycin/ Clindamycin/ Azithromycin</td>
<td>B</td>
<td>Considered safe in pregnancy.</td>
</tr>
<tr>
<td>Anti-hypertensive</td>
<td>Propranolol/ Alpha-methyldopa/ hydralazine</td>
<td>C</td>
<td>Considered antihypertensives of choice in pregnancy. May cause hypotension in fetus.</td>
</tr>
</tbody>
</table>

References:[23, 136]
Part III

Developing a differential, working up, and treating common medical complaints
Chapter 12

Urinary Complaints

12.1 Frequent Urination

History

- General Questions: Onset? Any other changes in urination (frequency, pain, amount, color)? Blood in urine? Difficulty urinating (hesitancy, weak urine stream, dribbling)? Changes in medications? Pattern of urination (more at night, throughout day)? Missed periods? Incontinence?

Physical: Based on history.

- In general, in males genito-urinary exam indicated. Look at penis for plaques (Peyronie’s disease-obstruction), narrowing of urethral orifice

Diagnostic Tests:

- Based on history and clinical suspicion:
  - A urinalysis should be performed unless there is compelling reason not to.
  - Consider a chemistry panel to evaluate for renal function and electrolyte abnormalities.
  - PSA should be ordered if there is suspicion for prostate abnormality.

Treatment (based on diagnosis)

- Is urination painful? See section on painful urination.
- Incontinence? See section on incontinence.[79]
- Hematuria? Weight loss? Must rule out cancer.[60]
- History of prostate cancer? Recent penile or urethral surgeries? Consider strictures.
- Nocturia? Drinking more at night? Drinking more caffeine or alcohol than usual? Recently started diuretic “water pill,” sudafed, or benadryl? Consider medication or beverage intake as cause.
  - Evaluation and Treatment:
    * Counsel patient to stop drinking beverages several hours prior to going to sleep.
    * Counsel patient to decrease alcohol/caffeine intake.
    * Consider chemistry panel.
    * Counsel patient to stop taking medication if possible. If not possible, consider d/cing PM dosing.[60]
  
  - Evaluation:
    - Check urinalysis.
    - Consider checking HbA1C or fasting glucose.
  
  - Treatment: See section on diabetes.

  
  - Evaluation and Treatment: Consider in-office pregnancy test.

• Man over the age of 50? Difficulty starting to urinate? Weak urine stream? Dribbling? Consider enlarged prostate (BPH). Seen in 35% of men greater than 50 years of age.
  
  - Evaluation:
    - Digital rectal exam: may not feel any abnormality as only peripheral region can be palpated, there may still be enough enlargement to cause constriction and not be palpable. Note the consistency of prostate: if nodular feel more suggestive of cancer. If palpation causes pain, or if prostate feels boggy, suggestive of prostatitis.
    - Check PSA if expected lifespan is >10 years.
    - Perform International Prostate Symptom Score (IPSS) to monitor progress of symptoms every 3-12 months and for necessity of initial treatment. Score 0-5 (0: not at all, 1: less than 20% of the time, 2: less than half the time 3: about half the time 4: more than half the time 5: almost always). Total score of 0-7 indicates mild prostatism. 8-18 is moderate prostatism. 19-35 is severe prostatism.
      - Had a sensation of not emptying your bladder completely after urinating?
      - Had to urinate again less than two hours after you have urinated?
      - How often have you stopped and started, several times when you urinated?
      - Found it difficult to postpone urination?
      - Had a weak urinary stream?
      - Had to push or strain to urinate?
      - During the last month, how many times did you most typically get up to urinate from the time you went to bed at night until the time you got up in the morning? (Score 0-5. 0: none, 1: is once per night 2: twice per night, 3: 3 times per night 4: 4 times per night, 5: 5 or more times per night.) [19]
  
  - Treatment:
    - Medication is usually offered for patients with a total IPSS score of >7. With lower scores, patient symptoms are as likely to resolve without medication as with.
    - First line medication: Alpha Blocker. Rapid onset (max effect at 4-6 weeks). Main side effect is orthostatic hypotension.
      - Non-Selective long acting: Terazosin (Hytrin), Doxazosin (Cardura), and Alfuzosin (UroXatral)
      - Non-selective short acting (long acting is preferred): Prazosin (Minipress)
      - Selective: Tamsulosin (Flomax). Generally more expensive than non-selective. Less likely to cause orthostatic hypotension.
    - Hormone Inhibition: Finasteride (Proscar): 5 alpha reductase inhibitor (blocks conversion of testosterone to more active dihydrotestosterone)
      - Can take 6 months to see full effect.
      - Side effects: erectile dysfunction, decreased libido, and decreased volume of ejaculate.
      - Decreases overall amount of prostate cancer, but may promote the more aggressive forms.
    - Herbal therapy: Saw palmetto
• Approved in Europe (France and Germany) for treatment of BPH, but has not been approved by the FDA.
• Conflicting evidence as to efficacy: One study shows it is as effective as finasteride in relieving symptoms of prostate obstruction, but does not decrease prostate volume. Another shows no evidence that is superior to placebo. [38]
* Catheterization: Reserved for patients with severe obstructive symptoms and high PVRs. Either self catheterization or chronic indwelling catheter may be used. Self catheterization preferred as there is decreased risk of infection.
* Nonsurgical invasive approaches:
  • Laser prostatectomy: slightly less effective than TURP at relieving urinary symptoms and peak urinary flow. Also required more reoperation than TURP (5% versus 1%). Hospitalizations were shorter and required less transfusions and developed less strictures.
  • Electrovaporization: similar to TURP in regards to urinary flow and symptom scores. Lower transfusion rates and shorter lengths of stay. Higher risk of urinary retention and reoperation with electrovaporization than TURP.
  • Microwave thermotherapy: Does not require hospitalization, done outpatient with local anesthesia and oral analgesic. Less effective than TURP at relieving urinary symptoms and peak urinary flow. Also required more reoperation than TURP (5 versus 1%). Required less transfusions and developed less strictures than TURP. Development of retrograde ejaculation was less common than with TURP.
* Surgery: After surgery, there is no need for medications. Very effective. Cost is high, and there is a risk of ED, incontinence, and retrograde ejaculation. Possibility of prostate regrowth requiring repeat operation.
  • Transurethral resection of the prostate (TURP)
  • Open prostatectomy: can be used if prostate is too large to remove with TURP. [39]
* Refer to urologist if:
  • If patient fails medical therapy or cannot tolerate medical therapy and would be a candidate for surgery.[60]
  • Patient is candidate for androgen ablation (Lupron or orchiectomy).


  - Evaluation:
    * Fluid deprivation test with help to determine the cause of Diabetes insipidus.
      • Psychogenic: Caused by excessive intake of fluid. Will have low sodium concentration. Fluid deprivation test will resolve increased frequency.
    * Desmopressin stimulation test: administer exogenous desmopressin, if urine concentration increases, indicated that cause of DI is low vasopressin. If it does not, suggests a renal etiology for DI.
      • Neurogenic (Central): Caused by low levels of vasopressin (ADH). Evaluation of other pituitary hormones as well as MRI is indicated.
      • Nephrogenic: Caused by inadequate response to ADH.
    * Look at medications: Lithium is known to cause diabetes insipidus.
    * If patient is pregnant, may have gestational diabetes insipidus. During pregnancy, placenta produces vasopressinase.
  - Treatment:
    * Neurogenic: Desmopressin.
    * Gestational: resolves 4-6 weeks following delivery. May treat with desmopressin.
    * Nephrogenic: HCTZ (and amiloride to spare potassium) or Indomethacin.
    * Lithium induced nephrogenic DI: can be managed with amiloride.
12.2 Incontinence

History

- The following 4 questions have been shown to be highly specific and sensitive for determining source of incontinence (stress incontinence, urge incontinence, mixed incontinence). During the past 3 months, did you leak urine most often:
  - When you were performing a physical activity such as coughing, sneezing, lifting or exercising? Stress predominant.
  - When you had the urge or the feeling that you needed to empty your bladder, but could not reach the toilet soon enough? Urge predominant incontinence.
  - Without physical activity and without a sense of urgency? Other cause predominant.
  - About equally as often with physical activity as with a sense of urgency? Mixed type. [86]

- Other general questions: Ask about loss of perineal or bladder sensation. Difficulty with stream initiation or weakened urine flow? (BPH, urethral stricture, stone tumor, or fecal impaction). Increased thirst? (Consider diabetes mellitus or insipidus).

- Red Flag questions:
  - Experiencing any “saddle anesthesia” (numbness of the inner thighs)? Lower back pain? Consider cauda equina syndrome.
  - Have you noticed any changes in cognition? Dementia? Problems with your walking? Consider Normal Pressure Hydrocephalus.
  - Do you have a history of poorly controlled diabetes? Neurological disorders? Bladder never feels empty? Consider overflow incontinence secondary to neurogenic bladder.
  - History of recurrent UTIs? Dysuria? Consider UTI. If patient has recurrent will likely need imaging to study renal anatomy.
  - Prolapse? Patient will require referral to urogyn/urologist to have pessary or surgery.
  - Recent/Sudden onset (within 1-2 months)? Hematuria? Consider bladder neoplasm. Cystoscopy will be required to rule out. [40]

Physical Exam

- Evaluate for mental status (if altered: suspicious for normal pressure hydrocephalus), neurologic exam (evaluate for changes in lower extremity sensation especially saddle anesthesia: cauda equina syndrome), abdominal (feel for masses, suspicious for neoplasm), rectal, and pelvic exam (evaluate for prolapse).

Diagnostic Tests

- Urinalysis to evaluate for possible infection.

- An ultrasound to determine post-void residual (PVR) esp if overflow incontinence is suspected.[67]

Selected Differential and Treatment

- When you were performing a physical activity such as coughing, sneezing, lifting or exercising? Consider Stress Incontinence:
  - First line: Kegel exercises. Pelvic floor muscle contractions should be held for several seconds and several sessions should be performed each day.
  - Bladder training (having patient urinate not based on urge, but on time schedule, generally starting every 2-3 hours, and then expanding that interval as patient comfort increases.
- Prompted voiding: may be useful for individuals dependant on a caregiver. Patient will toilet when prompted by caregiver.
- Extra-corporeal magnetic innervation chair: stimulates pelvic floor muscles with low intensity magnetic field. Twice weekly sessions for 20 minutes for 8 weeks. Maybe useful in patients with mild stress incont, who have not undergone surgery.
- Pessary: more frequently used in older patients. Can be short or long term.
- Urethral occlusion inserts: can be useful in pts with exercise induced incont. Requires manual dexterity to use.[148]
- Medications:
  * Duloxetine: Had originally been marketed for this indication. It did not receive FDA approval b/c of increased suicide and liver toxicity. Additionally, it does not appear that clinical usage of this medication has replicated the studies for this indication and as such is not regularly used in practice.[46]
  * Other medications: some clinicians have found that pseudoephedrine or topical estrogen have improved stress incontinence (oral estrogen is not recommended[101]. These are theoretically reasonable, but there have been few studies and they are not FDA approved for this indication. However, if patient would take these medications for other indication, it might be reasonable. [148]
- Surgery: Open retropubic colposuspension or suburethral sling.
  * Patients who have failed or are unable to adhere to non-surgical options should be considered for surgery.

- **When you had the urge or the feeling that you needed to empty your bladder, but could not reach the toilet soon enough?** Consider Urge Incontinence:
  - First line: Kegel exercises, bladder training, and prompted voiding (for descriptions, see above). More effective than medication if pt is compliant.
  - Medications:
    * Anticholinergic drugs- tolterodine (selective) and oxybutynin (non-selective). Both have similar efficacy. Tolterodine may have less anti-cholinergic side effects.
      · Side effects: main SE is dry mouth. Can also cause tachycardia, confusion, dizziness, abnormal vision, dry eyes, urinary retention, headache, nausea, dyspepsia, constipation.)
      · Contraindications: patients with closed angle glaucoma, urinary retention, or gastric retention.[67]
  - Electrical stimulation may also be used in select cases to inhibit detrusor muscle over-activity. Should only be considered in patients with severe incontinence who are unresponsive to medications and lifestyle changes.
- **Do you have a history of poorly controlled diabetes? Neurological disorders? Bladder never feels empty?** Consider Overflow Incontinence.
  - Intermittent self catheterization: preferred over indwelling catheter due to lower risk of infection.
  - Indwelling catheter. [62]

### 12.3 Painful Urination

**History**

- General questions: Onset? Location of pain: internal or external or suprapubic? Abnormal discharge? Abnormal or painful periods? Pattern to onset of symptoms if recurrent: after sexual intercourse, with periods. Assess for unprotected sex with new partners as well as known STDs in partners.
Physical exam:

- Men: should include GU examination. Evaluate for penile lesions, scrotal inflammation, and prostate tenderness (when performing DRE, avoid vigorous exam which may precipitate bacteremia and sepsis. Assess for CVA tenderness.

- Women: it is reasonable if patient does not have clear indications for other etiology (including abnormal vaginal discharge, vaginal dryness) to not perform GU exam initially, and to perform if patient is unresponsive to treatment. Assess for CVA tenderness. If patient does have other GU symptoms, a pelvic exam should be performed including: visual inspection of vaginal discharge, visualization of cervix, evaluation for cervical motion tenderness.[27]

Diagnostic Tests:

- Urinalysis w/ reflex culture: May not be necessary in select female patients that have clear symptoms of uncomplicated UTI. Also may be deferred in patients with “external” pain. Women should be counselled to give a “clean catch” sample: straddle or squat over the toilet and spread labia with non-dominant hand, with dominant hand swab vulva from front to back with three sterile gauze pads. A small amount of urine should be voided and then the specimen cup should be inserted into the stream mid-stream. Leukocyte esterase is 75% sensitive for UTI. Pyuria (3-5 WBC) is 96% sensitive. Nitrate positive is suggestive of UTI, but a negative result does not rule out.
  - Pyuria w/ >100,000 CFU of single organism: diagnostic of UTI.
  - Pyuria w/ <100,000 CFU, two or more organisms: Consider neoplasm, tuberculosis, prostatitis, or epididymitis.
  - Pyuria with no growth: Consider neoplasm, nephrolithiasis, tuberculosis, or BPH.
  - Hematuria w/o pyuria: Consider neoplasm, ureteral stone, or bladder stone.
  - If abnormal vaginal/urethral discharge: a wet mount of the discharge should be microscopically examined and possible gram stain.
    * KOH: will see septate hyphae if there are yeast.
    * Saline: clue cells indicate bacterial vaginosis. May see live trichomonads if there is trichomoniasis.
  - If recurrent UTIs: Intravenous pyelogram should be performed to look at anatomy.
  - If interstitial cystitis is suspected: cystoscopy may be used to confirm diagnosis
  - If suspect vesicoureteric reflux: Voiding cystography should be performed.[27]

Pediatric Considerations:

- Child between 2 months and 2 years of age with unexplained fever? Must consider UTI
  - More common in girls than boys. Rate in uncircumcised boys is twice that of circumcised boys (0.2% vs. 0.4%).
  - Young children are at higher risk for for renal scarring from a UTI and the incidence of vesicoureteral reflux VUR) is higher in young children.
  - Evaluation:
    * If patient is sick enough to require immediate antimicrobial therapy, a transurethral catheterization or suprapubic aspiration (SPA) specimen will be required for an uncontaminated specimen to be procured if antibiotics are to be initiated.
    * If patient does not appear sick enough to require immediate antimicrobial therapy, a transurethral catheterization or SPA can be used or urine may be collected in bag and have urinalysis performed. If urinalysis is positive, then transurethral catheterization or SPA must be obtained prior to initiating antimicrobials and a urine culture must be performed. If negative, it is reasonable to follow clinical course.
12.3. PAINFUL URINATION

* If patient is not clinically improved after two days, reculturing of the urine may be performed. Additionally, a renal ultrasound should be performed promptly to look for cause of obstruction or abscess and VCUG (voiding cystourethography) or RNC (radionuclide cystography) should be performed at the earliest convenient time to detect reflux.
* VCUG or RNC should be performed at earliest convenient time for children that are responsive to mediation.
* A DMSA (99 m Tc-dimercaptosuccinic acid) can be used to evaluate for pyelonephritis or renal scarring, but the usefulness in the clinical management of UTI is unclear.

- Treatment: 7-14 days of oral antimicrobials. If clinical evidence of pyelonephritis, 14 day course is recommended. After course is complete, patient should be maintained on therapeutic or prophylactic dosages until imaging studies are completed.
  * Amoxicillin 20-40 mg/kg/d in 3 doses or
  * Trimethoprim-Sulfamethoxazole 6-12 mg TMP, 30-60 mg SMX per kg per day in 2 doses or
  * Cefixime/Cefpodoxime/Cefprozil/Cephalexin/Loracarbef.[139]

Selected Differential and Treatments:

- **Is pain internal? Increased frequency?** Consider Urinary Tract Infection (bacterial cystitis).
  - Main organisms: *E. coli* (75-90%) *Staph saprophyticus* (5-15%) Remainder of cases mainly gram negative rods: Klebsiella, Proteus, Enterococcus
  - In patients with recurrent UTI, ingesting cranberry products decreased the occurrence of UTIs. There are no clear recommendations about the form or the amount that should be ingested. *The proposed mechanism for this is that a substance in cranberries reduces the ability of E. coli to adhere to the bladder wall.[64]*
  - Medications: Consideration should be given to local sensitivities and resistance.
    * Trimethoprim-sulfamethoxazole: 3 day course
      - Cannot be given in pts with sulfa allergy.
      - Side effects: GI upset, rash, urticaria
      - Widespread resistance in southeastern and western United States
    * Ciprofloxacin: 3 day course
    * Nitrofurantoin: 7 day course
      - Side effects: dizziness, restlessness, headache, diarrhea, nausea, rash
      - Commonly used in pregnant patients with bacteruria
    * Phenazopyridine (Pyridium, uristat): Symptomatic relief.
      - Contraindicated in pts with G6PD deficiency as can precipitate hemolysis
      - Side effects: GI upset, headache, rash
    * Prophylaxis for recurrent UTIs (2 or more symptomatic infections in 6 months or 3 in 12 months): Trimethoprim-sulfamethoxazole half tablet nightly for 6 months or nitrofurantoin nightly for 6 months. Post-coital prophylaxis can also be used and pt can either take a trimethoprim-sulfamethoxazole, ciprofloxacin, or nitrofurantoin tablet.

  - If uncomplicated can be treated as outpatient with 14 day course of either trimethoprim-sulfamethoxazole or ciprofloxacin. If caused by gram positive organism: amoxicillin-clavulanate can be used.
  - Complicated is defined as being in the setting of urinary tract structural abnormalities (eg obstruction or reflux), functional abnormalities, metabolic abnormalities predisposing to UTIs (diabetes), unusual pathogens (mycoplasma, pseudomonas, and proteus), recent antibiotic use, recent urinary tract instrumentation. If complicated, patient should be referred for emergent care.
– If patient has signs of systemic infection (urosepsis) including unstable vital signs with fever: Patient should be referred for emergent care.[62]

- Oral lesions? Arthralgia? Consider spondyloarthropathy (Bechets, Reiters, SLE).[27]

UTI is the most common cause of dysuria, but other sources should be evaluated.

- Men:
  - Penile discharge? Consider urethritis.
    * Evaluation:
      - Obtain urethral smear and culture (if positive: gonococcal, if negative: non gonococcal).
    * Treatment:
      - Patient should be instructed to abstain from intercourse until all partners are treated.
      - Antibiotics if pyuria: Azithromycin 2 g single dose, or Ofloxacin 400 mg bid for 14 days, or Levofloxacin 500 mg Qday for 14 days, or Doxycycline 100 mg bid for 14 days and a single shot of ceftriaxone 250 mgs or cefoxitin 2 g with Probencid or third generation cephalosporins 1 g single dose.[37]
      - If no pyuria: antibiotics will be ineffective. Symptomatic therapy with fluids and phenazopyridine (Pyridium) or Uricet. [62, 144]

  - Penile lesion? Painful vesicles? Consider herpes.
  - Penile lesion? Ulcer? Consider chancroid, syphilis, or Lymphogranuloma venereum (LGV).
  - Irritation of the glans? Consider balanitis.
  - Scrotal pain? Consider epididymitis or orchitis.
  - Perineal pain? Prostatic tenderness? Consider prostatitis or prostodynia (no evidence of bacterial infection).
    * Evaluate for inflammation/secretions to distinguish between the two (prostodynia will have no evidence of bacterial infection or of white blood cells).[27]

- Women:
  - Vaginal discharge? Positive cervical motion tenderness? Dyspareunia? Consider pelvic inflammatory disease (PID) or urethritis.
    * Evaluation:
      - Assess for cervical motion tenderness. Do lab evaluation for chlamydia and gonorrhea. Evaluate vaginal discharge and cervix for signs or yeast infection.
    * Treatment:
      - Instruct patient to avoid sexual intercourse until all partners are treated.
      - Ofloxacin 400 mg bid for 14 days or Levofloxacin 500 mg Qday for 14 days
      - Doxycycline 100 mg bid for 14 days and a single shot of ceftriaxone 250 mg or cefoxitin 2 g with Probencid or third generation cephalosporin 1 g single dose.[37]
  
    * Treatment: Topical estrogen creams.

    * Treatment: Discontinue use of douche or lubricants.

  - Cyclic pain? Premenopausal? Consider endometriosis. [101, 40, 27]

- Pain with bladder filling or emptying? Unilateral lower abdominal pain or back pain? Frequent voiding to relieve pain? Consider Interstitial cystitis:
- Evaluation: After UA rules out hematuria or UTI, a cystoscopy may or may not be performed. Hydro-distension, bladder biopsy, and potassium sensitivity tests (bladder is filled with 40 ml of sterile water and then drained and filled with 40 ml of 0.4 M KCL, a finding of increased pain during second fill indicates bladder hypersensitivity.)

- Avoid foods that aggravate symptoms: acidic foods, caffeine, alcohol, artificial sweeteners, and chocolate.

- First line medications: pentosan polysulfate, intravesical heparin and lidocaine, tricyclic antidepressants, and antihistamines.[96, 52]
Chapter 13

Upper Respiratory Infection

History:

- General questions: (1) Ask about onset (2) Location of any pain (3) Duration of symptoms (4) Ear pain/pressure/drainage (5) Sinus pain or pressure (6) Rhinorrhea (7) Cough (productive, nonproductive) (8) Sore throat (9) Fever (10) Body aches (11) Sick contacts (12) Previous episodes of similar symptoms (13) Medications


Physical Exam

- Ear: Pull on pinna (ear lobe) for pain, otoscopic evaluation (if normal should see “cone of light,” if abnormal, may see purulent fluid behind ear drum, may see redness of the ear canal.)

- Eye: look for conjunctival infection.

- Nose: observe nares with otoscope. Turbinates may appear “boggy” (pale blue with inflamed appearance) which is suggestive of recurrent irritation.

- Sinuses: palpate maxillary and frontal sinuses. Tenderness suggests sinusitis.

- Oropharynx: Use light source to evaluate oropharynx. Evaluate tonsils for erythema, exudates or edema. Evaluate for “cobblestoning” of the posterior pharynx which is suggestive of inflammation.

- Lymph nodes: Evaluate for enlargement of lymph nodes in neck and axilla. In young patients, it is common and not necessarily indicative of infection to have palpable lymph nodes.


- Cardiovascular: evaluate for any new murmurs.

Diagnostic Studies

- Rapid flu test: may indicated if patient is having new onset flu symptoms and especially if they are high risk (Children, pregnant women, people age 50 or older, patients with chronic medical conditions, people living in nursing homes, health care workers, people who live with people who are at high risk for flu)

- Rapid strep test: evaluate need for rapid strep test based on criteria below.
Selected Differential and Treatments

- **Pain in ear? Evidence of purulent fluid behind ear drum?** Consider Otitis Media.
    * Diagnosis:
      - Recent and usually abrupt onset of signs and symptoms of middle ear inflammation and effusion AND
      - Presence of middle ear effusion (either bulging TM, limited or absent mobility of TM, air fluid level behind TM, or otorrhea) AND
      - Signs or symptoms of middle ear inflammation as indicated by distinct erythema or the TM OR
      - Distinct otalgia (ear pain) that interferes with or precludes normal activity
    * Use of antibiotics based on age:
      - <6 months, if there is clinical suspicion use antibiotics.
      - 6 months- 2 years: Use axb if diagnosis is certain or severe illness. Severe illness is described as severe otalgia or temperature greater than 102 degrees.
      - If patient is between 6 months and 2 yo with nonsevere symptoms and an uncertain diagnosis, then a period of watchful waiting can be applied with close clinical follow up.
      - > 2 yo: Use axb if diagnosis certain and severe illness. Even if diagnosis is certain, but illness is not severe, watchful waiting with close clinical follow up may also be done rather than antibiotics.
    * Medications:
      - First line: Amoxicillin 80-90 mg/kg/day. If illness is severe, consider amoxicillin/clavulanate (Augmentin)
      - If penicillin allergy: cefdinir (Omnicef), cefpodoxime (Vantin), or cefuroxime (Ceftin)
      - If severe penicillin allergy (anaphylactic): azithromycin (Zithromax) or clarithromycin (Biaxin)
      - Cannot tolerate PO antibiotics: ceftriaxone (Rocephin)
      - Pain: ibuprofen or acetaminophen. Topical Benzocaine
  
  * **DO NOT TREAT with axb** when patient does not meet above criteria above for acute otitis media even if there is obvious effusion.

- **Sinus pain or pressure? Nasal congestion? Rhinorrhea? Acute Bacterial Sinusitis**
  - Common bugs: *S. pneumoniae, H. influenzae, M. catarrhalis*
  - Diagnosis may be made with some or all of the following symptoms: nasal drainage, nasal congestion, facial pressure or pain, post nasal discharge, hyposmia, anosmia, fever, cough, fatigue, dental pain, ear pressure or fullness.
  - Treat with antibiotics when: not improved after 10 days, worsening symptoms after 5-7 days. If pt fails to respond to medications within 72 hours, reevaluate and switch to alternate axb. Consider culture.
  - Medications:
    - First line: amoxicillin 80-90 mg/kg/day
    - If severe: amoxicillin/clavulanate
    - For beta-lactam allergies: TMP-SMX, macrolides, or clindamycin

- **Sore throat? Tonsillar exudates? Erythematous tonsils?** Consider pharyngitis.
  - Common bugs: Commonly viral. *S. pyogenes- group A strep “strep throat”*
- Strep score: Score: -1 or 0 (1% probability of strep. No further testing or treatment indicated) Score of 1, 2, or 3 (10-35% probability of strep. Rapid strep antigen testing and treat based on results). Score of 4 or 5 (51% probability of strep. Consider empiric treatment or rapid strep testing).
  * Fever +1
  * Cervical Adenopathy +1
  * Tonsillar Exudates +1
  * No cough +1
  * Age <15 yo +1
  * Age 15-45 yo +0
  * Age >45 yo -1
- When not to use abx: if there is a viral cause. Conjunctivitis, cough, rhinorhea, and diarrhea are uncommon with bacterial infection.
- Medications:
  * First line: penicillin V or penicillin G
  * Alternate therapies: amoxicillin, cephalosporin, clindamycin, macrolides

- **Productive cough? Crackles diffusely in lungs?** Consider bronchitis
  - Common bugs: Commonly has viral cause. *B. pertussis, Chlamydia pneumoniae, Mycoplasma pneumoniae)*
  - Prolonged unimproving cough for 14 days. Must clinically differentiate from pneumonia.
  - Medications:
    * First line: Macrolides or tetracyclines if pt >8 yo

- **Child less than 2 years old? Cough? May have wheezing and shortness of breath?** Consider bronchiolitis (Non-specific URI)
  - Nearly always caused by viruses. Common viruses: rhinovirus, adenovirus, RSV, enterovirus, coxsackie virus, and echovirus.
  - No indication for antibiotics unless suspicion for pneumonia or meets criteria for bronchitis.
  - Medications: None
  - Supportive treatment: increase PO intake, humidifier, suctioning, humidifier.[151]

- **Myalgias? Fever? Malaise?** Consider Influenza.
  - Diagnosis:
    * Some or all of the following symptoms suggest influenza: abrupt onset of fever, myalgias, headache, rhinitis, severe malaise, nonproductive cough, and sore throat.
  - Antibiotics are **not** indicated
  - Treatment:
    * Generally supportive
    * Antiviral medications (oseltamivir and zanamivir) can decrease duration of symptoms by 24 hours if initiated within 48 hours of onset of symptoms. Outside of this window, they have minimal effectiveness, though studies of starting medications >48 hours after onset of symptoms in severe cases have not been performed.
  - Comments about H1N1:
    * ~50% of cases are seen in patients <24 years of age, but majority of deaths are in people 50-65 years of age. 6% of deaths are in pregnant women (only 1% of the general population is pregnant at a given time.)
* Infectious period is considered to be one day before fever begins until one day unit after fever ends.

* Evaluation:
  - If patient has uncomplicated clinical illness, they do not need diagnostic testing and instead should be managed clinically.
  - Hospitalized patients with suspected influenza, as well as patients with who the diagnosis would inform clinical care, infection control, or management of close contacts should be tested with rapid flu followed by PCR if clinical suspicion is high and rapid flu is negative.
  - Rapid flu tests have sensitivity that ranges between 10-70%, and therefore, a negative test does not rule out influenza.
  - PCR is very sensitive (86-100%) but results take 2-4 days to get back.

* Treatment:
  - If patient presents with mild/ uncomplicated illness with no risk factors: if patient presents within 48 hours of onset, may consider antiviral. Provide instructions for symptomatic care, infection control, and return to care if not improved in 72 hours.
  - If patient presents with mild/uncomplicated illness with risk factors: treat with antiviral. Provide instructions for symptomatic care, infection control, and return to care if not improved in 72 hours.
  - Antivirals (zanamivir or oseltamivir) should be administered within the first 48 hours of symptoms. Peramivir (IV dosing- must be requested from the CDC) can be used in special circumstances where patient has not responded to either zanamivir or oseltamivir, or drug delivery by a route other than IV is not expected to be dependable or the clinician judges IV therapy is appropriate due to other circumstances. If there is suspicion for influenza, should not delay treatment to confirm with laboratory studies.
  - Though it is preferable to start treatment within 48 hours, patients with prolonged or severe illness (for example: requiring ICU care) starting medication after 48 hours has been shown to reduce mortality and length or hospitalization.
  - Chemoprophylaxis: Should be given to persons at high risk for complications for influenza, health care workers, and pregnant women if they had close contact with a person with suspected or confirmed H1N1 during their infectious period (one day before fever and 24 hours after fever ends). Close contact is defined as droplet exposure from coughing or sneezing or skin contact with patient or surface contaminated with droplets and then self inoculation to mucosal surface.[7]
Chapter 14

Abdominal Pain

History for abdominal pain:


- Past medical/surgical/family history: Prior abdominal surgeries (including C-sections)? Previous episodes of obstruction? Known gallstones or kidney stones? Strong family history of ovarian or breast cancer?


Physical exam

- Red flag signs:

  - Ominous signs of appendicitis: positive obturator sign, psoas sign, Rosving’s sign, or tenderness to palpation at McBurney’s point.
  - Ominous signs of cholecystitis: positive Murphy’s sign.
  - Ominous signs of ruptured abdominal aortic aneurysm (AAA): hypotension, pulsatile abdominal mass.
  - Ominous signs of mesenteric ischemia: pain out of proportion with physical exam.
  - Ominous signs of obstruction: high pitched bowel sounds
  - Ominous signs of perforation: hypotension, tachycardia, and fever with generalized abdominal pain and distention.

- In general:

  - Vital signs: temperature (fever may be sign of viral etiology, cholangitis, perforation), pulse, blood pressure (hypotension and tachycardia are ominous signs of shock, ruptured AAA).
  - Skin: assess for flank ecchymosis (Grey Turner’s sign: retroperitoneal hemorrhage of ruptured AAA), jaundice.
• Murphy’s sign for cholecystitis: abrupt disruption of deep inspiration upon palpation of the gallbladder area
• Psoas Sign for acute appendicitis: patient should lie on side. Examiner will passively extend the thigh of pt with knee extended.
• Obturator sign for acute appendicitis: pain with internal rotation of right thigh.
• Tenderness to palpation at McBurney’s point for acute appendicitis: one third of the distance from anterior superior iliac spine to the umbilicus.
• Rosving’s sign for acute appendicitis: pain in right lower quadrant with palpation of left lower quadrant.

– Mental status exam: If there is concern of hepatic encephalopathy, assess for asterixis. Have patient hold arms out like they are trying to stop traffic. If patient’s hands flap, that is a positive sign of asterixis.
– Pelvic and rectal examination should be performed to check for masses, tenderness, and cervical motion tenderness.
– Concern for psychogenic pain? Deep palpation either with stethoscope or with distraction can be used to assess for pain.

Diagnostic Studies

• CBC, electrolyte panel, liver panel, BUN, creatinine, amylase/lipase, urinalysis, blood cultures, fecal occult blood, and cardiac enzymes. Consider lactate as well. In females, a pregnancy test should be obtained (preferably serum based as urine pregnancy test is less sensitive: important to rule out ectopic pregnancy).
• If initial lab studies show no clear diagnosis: consider imaging
  – Chest X-ray to evaluate for pneumonia, free air, CHF, or PE (not the ideal imaging modality- CT angio preferred if suspicion high).
  – Upright abdominal X-ray if there is suspicion for obstruction, ileus: at least 3 air fluid levels and absence of gas in the large bowel suggests small bowel obstruction. Some air fluid levels with gas in the colon suggestive of ileus or partial obstruction. Distention of small and large bowel suggestive of large bowel obstruction or ileus with ileocecal valve not competent. If ileocecal valve is competent, large bowel only will be dilated.
  – US: if you suspect AAA, suspicious for biliary tract disease, or hydronephrosis secondary to kidney stones.
  – CT: if suspect bowel obstruction, mesenteric ischemia, AAA, appendicitis, pancreatitis with signs of sepsis.
  – Angiography: if suspect mesenteric ischemia.
  – Upper endoscopy: to evaluate for PUD.
  – Barium enema should be performed if large bowel obstruction is suspected. [20, 90, 89, 31]

Selected Differential and Treatment of Chronic Abdominal Pain:

• Blood mixed into stool? Lower abdominal pain? Consider cancer.
  – CT scan and colonoscopy should be performed.
  – Even in the young patient (<40 years) with obvious source (hemorrhoids) and no risk factors: a sigmoidoscopy should be performed.[72]

• Long standing abdominal discomfort accompanied by either constipation, diarrhea, or both? Excess gas? Waxing and waning symptoms for more than 2 years? Worse with stress? Consider Irritable Bowel Syndrome.
- There are no specific tests or physical exam findings, but endoscopy, blood tests and stool evaluations should be done to exclude other etiologies.

- Diagnosis made by history:
  * Rome III criteria: abdominal pain or discomfort for at least 6 months occurring at least 3 days per months in the past 3 months associated with two or more of the following:
    - Improvement with defecation.
    - Onset with change in frequency of stool.
    - Onset associated with a change in the form and appearance of stool.
  * Manning criteria: (3 or more of the following)
    - Pain relief with defecation, often.
    - Looser stools at pain onset, often.
    - More frequent stools at pain onset, often.
    - Visible abdominal distention.
    - Mucous per rectum.
    - Feeling of incomplete evacuation.

- Treatment:
  * Specific dietary changes are not recommended unless patient is able to identify triggers. Patient should be encouraged to keep journal to identify stressors that are related to symptoms. Stress reduction therapy and counseling may be helpful
  * Medications:
    - Antispasmodics: Dicyclomine/hyoscyamine ACh inhib at parasymp. Reduces contractions in the colon. Best to take before meals. Side effects: Dry mouth, fatigue, constipation, urinary retention.
    - Alosetron hydrochloride: 5-HT3 receptor antagonist. Decreases abdominal sensitivity (restricted usage now due to potentially life threatening GI effects).
    - Antidepressants: SSRI s and Tricyclics. Lower doses are required than for depression.
    - Antibiotics: Neomycin and rifaximin.
  * Constipation predominant: osmotic laxatives and fiber.
    - Check: CBC, TSH, likely will need colonoscopy
  * Diarrhea predominant: antidiarrheals.
    - Check: Colonoscopy, CBC, O&P of stool.
  * Pain predominant:
    - Check: serum amylase and liver enzymes.[5]

  - **Intermittent bloody diarrhea? Rectal urgency? Tenesmus (pain with defecation)?** Consider Ulcerative Colitis.

  - Characterized by mucosal inflammation, severe diarrhea, and contiguous colonic involvement including the rectum.

  - Evaluation: Patient should be evaluated for osteoporosis, oral ulcerations, arthritis, and primary sclerosing cholangitis. Colonoscopy or proctosigmoidoscopy and biopsy should be performed to confirm diagnosis.

  - Treatment:
    * 5-ASA: oral or suppository. Suppository works quicker, but may cause anal irritation and have less systemic effects. Studies suggest that patients that regularly take 5-ASA have a decreased risk of colorectal cancer.
      - Side effects: agranulocytosis, diarrhea, headache, nausea, rash, and renal impairment.
    * If patient fails treatment with 5-ASA, Prednisone (40-60 mg per day) may be used until symptoms are controlled (usually 10-14 days). A taper of 5 mg per week should then be employed. It is not advised to use chronic maintenance steroids.
· Side effects: Adrenal insufficiency, hyperglycemia, and osteoporosis
  * If patient does not respond to oral steroids in 5-7 days, pt should be admitted for course of IV steroids.
  * Colectomy is indicated for patients with dysplasia or cancer, resistant to maximal medical therapy, massive hemorrhage, perforation, or toxic megacolon.

– Follow up:
  * Initial colonoscopy should be performed 8 years after diagnosis for pancolitis and 12-15 years after diagnosis for left sided disease. Follow up examinations should be done every one to two years with random mucosal biopsies every 10 cm.[82]

● **Chronic or nocturnal diarrhea? Crampy intermittent abdominal pain? Recurrent low grade fevers, malaise, and arthralgias?** Consider Crohn’s Disease.

  – Characterized by transmural inflammation, “skip” noncontiguous lesions, less common rectal involvement, and common fistula/sinus tracts.

  – Evaluation: Patient should be evaluated for arthralgias, skin manifestations (including erythema nodosum, pyoderma gangrenosum, and aphthous ulcers of the mouth.

  – Treatment:
    * Mild to moderate disease: treat with 5-ASA. If patients are unresponsive, an antibiotic (ciprofloxacin or metronidazole) may be added.
    * Moderate to severe disease: Prednisone with rapid taper if requiring hospital admission, IV steroids should be used. If not effective, Infliximab (Remicade) may be used.
    * If patient requires maintenance therapy, methotrexate may be used.
    * Surgery: Will not be curative, but may be necessary if there is intestinal obstruction, abscess or fistula, perforation, hemorrhage, or perianal disease.[78]

● **Pain with lying down? Burning epigastric pain? Worse after large meals?** Consider GERD.

  – Evaluation: A careful clinical history is sufficient for diagnosis. 24 pH monitoring is usually unnecessary, but can help to clarify diagnosis if atypical chest pain is presenting symptom. Barium swallow can be useful if there is dysphagia, significant weight loss, or occult blood.
    * Though guidelines are unclear: It is reasonable that a patient who has had >5 years of severe GERD should be screened for Barrett’s esophagus with endoscopy.

  – Treatment:
    * Step 1. Lifestyle modifications:
      · Avoid foods that are high in fat or high in carbohydrates.
      · Weight reduction if obese.
      · Avoid large evening meals.
      · Avoid cigarettes, alcohol, and coffee.
      · Avoidance of medications that can aggravate reflux by decreasing sphincter tone: theophylline, calcium channel blockers, meperidine, and anticholinergics. Avoid medications that may injure mucosa: tetracycline, quinidine, NSAIDs, and wax matrix potassium chloride tablets.
      · Elevation of head when sleeping.
    * Step 2. Suppress Gastric Acid production:
      · Antacids after meals and at bedtime.
      · Oral H2 blockers (Ranitidine 150 mg bid, famotidine 20 mg bid, and cimetidine 800 mg bid) are first line. Once daily dosing can be used in milder cases.
      · Proton pump inhibitors (omeprazole 20-40 mg/d or lansoprazole 15-30 mg/d) are the treatment of choice for erosive esophagitis, Barrett’s esophagus, and refractory GERD.
    * Step 3. Promotility Therapy:
· Metoclopramide (dopamine agonist): 10-15 mg qid
· Bethanechol (cholinergic agent): 25 mg qid

* Step 4. Antireflux surgery (Nissen fundoplication, endocinch, or Stretta procedure):
  · Can be useful in severe, difficult to control, or persistent symptoms.[62]

• Poorly localized vague pain? Chronic use of NSAIDS? Consider Peptic Ulcer Disease.
  
  – Evaluation:
    * If there has been perforation, pain will be acute, often epigastric, with abdominal rigidity, likely nausea and vomiting, bleeding, and decreased bowel sounds.
    * With perforation, may have elevated amylase and leukocytosis.
    * Acute Abdominal Series (X-Rays) will show free air in abdomen
    * If uncomplicated, no need for barium swallow or endoscopy and empiric treatment with no diagnostic confirmation. If complicated (positive fecal occult stool) or signs of perforation, endoscopy is indicated.
    * Testing for H. pylori: usually unnecessary, but if diagnosis unclear:
      · Endoscopic antral mucosal biopsy: 90% sensitive and 100% specific.
      · 13C-urea breath test: 91% sensitive and 91% specific. Tests for active infection. Expensive and not widely available.
      · Serology: 71% sensitive and 85% specific. Most widely used.
  
  – Treatment:
    * Avoid use of aspirin and NSAIDs. Use of enteric coated aspirin may decrease superficial ulcers, but does little to impact deep ulcers. Prescribing PPI with NSAIDs can decrease risk of PUD.
    * Cox-2 inhibitors: rofecoxib (Vioxx) most selective, but has been recalled due to increased cardiovascular risk.
    * Lifestyle modifications: Smoking cessation, avoid eating before bedtime, limiting caffeine intake (other dietary modifications have not been shown to be effective).
    * Medications: empiric treatment for H. pylori can be reasonable.
      · Triple therapy: (many possible combinations) omeprazole 40 mg daily, clarithromycin 500 mg tid x2 weeks, and amoxicillin 1 g bid x10 days.[20, 62]

  
  – Evaluation:
    * Physical exam: look for evidence of ascites, edema, check mental status and evaluate for asterixis. Evaluate for depression.
    * Biopsy is not needed for diagnosis, but if chronic hepatitis is confirmed a biopsy should be performed to confirm grade and stage.
    * If patient has confirmed diagnosis of Hep B/C/D, should be evaluated for Hep C, Hep D, Hep A (anti-HAV IgG or total), AFP, HIV, family history of hepatocellular carcinoma. Check for albumin levels, and PT, INR, PTT, BUN and Cre, CBC (evaluate for pre-existing leukopenia or thrombocytopenia as ribavirin may cause anemia), iron levels (evaluate for hemachromatosis).
      · Hepatitis B surface antigen (HBsAg): present in acute or chronic infection
      · Hepatitis B surface antibody (anti-HBs): marker of immunity acquired through natural HBV infection, vaccination, or passive antibody (immune globulin)
      · Hepatitis B core antibody (anti-HBc): IgM—indicative of infection in the previous six months
      · IgG—indicative of more distant HBV infection that may have been cleared by the immune system or that may persist;
CHAPTER 14. ABDOMINAL PAIN

- Positive HBsAg and anti-HBc IgG—indicative of persistent chronic HBV infection
- Hepatitis B e antigen (HBeAg): correlates with a high level of viral replication; often called a “marker of infectivity”
- Hepatitis B e antibody (anti-HBe): correlates with low rates of viral replication
- HBV DNA: correlates with active replication; useful in monitoring response to treatment of HBV infection, especially in HBeAg-negative mutants.

- Treatment:
  * Hep B: indicated if patient has HBeAg or HBV DNA and ALT 2x normal or moderate to severe hepatitis on liver biopsy or presence of HBV DNA plus cirrhosis.
  - Interferon alpha 2b: very expensive ($5600 for 16 wks of therapy) may cause fatal or life threatening autoimmune, infectious, or ischemic disorders. Pts should be carefully followed on this medication.
  - Lamivudine (Epivir): May cause lactic acidosis.
  - Adefovir dipivoxil (Hepsera): chronic use may result in nephrotoxicity, lactic acidosis, and discontinuation can result in severe acute exacerbation.
  * Hep C: treatment is indicated unless patient has comorbid conditions that would make treatment more dangerous and HCV viral genotype (if type 1: success rate only 40-50%, if 2 or 3: success rate 70-80%).
  - Patient should have pregnancy test (pregnancy is absolute contraindication to treatment) as well as TSH (to evaluate for pre-existing autoimmune thyroiditis which can be exacerbated by pegylated interferon). Anemia, CAD, severe depression, and psychosis are relative contraindications to treatment.
  - Treatment is pegylated interferon and ribavirin.[87, 147]


  - Evaluation: Amylase and lipase levels are not diagnostic for chronic pancreatitis. Pancreatic function tests may be abnormal. Fecal fat estimation. Fecal elastase. Check for hypertriglyceridemia and hyperparathyroidism. CT imaging with contrast will show calcifications within the pancreatic ducts.

  - Treatment: Focus on pain relief and management of complications.
    * Lifestyle modifications: smoking and alcohol cessation. Low fat diet and eating small meals.
    * NSAIDs and acetaminophen are first line.
    * If steatorrhea or malabsorption are present: pancreatic enzymes should be administered.
    * One half of patients will eventually require surgery.[102]

- Post-menopausal woman? Bloating or early satiety of new onset within the last 12 months? Consider ovarian cancer.

  - Evaluation:
    * Symptoms index: Pelvic or abdominal pain, increased abdominal size or bloating, or difficulty eating/early satiety of new onset within the last 12 months occurring more than 12 timer per month. Considered positive if patient has even one of the above symptoms.
    * Palpate for adnexal mass, pelvic exam, rectovaginal exam. Ultrasound should be performed. CA 125 should be tested for (considered elevated if >35 U/ml).

  - Treatment: Refer to gynecology or gyn-one as available. [34]


  - Evaluation: LFTs (may show elevated serum bilirubin and alkaline phosphatase). CT scan, CA 19-9 may be elevated.

  - Treatment: Refer to surgery or surgical oncology as available.[32]
Selected Differential and Treatment for Acute Abdominal Pain:

**Generalized**

  - Common bugs: rotavirus, Norwalk virus, adenovirus, enterovirus. *E. coli*, *Yersinia*, *Campylobacter*, *Salmonella*, and *Shigella.*[81, 11]
  - Evaluation: evaluation for acute abdomen, meningitis, stool studies.
  - Treatment:
    * Primarily fluid and electrolyte replacement. Bismuth subsalicylate (Pepto-bismol) can decrease the severity and duration of symptoms, but should not routinely be used in children. Efficacy and safety of loperamide is unclear. In bacterial gastroenteritis, it prolongs course and in viral gastroenteritis its effect is unknown.
    * Patients with diarrhea lasting more than 7 days, severe dehydration with cardiovascular instability, or immunocompromised host should be referred for emergent evaluation and therapy.[94]

- **Feculent emesis? Weight loss? Fatigue?** Consider large bowel obstruction.
  - Most common cause is malignancy. Symptoms will likely be developing over time rather than acute.
  - Sigmoid volvulus can also cause LBO. Factors that predispose to volvulus include: laxative use, sedatives, anticholinergics, and antiparkinsonian medications.
  - Diagnosis will likely be made with plain abdominal films that will show haustral markings that incompletely traverse the circumference of the bowel.
  - If dilated more than 9 cm, increased risk of perforation, otherwise, barium enema can be used to confirm diagnosis.
  - Patient will need to be referred immediately for emergent care.

- **Severe poorly localized pain out of proportion with physical exam? Nausea? Vomiting? Diarrhea?** Consider Acute Mesenteric Ischemia.
  - If perforated: patient may have distention, shock, and peritoneal irritation.
  - Only 25% of patients will have positive fecal occult blood studies. 
  - May see metabolic acidosis, elevated lactate, and elevated amylase but if early infarction, these may be normal. Gold standard for diagnosis is mesenteric angiography.
  - Patient must be referred immediately for emergent care.

  - Patient may have positive peritoneal signs on physical exam.
  - Diagnosis made with acute abdominal series (Abdominal X-ray) to assess for distention.
  - 20% of pts older than 65 yo with SBO will have gallstone ileus. Diagnosed with X-ray findings: air in biliary tree, calculus on plain films, and SBO.
  - Patient must be referred immediately for emergent care. Patient will likely need surgery, but if obstruction is only partial, may respond to conservative treatment with IVF and NG tube suction.[31]
CHAPTER 14. ABDOMINAL PAIN

Epigastric


  – Amylase 5x greater than normal (70-100% sensitive and 79-95% specific). Elevated amylase may also be associated with mesenteric ischemia, peptic ulcer disease, and bowel perforation.
  – Lipase (70-100% sensitive and 80-100% specific)
  – Patient will need to be referred for emergent care.[102]


  – Ruptured AAA: only in 25-30% of cases will the classic triad of hypotension, back pain, and pulsatile mass be seen. Palpable mass with flank ecchymosis is highly suggestive of ruptured AAA.
  – Abdominal X-ray may initially show calcification of aneurysm, US can be used to distinguish AAA from other processes.
  – 90% of patients with AAA will have smoking history.
  – Treatment: if rupture is suspected, patient will need to be referred immediately for emergent care. If aneurysm does not show signs of rupture, patient should have size evaluated by ultrasound.[31] Patient should be counselled to stop smoking, control hypertension and dyslipidemia.
    * Aneurysms 4-5.4 cm should be monitored by U/S or CT every 6-12 months.
    * Aneurysms 3-4 cm in diameter should be monitored by U/S every 2-3 years.
    * Surgical repair is recommend for aneurysms grater than 5.4 cm.

• Poorly localized vague pain? Chronic use of NSAIDS? Consider Peptic Ulcer Disease.

  – See above for evaluation and treatment.

Right Lower Quadrant


  – Fever is a poor indicator. Only 23% of patients had temp greater than 100 degrees.
  – Evaluation: Pt should be referred immediately for emergency care. Patient will likely receive CT scan.
  – Treatment: Patient will be admitted and given broad spectrum antibiotics and IVF. Patient will also likely have surgical intervention.

Right Upper Quadrant


  – Cholecystitis: inflammation of the gallbladder resulting from gallstone blocking flow of bile.
  – Evaluation:
    * Murphy’s sign: inspiratory arrest with palpation of the RUQ (seen in 50% of older pts with chole and less than that in younger pts)
    * RUQ U/S: presence of stones or nonvisualization of gallbladder (no fluid filled lumen), tenderness of gallbladder during U/S, thickening of gallbladder wall, and rounded shape.
* If U/S is nondiagnostic, but clinical suspicion is still high, repeat U/S or HIDA scan may be used.
  
  – Treatment: Patient should be admitted to hospital for pain control, IVF, and empiric broad spectrum antibiotics.

* Immediate surgery should be considered if patient shows evidence of perforation or vital sign instability, and if patient is a low surgical risk presenting with symptomatic cholecystitis. In patients who are high surgical risk who despite two days of medical care continue to require intervention, gallbladder drainage by percutaneous drainage which will be followed by cholecystectomy once the cholecystitis resolves.

• Fever? Jaundice? RUQ pain? (Charcot’s triad) and shock? Mental status changes? (Reynold’s pentad- seen only in 14% of pts) Consider ascending cholangitis.

  – Ascending Cholangitis: Infection of bile duct from bacteria ascending duodenum usually as bile duct is already partially obstructed by gallstones.

  – Evaluation: >50% of pts will have elevated alk phos, ~40% of pts will have hyperbili, RUQ U/S. Can be followed with ERCP which is both diagnostic and therapeutic. If patient is at high risk with invasive diagnostic technique and is medically stable, magnetic resonance cholangiopancreatography can be used to confirm diagnosis and is 90% sensitive.[31]

  – Treatment: Patient needs immediate admission for supportive care including monitoring of vital signs for signs of shock, IVF, pain control, and broad-spectrum antibiotics.

* Majority of patients will respond to conservative therapy alone. However, some patients will require urgent biliary decompression (indications are persistent abdominal pain, hypotension after resuscitation, fever >102 degrees, and mental confusion). ERCP is generally first line for decompression, but direct percutaneous approach, or open surgical decompression may be used as well.


  – Gallstone in the common bile duct (CBD).

  – Evaluation: U/S may not be diagnostic in 10-20% of patients if dilation of the CBD is not present. Magnetic resonance cholangiopancreatography is 90% sensitive. If noninvasive testing is negative, but clinical suspicion remains high, Endoscopic Retrograde Cholangiopancreatography (ERCP) can be both diagnostic and therapeutic.

  – Treatment: ERCP is generally considered gold standard for treatment. [90, 31, 62]

Left Lower Quadrant

• LLQ pain? No evidence of inflammation(no fever, no leukocytosis, no peritoneal signs on examination)? Adult patient? Consider diverticulitis.

  – CT scan will often be used for diagnosis.

  – Treatment:

* Outpatient treatment is appropriate when: patient is reliable, do not have high fever, do not have significant leukocytosis.
  
  • Antibiotics: Ciprofloxacin 500 mg bid and metronidazole 500 mg tid for 7-10 days.
  
  • Lifestyle: instruct patients to consume only clear liquids and if they have improvement in pain in the next 2-3 days, may advance diet slowly.
  
  • Patients should return to medical attention if increasing pain, fever, or inability to tolerate fluids.

* Inpatient treatment: Conservative treatment with bowel rest, IVF (advancing as pain improves) and antibiotics is successful in >70% of patients. Antibiotics should be broad spectrum.
- Augmentin 3 g every 6 hours or
- Zosyn 3.375 g every 6 hours or
- Ceftriaxone 1 g every 24 hours and metronidazole 500 mg tid
* 2-6 weeks after resolution of symptoms: patient should undergo colonoscopy to evaluate neoplasia and extent of diverticulosis.
* Surgery may be indicated to remove portion of colon with diverticula after second attack of diverticulosis.[155]

- **Young child? “Red currant” stool?** Consider Intussusception.
  - Patient will need to be referred immediately for emergent care and will need reduction (either operatively or non-operatively).

- **Sexually active? Abnormal vaginal discharge?** Consider PID.
  - Refer to painful urination section (Chapter 12.3) for treatment and workup.

**Atypical causes:**
- UTI, CHF (with hepatic congestion), pneumonia, MI (esp inferior wall), PE, constipation, urinary retention, or abdominal muscle injury. If questions above are not productive, then it may be fruitful to evaluate for one of these causes[11, 31]
Chapter 15

Headache

History

- Important questions to ask: 1) age at onset 2) description of headache (location of pain, associated symptoms, precipitating factors, aggravating factors) 3) associated with menses 4) medications pt has tried 5) current meds 6) allergies 7) sleep patterns 8) family history 9) surgical history 10) previous medical testing 11) psychological history 12) sources of stress 13) social history 14) cigarette smoking.


Physical exam:

- Complete neurologic exam should be performed (assessing for stereognosis may show subtle signs of frontal lobe dysfunction), assess for mental status, patient should be assessed for papilledema, assess for cervical range of motion, temporomandibular motion and tenderness, assess for sinus pain and pressure (however, be cautious 90% of patients reporting frequent sinus headaches meet criteria for migraine headaches)

- In children: all of the above should be performed in addition head circumference should be measured for macrocrania, examine skin for discolorations or nodules (seen in tuberous sclerosis and neurofibromatosis). [45]

Diagnostic tests

- Labs: Based on clinical suspicion. Lumbar puncture (LP) should be performed if there is concern for meningitis, subarachnoid hemorrhage, pseudotumor cerebri, or neuroborreliosis. [85]

- Imaging: Should not generally be considered for patients with migraine headaches and normal physical exam and though it has not been studied is not generally recommended for tension type headaches. There is insufficient evidence to recommend MRI over CT. Imaging should be performed in the following situation:

  - Nonacute headache and an unexplained neurological finding on neuro exam
  - If red flag symptoms are present: headache worsened by Valsalva, headache causes awakening from sleep, new headache in someone older than 50 years of age, and progressively worsening headache.
  - If the results are likely to change management, if pt is significantly more likely than general population to have significant abnormality, and if testing is indicated on an individual basis (eg for reassurance).[4, 69]
  - In children: all of the above and in addition if chronic daily headache is worsening.[85]
Selected Differential and Treatment

- **Headaches lasting longer than 4 hours? Nausea, vomiting, photophobia, or phonophobia with headache?** Consider migraine.

  - Diagnostic criteria: There must be at least 5 attacks that meet this criteria
    * Headache lasting 4-72 hours
    * Headache with at least two of the following characteristics
      - Unilateral location
      - Pulsating quality
      - Moderate or severe intensity (inhibits or prohibits daily activities or causes avoidance of routine)
      - Aggravated by physical activity
    * During the headache, at least one of the following occurs
      - Nausea and vomiting
      - Photophobia and phonophobia

  - Migraine with aura has the same diagnostic criteria, but patient will have aura
    * Aura: may be visual, sensory, motor, or speech. Visual changes include parallel zigzag lines that are often associated with scotomatous defects. Sensory deficits can involve an ipsilateral arm or para-orbital numbness or tingling. Sensation may have a marching characteristic.

  - Other types of migraines:
    * Basilar type migraines: aura may have dysarthria, vertigo, tinnitus, diplopia, and bilateral paresthesias.
    * Retinal migraine: reversible monocular visual disturbances
    * Status migranicus: migraine lasting at least 72 hours[69]

  - Treatment:
    * Lifestyle modifications (CASH mnemonic): Caffeine: limit to 8 oz of coffee per day (or equivalent- avoid diet pulls, Excedrin, Anacin, Fiorinal or Fioricet), Aerobic exercise: 3 days per week of 30 minutes, Sleep: 7-8 hours uninterrupted sleep per night, Hormones: evaluate for symptoms of thyroid, estrogen, and progesterone abnormalities.
    * Headache journal: Encourage pts to keep track of what triggers headaches and counsel to avoid those.
    * Abortive medications: Pt should be advised to take NSAIDs such as Naproxen 550 mg, Ultram 50-100 mg, or Midrin 2 tabs. This can be repeated with one tablet every hour up to 5 per attack and 10 per week. Caffeine based medications such as Fioricet, Fiorinal, or Excedrin may also be used but no more than twice weekly.
    * Moderate to severe pain: indomethacin 25-75 mg every 8 hours or a triptan or Migranal (lidocaine) nasal spray. Triptans are not indicated for basilar migraines or hemiplegic migraines. Ergotamine or dihydroergotamine may also be considered.
    * If patient has moderate to severe headaches <10-15 days per month. Consider all the above treatments and prophylactic treatments. All prophylactic medications should be continued for 6 months after headaches are under good control and then may taper.
      - If pt is having sleep disturbances: consider amitriptyline 10 mg nightly, increase dose 10 mg every 3 nights until headaches are prevented. Side effects: Sedation, dry mouth, weight gain, tremor, cardiac arrhythmia, and difficulty voiding.
      - If no sleep disturbances: consider Depakote 1000 mg, starting at 250 mg bid and increasing by 250 mg every week to maximum dose.
      - Unable to tolerate amitriptyline: Long acting propanolol 160-240 mg daily.
      - SSRIs, Sansert, Periactin, Neurontin are not as effective as above medications and should only be considered after failing above meds. [69]
* If patient has mild-moderate headaches more than 15 days monthly, or chronic daily headache, or have severe disabling headaches more than several days a month, consider all the medications, lifestyle changes, and prophylactic medications above.
  - Consider 5-10 day course of prednisone beginning at 60 mg and tapering to 20 mg over 5-10 days.[92, 45]

* In children:
  - Lifestyle changes should be initiated as above and abortive agents may be used as above.
  - Acetaminophen and ibuprofen are the mainstays of abortive therapy. Caffeine containing agents may be used as well.
  - Triptans have not been approved for use in children, but preliminary studies in pts 12-18 yo have shown beneficial results.
  - Antiemetics should be used and will often relieve all symptoms including headaches.
  - For prophylaxis: very few medications have been trialed in children. Cyproheptadine (Periactin), amitriptyline, propanolol, carbamazepine, or valproic acid may be used.

- **Band like pain across head? No nausea or vomiting? Pain only mild or moderate?** Consider tension headache.
  - Diagnostic criteria for tension headache. Pt must have at least 10 previous headaches that meet the following criteria
    - Headache lasting for 30 minutes to 7 days, with at least two of the following pain characteristics:
      - Pressing or tightening quality
      - Mild to moderate intensity
      - Bilateral location
      - No aggravation by routine physical activity
    - Both of the following:
      - No nausea or vomiting
      - May have neither or only one of the following: photophobia or phonophobia
  - Chronic tension headache: must meet the above criteria and be present for at least 15 days/month for more than 3 months.

- **Unilateral orbital pain? One sided tearing? Multiple headaches per day? Headaches lasting less than 3 hours?** Consider cluster headache.
  - Diagnostic criteria for cluster headache: Patient must have history of 5 attacks that meet the following criteria:
    - Severe unilateral orbital or supraorbital pain lasting 15-180 minutes.
    - Headache associated with at least one of the following ipsilateral signs in addition to the headache: conjunctival injection, lacrimation, nasal congestion, miosis/ptosis, eye edema, forehead and facial sweating, or sense of restlessness or agitation.
    - Frequency from every other day to eight times a day.
  - Treatment:
    - Can use the same abortive treatments as described for migraines.
    - Responsive to 100% oxygen: can relieve an attack within 10-15 minutes.
    - Prophylactic treatment: can be used if pt has chronic cluster headaches. May use Divalproex (Depakote), a pulse of steroids, or verapamil.[4]

- **New onset headache in a patient older than 50 years of age? Headache lasts all day and may be worse at night? Joint tenderness?** Consider Giant cell arteritis or Temporal arteritis.
– If this is suspected, patient should immediately be started on steroids. A biopsy of the temporal artery will need to be performed, but steroids should be initiated immediately.


  – Treatment will likely involve anticonvulsants such as carbamazepine and gabapentin. [4]

- History of episodic headaches, now having milder, but daily headaches? Using medications for headaches more frequently? Consider transformed migraine (medication overuse headache or rebound headache).

  – Criteria for diagnosis of transformed migraine:
    * >15 headaches per month for >1 month.
    * Average headache lasting >4 hours per day (if untreated).
    * At least one of the following:
      - History of any form of episodic migraine meeting IHS criteria.
      - History of increasing headache frequency with decreasing severity of migrainous features over a period of at least 3 months.
      - Headache at some time meets criteria for migraine other than duration.
      - Does not meet criteria for new daily persistent headache or hemicrania continua.

  – Criteria for diagnosis of medication overuse headache:
    * Headache present for >15 days per month with worse pain during medication overuse and resolution of pain and reversion to previous episodic pattern (<15 days per month) within 2 months after discontinuation of medication.
    * Definition of medication overuse: regular overuse of headache medication for >3 months, use of Ergotamine, triptan, opioids, and combination analgesics >10 days per month, use of simple analgesics >14 days per month, total use of headache medications >14 days per month.[45]

    * Treatment:
      - Discontinue use of abortive treatments- this may cause initial increase in symptoms.
      - Patient should be placed on prophylactic medications (see above).

- Recent viral illness and now having persistent daily headache? Bilateral headache? Consider new daily persistent headache

- History of episodic headaches, now having milder, but daily headaches? Now having bilateral head and neck pain that was not present before? Consider tension type chronic daily headaches.[92, 45]

  – Treatment:
    * Abortive: May use NSAIDs or caffeine containing agents.
    * Prophylactic: Amitriptyline may be used dosed as stated above. Muscle relaxants may also be useful.
    * Other therapies: relaxation therapy, physical therapy (stretching exercises and possibly even traction), and stress management programs may all be helpful in treatment.
    * Small studies have indicated that nerve block in C1-C2 have shown complete relief of symptoms in 2/3 of patients with occipital headache.

- Constant headache with episodes of painful exacerbations? Tearing and rhinorrhea? Consider hemicrania continua.

  – Treatment: Headaches of this type are rare but are consistently responsive to indomethacin.

- Clicking of jaw? Pain near ear? History of bruxism? Consider TMJ.

  – Treatment should include NSAIDs and muscle relaxation techniques. Avoid excessive chewing. [4]
Chapter 16

Musculo-Skeletal Pain

Differentiating between rheumatologic conditions:

- Osteoarthritis Degenerative Joint Disease (DJD): pain improved with rest, <30 minutes of morning stiffness or none at all, pain mainly in hands and weight bearing joints, maybe history of trauma to affected joint
  - PEX: may have crepitus, no warmth or redness, may have bony enlargement
  - Diagnostic studies: Normal ESR, negative rheumatoid factor. Plain film imaging may reveal stigmata of osteoarthritis (loss of joint space, osteophytes at joint margins, sclerosis of subchondral bones, and subchondral cysts).
  - Treatment:
    * Pharmacotherapy:
      - First line: Acetaminophen- favorable safety profile not to exceed 4 gm/day. Use with caution in patients with liver disease or chronic alcohol abuse.
      - NSAIDs: more effective. NSAIDS with least renal toxicity: nonacetylated salicylates, Sulindac, and nabumetone. NSAID with least GI toxicity: Ibuprofen. NSAID associated with accelerated joint destruction: indomethacin.
      - Cox-2 inhibitors: may be used, but have been shown to increase risk of cardiovascular events.
      - Topical: Capsaicin, transdermal lidocaine
      - Injectable: Corticosteroids, viscosupplementation.
    * Non-pharmacologic: Education, PT/OT, weight loss, footwear, osteopathic manipulation/acupuncture/heat/cold.[21]

- Gout or Infection: Painful despite rest, pain at all times (morning included), usually only one joint involved or few, can have some systemic symptoms (fever/chills)
  - PEX: warmth and redness of involved joint, effusion, pain with motion
  - Diagnostic studies: Synovial fluid aspiration (will show elevated WBC and may have positive gram stain, should obtain culture in infection, will show urate crystals in gout, and CPD crystals in pseudogout), ESR will likely be elevated. Patient likely to have elevated serum urate in gout.
  - Treatment:
    * Gout:
      - Allopurinol can be prescribed to decrease the number of outbreaks.
      - NSAIDS are first line if not contraindicated. If ineffective/contraindicated, colchicine can be used during acute flare. Glucocorticoid injections may also be used.
    * Septic joint:
Empiric treatment with vancomycin (30 mg/kg IV divided into 2 doses) if gram stain shows gram positive cocci. If gram stain shows gram negative rods, initial treatment with 3rd generation cephalosporin (ceftazidime with gentamicin if pseudomonas suspected) usually parenteral antibiotics for 14 days followed by another 14 days of oral therapy.[62, 61]

- Rheumatoid arthritis: Pain is improved with activity, >1 hour of morning stiffness peripheral joints tend to be involved often symmetrically, may have systemic symptoms
  
  - PEX: Usually tenderness, involvement of PIP and MCP in hand, usual sparing of DIP except for thumb, may have synovial swelling and tenderness of joints
  
  - Diagnostic studies: May have elevated ESR, positive rheumatoid factor
  
  - Treatment:

    * NSAIDs: 3200 mg of ibuprofen, 1000 mg of Naproxen, 200 mg of celecoxib divided or in single dosing. Disease modifying antirheumatic drugs
    * Glucocorticoids: oral prednisone is used sparingly, preferred mode of treatment is injection of long acting glucocorticoids.
    * Disease modifying antirheumatic drugs: hydroxychloroquine and sulfasalazine for 2-3 months are used in mild active RA due to relatively low risk of serious adverse effects. Minocycline may also be used. More potent DMARDs may be required in more severe disease these include: methotrexate, leflunomide, and TNF inhibitors.[66]

**History:**

- General questions: Onset? Location? Duration? Character of pain? What makes pain better? What makes pain worse? What treatments have you tried? Trauma? Does pain radiate? What activities does this limit you from doing? Do you have pain at rest?


**Physical Exam:**

- See below for specifics of each joint, but in general should involve observation, palpation, range of motion (active and then passive), strength, neuro-vascular testing (including pulses, capillary refill, sensation, and reflexes), and provocative maneuvers.
**Shoulder[152, 153]**

**Observation:**
- AC joint (elevation, prominence, asymmetry), deltoid (atrophy may be suggestive of axillary nerve injury or disuse), scapula (winging suggests serratus anterior weakness/atrophy)

**Palpation:**
- Subacromial palpation: identify acromion by following scapular spine to its tip, gently palpate subacromial space, positive test implies inflammation of tendon or bursa.
- Biceps tendon: palpate biceps tendon in bony groove, positive suggests biceps tendinitis.
- Sternoclavicular joint: dislocation of clavicle will usually be felt as a medial and superior displacement. TTP suggests arthritis.
- Coracoid process: find deepest portion of clavicular concavity and drop from below this 1 inch, palpate laterally and posteriorly to touch tip.
- Greater tuberosity of humerus: inferior to acromion’s lateral edge.
- Bicipital groove: between greater and lesser tuberosities- long head of biceps lies in this groove.
- Scapula: follow acromion posteriorly to spine of scapula.
- Deltoid: palpate for fullness, differentiate tenderness in bicipital groove from tenderness in anterior deltid.
- AC joint: palpate point at which clavicle articulates with acromion.

**ROM:**
- Assess active (patient actively moving) ROM first, then passive ROM (you move pt through movements and may move pt further then they do actively if they are limited by pain).
- Forward flexion: 180 degrees is normal.
- Extension: normal 45 degrees.
- Abduction: normal 180 degrees.
- Abduction/External rotation: have pt reach hand behind head (normal is to C7).
- Adduction/Internal rotation: direct patient to reach hand behind back (normal is to T7).
Strength:

- Empty can test (supraspinatus): abduct shoulder to 80 degrees with 30 degrees forward flexion and full internal rotation (thumb pointing downward), resist forward flexion
- Infraspinatus and Teres Minor: abduct to 20-30 degrees, bend elbow at 90 degrees, place hands on outside of forearms, resist pt as they attempt to externally rotate

- Subscapularis: place hand behind back with palm facing out, have pt lift hand away from back

Neuro-vascular:


Provocative maneuvers:

<table>
<thead>
<tr>
<th>Image</th>
<th>Maneuver</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Neers test for impingement: place one hand on pts scapula, grasp forearm with other, internally rotate thumb (so it is pointing downward), gently forward flex the arm. Pain along biceps tendon suggests impingement.

Hawkin’s Test for impingement: raise pts arm to 90 degrees forward flexion, rotate forearm internally (thumb down), pain suggests impingement.

Yergason’s test for Biceps Tendinitis: flex elbow to 90 degrees, shoulder adducted, grasp pts hand and direct them to supinate arm against resistance. Positive test: pain at insertion of the biceps.
Speed’s Maneuver for Bicipital Tendinitis: Position the elbow is flexed to ~30 degrees and the forearm supinated (palm up), direct the patient to flex their arm as you provide resistance. Positive test: pain at insertion of biceps.

Cross arm test for DJD: ask pt to move arm across chest, if it causes pain at the (Acromio-clavicular) AC joint, than it is suggestive of DJD.

Apprehension test for glenohumeral instability: have pt lie on back with arm hanging off back of bed, grasp elbow in hand and abduct humerus to 90 degrees, externally rotate arm while anteriorly on humerus. Positive test will give pt sense of instability.
<table>
<thead>
<tr>
<th>Diagnostic studies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Adapted from [99]</td>
</tr>
</tbody>
</table>

**Sulcus Sign for multidirectional instability:** apply longitudinal traction to the humeral shaft w/ arm at side while in a seated position; Positive test: greater than 1 cm of displacement. 3 cm is severe.

**Drop Arm Test for Supraspinatus Tears:** Fully abduct the patient’s arm, so that their hand is over their head, ask them to slowly lower it to their side. Positive test: ~90 degrees the arm will seem to suddenly drop towards the body. This indicates supraspinatus tear.

**Crank Test for Labral Injury:** Patient’s arm is abducted and elbow flexed, examiner directs humerus into glenohumeral joint while at the same time rotating the arm. Positive test: glenohumeral joint pain suggests labral tear.
<table>
<thead>
<tr>
<th>Imaging Modality</th>
<th>Indications</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain Films</td>
<td>- First imaging modality for all shoulder pathology.</td>
<td>Detection of:</td>
</tr>
<tr>
<td></td>
<td>- Often the only imaging modality needed for: trauma, calcific tendinitis, and arthritis.</td>
<td>- Bone bruise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Subtle fractures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Soft tissue pathology</td>
</tr>
<tr>
<td>CT scan</td>
<td>- Preoperative evaluation of intra-articular fractures</td>
<td>- Limited soft tissue evaluation</td>
</tr>
<tr>
<td></td>
<td>- Post arthroplasty evaluation</td>
<td>- Detection of bone marrow edema</td>
</tr>
<tr>
<td>MRI</td>
<td>- Best initial modality for evaluation of soft tissue of the shoulder (rotator cuff, biceps, tendons, bursa, labrum)</td>
<td>- Lower sensitivity for evaluation of shoulder instability/labral tear compared to MRA</td>
</tr>
<tr>
<td></td>
<td>- Evaluation of bone marrow</td>
<td></td>
</tr>
<tr>
<td>Bone Scan</td>
<td>- Infection after arthroplasty</td>
<td>- Lack of anatomic localization and detail</td>
</tr>
<tr>
<td></td>
<td>- Suspected metastases</td>
<td></td>
</tr>
<tr>
<td>Conventional arthrography</td>
<td>- Diagnosis and treatment of frozen shoulder (adhesive capsulitis)</td>
<td>- Invasive</td>
</tr>
<tr>
<td>MR arthrography</td>
<td>- Procedure of choice for evaluating shoulder instability/labral tear</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- High suspicion of rotator cuff tear with normal MRI</td>
<td>- Invasive</td>
</tr>
<tr>
<td>CT arthrography</td>
<td>- Rotator cuff tear, when MRI is not available or is contraindicated</td>
<td>- Invasive</td>
</tr>
<tr>
<td></td>
<td>- Shoulder instability/labral tear when MR arthrography is not available or is contraindicated</td>
<td>- Lower sensitivity for evaluation of shoulder instability/labral tear compared to MR arthrography</td>
</tr>
<tr>
<td>U/S</td>
<td>Evaluation of:</td>
<td>- Not widely used or readily available in the United States</td>
</tr>
<tr>
<td></td>
<td>- Rotator cuff tendons</td>
<td>- Highly operator dependent</td>
</tr>
<tr>
<td></td>
<td>- Biceps tendon</td>
<td>- Limited evaluation of very small or very large (&gt;3 cm) tears and for partial thickness tears</td>
</tr>
<tr>
<td></td>
<td>- Calcific tendinitis</td>
<td>- Limited evaluation of the labrum and bony structures</td>
</tr>
<tr>
<td></td>
<td>- Subacromial space</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Muscle</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Interventional therapeutic procedures</td>
<td></td>
</tr>
</tbody>
</table>
Differential Diagnosis and Treatment of Selected Conditions:

Acute Injuries:

- **Fall onto outstretched hand? Point tenderness of obvious deformity of clavicle?** Consider clavicle fracture.
  
  - Imaging: X-ray with AP view and with AP view taken with x-ray beam tilted to 45 degrees (cephalic tilt view). Chest X-ray should be considered in patient with severe trauma to chest.
  
  - Treatment: Figure-of-eight strap or sling worn for 2-4 weeks. Follow up X-ray in 4-6 weeks. If fracture is displaced, refer to orthopedist.

- **Direct blow or fall onto outstretched hand? Crepitus along humeral shaft?** Consider Proximal Humeral Fracture.
  
  - Imaging: AP and lateral radiographs of the humerus. Axillary view should be included if patient is able, if not Y view (scapular lateral view) should be obtained.
  
  - Treatment: If displaced less than 1 cm, place in shoulder immobilizer to prevent external rotation and abduction. If involves anatomic neck, displaced greater than 1 cm, or complex fracture-refer to ortho.

- **Direct blow to scapula? Tenderness along scapula? Painful abduction?** Consider scapular fracture.
  
  - Imaging: AP and axillary or lateral view of shoulder, chest film is indicated if there is high force trauma.
  
  - Treatment: Sling for comfort. Range of motion exercises should be started as soon as pain resolves. To avoid frozen shoulder, begin mobility as soon as pain permits. If fracture site is unstable or involves articular site, refer to ortho.

- **Holding shoulder in external rotation and abduction? Palpable humeral head anteriorly? Positive apprehension test?** Consider glenohumeral dislocation. Anterior dislocation is much more common than posterior dislocation. If posterior dislocation patient will typically hold arm in abduction and internal rotation with limited forward elevation and external rotation.
  
  - Imaging: AP view will usually show anterior dislocation but can miss posterior dislocation. Axillary or Y view are more appropriate for posterior dislocation. CT scan may required to follow up if diagnosis is still questionable.
  
  - Treatment: Relocation of humerus and immobilization to permit healing of the capsule. Mobilization should be restarted by 7-10 days as well as ROM exercises to prevent frozen shoulder. If there is evidence of bony injury (Hill-Sachs lesion-fracture of the humeral head) they should be referred to ortho. Recurrence rate of anterior dislocations in younger thrower athletes is 90%. If recurrent shoulder dislocation, likely will require surgery (Bankart repair of the detachment of the labrum to the glenoid).

Chronic Pain:

- **Older patient? Decreased strength in rotator cuff muscles?** Consider Rotator Cuff Tear. If patient is younger, more likely following acute trauma.
  
  - Imaging: AP view of glenohumeral joint.
  
  - Treatment: Surgical repair in younger and selected older patients. Rehabilitation in patients who are not good candidates for surgery.

- **Pain in anterolateral aspect of shoulder? Radiation, but not below elbow? Pain worse at night? Aggravated by overhead activity? Popping or clicking?** Consider impingement. If in older patient, likely due to overuse and degeneration of supraspinatus tendon. If in younger patient, more likely due to underlying instability.
– Imaging: Should be considered after 2-3 months of conservative therapy, if not improved. Will likely need MRI.
– Treatment: Rest, NSAIDs, icing, and avoid aggravating activities. After pain has resolved, patient should do rotator cuff strengthening exercises. Corticosteroid injections may also be considered.

- **Pain near deltoid insertion? Can’t sleep on affected side? Restriction of glenohumeral elevation and external rotation? Distant history of shoulder injury?** Consider Adhesive Capsulitis or “Frozen Shoulder”

  – Imaging: Radiographs will often appear normal. Arthrography will often demonstrate constriction of joint capsule. Arthrography will often dilate the capsule and therefore may be therapeutic as well.
  – Treatment: Physical therapy, pain medications such as NSAIDs, or corticosteroid injections. Surgical referral can be used after conservative treatment fails.

- **Discrete pain and tenderness of the area of the bicipital groove? Positive Yergason’s and Speed’s test?** Consider bicipital tendinitis.

  – Imaging: Not generally indicated. If pain does not improve with conservative treatment, may consider MRI.
  – Treatment: Rest, icing, NSAIDs, and corticosteroid injections, if conservative management fails surgical transfer of tendon may be necessary.

- **Throwing athlete? Shoulder that clicks or pops with motion? Positive clunk test? Signs of laxity or instability?** Consider labral injury.

  – Imaging: Plain film will likely be normal. MRI arthrography may be needed to view torn labrum.
  – Treatment: Rest, NSAIDs, physical therapy, and arthroscopic or open surgical repair may be indicated.

- **Loss of passive motion and stiffness? Positive cross arm test?** Consider Glenohumeral arthritis.

  – Imaging: AP view of glenohumeral joint
  – Treatment: Heat and ice, NSAIDs, ROM exercises, corticosteroid injections, and if conservative therapy fails refer for further evaluation. See section on osteoarthritis.[153]

### Knee [29, 30]

**Observation:**

- Is patient varus (bow kneed- but varus actually refers to inward stress as it is referencing the feet or distal joint) valgus (knock-kneed- though valgus refers to outward stress as it is referencing the feet or the distal joint)?

**ROM:**

- Full flexion: 140 degrees.
- Full extension: 0 degrees.
Palpation:

- Assess for ballotment: slightly flex knee, place one hand on suprapatellar pouch and gently push down forcing fluid to collect, push down on patella with thumb, is positive will feel as if it is floating and bounce back.

- Assess for small effusion: gently stroke upward along medial aspect of patella pushing fluid up and lateral, gently push on lateral aspect of joint, if positive will see a slight bulge in the medial area when you push laterally.

- Assess for joint line tenderness: have pt slightly flex knee, press along medial and lateral aspect of joint and assess for tenderness.

Provocative maneuvers:

- Menisci:

  - McMurray’s Test for medial meniscus tear (right sided): place left hand on medial aspect of knee, place right hand on right foot, fully flex knee, evert (turn outwards) foot, and place valgus (outward) pressure on knee, if positive will feel click at the medial aspect of knee with left hand.

  - McMurray’s Test for lateral meniscus tear (right sided) same as above, but invert (turn inwards) foot, place left hand on lateral aspect of joint, place varus (inward stress) on knee, gently flex and extend knee. Positive: will feel click at the lateral aspect of knee or pain.

  - Appley Grind Test for meniscal injury: have patient lie on stomach, grasp ankle and foot with both hands, place your knee on the patients thigh and put some downward pressure, gently rotate the ankle back and forth. Positive test: pain in area of menisci.
• Ligament:
  - MCL (right sided): flex knee to 30 degrees, place left hand on lateral aspect of knee, place right hand on ankle, push inward with left hand while supplying opposing force with right hand, positive test is if MCL opens up along medial aspect without clear endpoint. If testing in full extension, ACL is stabilizer and if test shows no clear endpoint, indicates ACL tear as well.
  - LCL (right sided): flex knee to 30 degrees, place right hand on medial aspect of knee, place left hand on ankle, push outward with right hand while supplying opposing force with left hand, positive test is if LCL opens up along lateral aspect. If testing in full extension, ACL is stabilizer and if test shows no clear endpoint, indicates ACL tear as well.

• ACL (Lachman’s Test- right sided): Grasp femur above the knee with left hand and tibia with right, flex knee slightly, pull up sharply with right hand while stabilizing femur with left, positive test will give unrestrained forward movement.

• PCL (Posterior Drawer test- right sided): Patient lies down with right knee flexed to 90 degrees, sit on foot, grasp below knees with both hand with thumbs meeting along front of tibia, push backward, positive test will have unrestrained retrograde movement.

• Chondromalacia (osteoarthritis of underside of patella): gently push down on patella with both thumbs. Positive test: pain inferior to knee cap.
• Nobel’s test: Have pt lie on normal hip, with afe act hip and knee flexed. Examiner places thumb over femoral epicondyle. Examiner repeatedly flexes and extends knee. Positive test: pain over IT band insertion on femoral epicondyle.

• Ober test for iliotibial band syndrome: Have pt lie on normal hip, with afe act hip and knee flexed. Hip is abducted and extended then attempt to adduct the hip. Positive test: will have limited adduction due to contracture.

Selected Differential and Treatments in Children and Adolescents:


  – Imaging: not indicated
  – Treatment: Rest, NSAIDs, Cho-Pat strap.

  – Imaging: Plain films should be ordered, but negative plain films do not exclude diagnosis and if suspicion is high, CT scan is indicated.
  – Treatment: Immediate ortho consult is indicated.

  – Imaging: Plain films may demonstrate. Recommend AP, Posterior anterior tunnel, lateral and Merchant’s view. If suspicion is high, MRI is highly sensitive.
  – Treatment: Refer to ortho, patient will need surgery for removal of damaged bone and induction of micro-trauma to induce new bony growth.
CHAPTER 16. MUSCULO-SKELETAL PAIN

Selected Differential and Treatments In Adults:

  - Imaging: Weight bearing AP and posteroanterior tunnel, non-weight bearing Merchant and lateral views.
  - Treatment: NSAIDs are first line. Corticosteroid injections may be used and most patients will require. Viscosupplementation injections is a newer treatment with longer lasting effects than corticosteroid injections. See osteoarthritis section for further discussion.

- **Mild to moderate anterior knee pain aggravated by sitting for prolonged periods? Positive patellar grind?** Consider Patellofemoral pain syndrome.
  - Imaging: Not indicated
  - Treatment: Rest, Ice, NSAIDs, and Patellar stabilization sleeve.

- **Medial knee pain? Pain worse with more use? Mobile nodule present on medial aspect of knee anterior to joint line? Consider Plica syndrome.**
  - Imaging: Not indicated, but if diagnosis is unclear, MRI is indicated.
  - Treatment: NSAIDs can be used as first line, corticosteroid injection may be used if pain does not improve, and in rare cases surgery may be used.

- **Medial knee pain? Tenderness on medial aspect of knee just posterior and distal to medial joint line? Pain with resisted knee flexion or valgus stress? Consider Pes anserinus bursitis.**
  - Imaging: Not indicated, but if diagnosis is unclear, MRI is indicated.
  - Treatment: Rest, ice, NSAIDs, sonography, physical therapy, sleep with small cushion between thighs. Resective surgery may be performed if condition is refractory to treatment.[59]

- **Lateral knee pain? Pain worse with greater use? Positive Noble and Ober’s? Consider Iliotibial band syndrome.**
  - Imaging: Not indicated.
  - Treatment: Rest, Ice, NSAIDs, Physical therapy, and Iliotibial band strap. May perform corticosteroid injection, if refractory to treatment.

- **Gradual onset of pain? Instability? Palpable cyst/fullness in the popliteal area? Consider Popliteal (Baker’s) Cyst.**
  - Imaging: Diagnosis may be made with arthrography, ultrasonography, CT scanning, or MRI.
  - Treatment: NSAIDs may be trialed, but patient will likely require corticosteroid injection or rarely surgery for excision of cyst.

Selected Differential and Treatment with Trauma

- **Pop at time of injury? Noncontact deceleration force (planting foot and sharply turning)? Positive Lachman’s? Consider ACL tear.**
  - Imaging: MRI indicated
  - Treatment: Refer to ortho.

- **Trauma placing valgus stress on knee (MCL) or varus (LCL)? Swelling on medial (MCL) or lateral (LCL) aspect of knee? Point tenderness on medial joint line (MCL) or lateral joint line (LCL)? Valgus stress (MCL) or varus (LCL) at 30 degrees replicated pain? Laxity or no clear endpoint with valgus (MCL) or varus (LCL) stress? Consider collateral ligament tear or strain.**
- Imaging: MRI indicated.
- Treatment: Refer to ortho.


- Imaging: MRI.
- Treatment: Refer to ortho.

**Foot and Ankle [149]**

**Observation:**

- Observe for swelling, bruising, pes planus or pes cavus (flat foot or high arches: observe while standing), gait.

**Palpation:**

- Bony:
  - Ankle: Assess for TTP on lateral malleolus, medial malleolus, distal tibia.
  - Metatarsal squeeze, calcaneus, axial load on the toes (push toes inward onto foot), palpate the base of the 5th metatarsal.

- Ligaments: Assess for tenderness to palpation over CFL, PTFL, ATFL (talar dome) Deltoid ligament, Achilles tendon

**ROM:**

- Dorsiflexion: 20 degrees
- Plantarflexion: 50 degrees

**Strength:**

- Dorsiflexion, plantarflexion, inversion, eversion

**Provocative Maneuvers:**

<table>
<thead>
<tr>
<th>Image</th>
<th>Maneuver</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Selected Differential and Management:

Trauma:

- **Rolled ankle?** *Positive talar tilt?* Consider Ankle Sprain.
  
  - Imaging: Plain films should be performed based on the Ottawa Criteria: Imaging should be performed if there is pain in the malleolar zone and bone tenderness at the posterior edge of the tip of the lateral malleolus or posterior edge or tip of the medial malleolus or inability to bear weight both immediately and in the emergency department.
- Treatment:
  * Grade 1 or 2 sprain: (no tear or partial tear: Clear talar tilt end point): Rest, Ice, NSAIDs, elevation, crutches until weight bearing is pain free, and ROM exercises when the patient is pain free. If patient is repeatedly “rolling” ankle, consider ankle brace for stabilization.
  * Grade 3 sprain: (Total tear) Refer to ortho. Casting vs. surgery should be considered.

- Imaging: Not indicated unless symptoms fail to improve with conservative treatment
- Treatment: NSAIDs, Ice. Instruct patient on stretches that may be performed. If imaging reveals a bone spur, this should **not** be construed as the cause of the pain, and does not in itself require treatment.

- **Swelling of the Achilles tendon? Tenderness over Achilles tendon?** Consider Achilles tendinitis.

- Imaging: Not indicated, but may use ultrasound or MRI if there is concern for tear or rupture.
- Treatment: May use heel cups/lifts, NSAIDs, Ice, Achilles tendon stretches and calf strengthening.

- **Swelling of the medial midfoot? Tenderness over medial midfoot?** Consider posterior tibialis, flexor digitorum longus, and flexor hallucis longus tendinitis.

  - Imaging: Not indicated, but may use ultrasound or MRI.
  - Treatment: NSAIDs, Ice, PT

---

**Lower Back[75]**

**Observation:**

- Look for symmetry of back, look at curvature of spine, observe normal gait

**Palpation:**

- Palpate the spine for bony tenderness, palpate the paraspinal muscles.

**ROM:**

- Strength: Assess strength of lower extremities for symmetry.
Neuro-vascular exam:

- Assess patellar (L4 nerve root) and Achilles (S1 nerve root) DTRs. Rectal exam: cremasteric reflex, anal wink. Assess for symmetrical sensation to light touch.

Provocative Maneuvers:

<table>
<thead>
<tr>
<th>Image</th>
<th>Maneuver</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Straight leg raise" /></td>
<td></td>
</tr>
<tr>
<td>Straight leg raise: Pt lies supine on table and examiner raises leg off the table. If there is pain down the leg at 30-70 degrees of elevation, this is considered a positive test. Crossed straight leg raise: Pt lies supine on table and examiner raises leg of the unaffected side. If pt has pain down the unraised leg, this is considered a positive test.</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="FABER test" /></td>
<td></td>
</tr>
<tr>
<td>FABER test (for sacroiliac joint disorder): Pt lies supine on the exam table, place the foot of the affected side on the opposite knee, press down on the flexed knee and the opposite anterior superior iliac crest. A positive test is pain in the sacroiliac area indicates a problem with the sacroiliac joints.</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Stork test" /></td>
<td></td>
</tr>
<tr>
<td>Stork test (for spondylosis): Pt stands on one leg and leans backwards. A positive test is LBP and indicates spondylosis.</td>
<td></td>
</tr>
</tbody>
</table>
Imaging (AP and Lateral plain films) is indicated if any of the following red flags are present:

- History of serious trauma
- Age greater than 50 if there is suspected malignancy
- Pain at rest with suspicion of tumor
- Unexplained weight loss
- Drug or alcohol abuse with signs of disc space infection (redness, warmth, swelling)
- Temperature greater than 38 degrees Celsius
- Unremitting pain of 4-6 weeks duration after conservative treatment (ESR should also be obtained)
- Treatment with corticosteroids
- Unrelenting nocturnal pain
- Pain relieved by ASA (osteoid osteoma).

- If there is concern for spondylasis and spondylolisthesis it will require oblique x-rays to visualize pars defects. If there is concern for malignancy normal plain films, ESR, Alk Phos, and calcium levels are adequate to exclude occult malignancy

Selected Differential and Treatment:

- **Shooting pain down leg? Positive straight leg raise? Positive crossed straight leg raise?** Consider disk herniation, sciatica.
  
  Imaging: If patient fails to improve with conservative treatment for 4-6 weeks, MRI may be indicated.

  - Treatment: Recommend strengthening and flexibility exercises at home or at PT, NSAIDs, muscle relaxants if there is a palpable muscle spasm, icing, TENS unit, teaching proper back hygiene, and may consider incising trigger points with lidocaine.

- **Positive stork test? Younger athlete? Pain with forward flexion, rotation from side of lesion, and lateral bending toward lesion?** Consider spondylosis.
  
  - Imaging: Obtain AP, lateral, and oblique plain films to evaluate for “broken neck on Scottie dog.” If suspicion is high, but x-ray is negative, a bone scan may be obtained.
  
  - Treatment: If injury is acute: rest for 8-12 weeks with no loading forces on the spine. May require body cast or Boston brace. Activity can resume 4 weeks after becoming symptom free. If injury is chronic, fusion may be warranted. If healing has already occurred, activity may resume after they are asymptomatic.

- **Flattening of lumbar lordosis? Palpable bony step off? Severe LBP? Limited forward flexion (fingers to thighs only)?** Consider spondylolisthesis. This is a slippage of one vertebra upon the one below due to loss of continuity between the anterior and posterior elements
  
  - Imaging: Standing AP and lateral. Obliques lying or standing. AP view “Napoleons hat.”
  
  - Treatment: Strengthening program. Hamstring stretching, and fusion if conservative treatment fails.

- **Leg cramping with walking and standing? Pain decreases with sitting and lying? Walk hunched over to open canal?** Consider spinal stenosis.
  
  - Imaging: Not indicated, but plain films may be ordered if diagnosis unclear.
  
  - Treatment: NSAIDs, Oral steroids, epidural steroids, or elective surgery (decompression laminectomy) may be performed.
Wrist and Hand [42, 41, 53]

**Observation:**
- Assess for atrophy of muscles of hand (hypothenar and thenar eminence), assess for presence of contractures, and any swelling.

**Palpation:**
- Palpate over the distal heads of radius (tenderness may suggest Colles fracture or de Quervain’s tenosynovitis) and ulna, palpate the bones of the wrist, squeeze the metacarpals, place axial load on the phalanges, do fulcrum testing of metacarpal, assess for tenderness of anatomic snuffbox (tenderness suggests scaphoid fracture)

**ROM:**
**Strength:**

- Wrist flexion/extension, Radial/ulnar deviation.

**Provocative Maneuvers:**

- Grind test (for radiolunar joint instability): Place axial load on the distal ulnar and radial heads and then twist the forearm. Positive test is pain.

- Finkelstein’s test (for de Quervain’s tenosynovitis): Ulnar deviation of the wrist while grasping the thumb. Positive test is pain over the radial styloid.

- Lunotriquetral shear test (for lunotriquetral ligament tear): apply dorsal force to triquetrum and palmar force over the lunate. A positive test is painful click.

- McMurray’s test (for TFCC lesion): Press the triquetrum against the head of the ulna with the wrist in ulnar deviation. Positive test is pain, crepitus, or a snap.

- Supination lift test (for TFCC injury): ask pt to lift themselves off the examination table or to lift the exam table with palm flat. Positive test is pain and weakness. However, this test is only appropriate in reasonably fit patients.

- Watson’s test or Scaphoid shift test (for scapholunate separation or instability): Press the scaphoid tuberosity on the palmar aspect while moving the wrist from ulnar to radial deviation. A positive test is a click or a pop.

**Selected differential and treatment:**

- **Pain over the anatomical snuffbox? History of trauma?** Assume scaphoid fracture.
  - Imaging: Plain films of the hand including scaphoid view should be ordered. If there is no fracture seen, repeat imaging should be performed in three weeks.
  - Treatment: If initial x-ray shows fracture, patient should be put in long arm cast or a short arm thumb spica splint or cast and shoulder sling. A simple palmar sling or “sugar tong” splint is inadequate. If initial radiographs are negative, pt should be put in a temporary thumb spica splint for two weeks until there is repeat imaging. If there is no tenderness at repeat evaluation and the imaging is negative, patient needs no further evaluation. If tenderness persists, refer to ortho.

- **Positive Watson test? Fall on or trauma to hypothenar eminence? Pain out of proportion to injury?** Consider scaphoid lunate instability.
– Imaging: Will often be negative, but plain films of hand with scaphoid view should be obtained.
– Treatment: Refer to ortho, and stabilize initially with thumb spica splint.

Elbow [35]

**Observation:**
- Look for swelling along the olecranon border (bursitis).

**Palpation:**
- Assess for tenderness over the lateral and medial epicondyle, and lateral collateral ligament and medial collateral ligament.

**ROM:**
- Normal flexion is from 0 to 150 deg of motion and 80 deg of pronation and supination.
Strength:
- Flexion/Extension. Pronation/Supination.

Provocative Maneuvers:
- Tennis elbow test (for lateral epicondylitis): Extend elbow and examiner will stabilize elbow with hand and thumb on lateral epicondyle. Pt will make fist and pronates arm while examiner resists pronation. A positive test is pain when test is performed with 90 degrees of elbow flexion.
- Radial tunnel syndrome test: Examiner will apply flexion force against third digit distal to PIP joint. A positive test is pain over the extensor muscles in the proximal forearm.
- Ulnar and radial ligamentous stability test: Flex pts forearm to 20 degrees. Examiner applies valgus (ulnar laxity) and varus (radial laxity) pressure alternately. Positive test is laxity and suggests ligamentous instability.
- Golfer’s elbow test: elbow in 90 degrees of flexion, wrist pronated with fingers in fist. Examiner supports wrist with one hand while palpating medial epicondyle with other while passively supinating forearm and fully extending forearm. Positive test is pain over medial epicondyle.

Selected differential and treatments:
  - Imaging: Not indicated.
  - Treatment: NSAIDs, ice, and rest.
- Posterior elbow pain worse with extension? Tenderness of the distal head of the triceps tendon? Consider Triceps tendinosis.
  - Imaging: Not indicated.
  - Treatment: NSAIDs, ice, and rest.
- Lateral elbow pain? Worse with activity that radiates down the lateral forearm? Positive tennis elbow test? Consider Tennis Elbow (extensor carpi radialis tendinosis)
– Imaging: Not indicated.
– Treatment: NSAIDs, ice, rest

• *Medial elbow pain? Pain worse with wrist flexion and forearm pronation?* Consider Golfer’s elbow (Flexor carpi radialis tendinosis).

– Imaging: Not indicated.
– Treatment: NSAIDs, ice, rest

**Hip [10, 80]**

**Observation:**
- Assess gait, ability to bear weight, assess for symmetry.

**Palpation:**
- Palpate over the greater trochanter (bursitis), inferior pubic ramus (possible femoral fracture).

**ROM:**
- Assess for abduction 45 degrees, adduction 25 degrees, flexion 135 degrees, extension 15 degrees, external rotation 45 degrees, and internal rotation 35 degrees. Pain in the groin with internal rotation suggests possible femoral head fracture.

**Strength:**
- Assess for symmetry and pain abduction, adduction, flexion, extension, external and internal rotation.

**Provocative Maneuvers:**
- In infants:
  - Ortolani maneuver for hip dysplasia: Abduct the infant’s leg using the examiner’s thumb while placing anterior pressure on the greater trochanter using the examiner’s index and forefinger. Positive test: a “clunk.”
  - Barlow maneuver for hip dysplasia: Adduct the hip (bringing the thigh towards the midline) while applying pressure on the knee, directing the force posteriorly. Positive test: a clunk or hip coming out of socket.[57]

- Ober’s test (for Iliotibial band syndrome): have pt lay on unaffected side. Extend and abduct thigh. If pts knee stays at the level of the hip (knee does not drop down) or patient has pain in the lateral thigh, this is a positive test.
• Noble’s test (for iliotibial band syndrome): Have pt lie on normal hip, with affect hip and knee flexed. Examiner places thumb over femoral epicondyle. Examiner repeatedly flexes and extends knee. Positive test: pain over IT band insertion on femoral epicondyle.

Selected Differential and Treatment in Children:

• *Clunk with Ortolani or Barlow maneuver?* Consider developmental hip dysplasia.
  
  – Imaging: Plain films.
  
  – Treatment: refer to ortho for likely Pavlik harness and reduction of hip.

• *Gradually worsening hip and/or knee pain? Limited abduction, flexion, and internal rotation? Young patient?* Consider Legg-Calve Perthes disease.
  
  – Imaging: Plain films to look for changes in epiphysis.
  
  – Treatment: Refer for ortho.

• *Pain in knee or anterior thigh with normal knee exam? Young patient? Limited internal rotation?* Consider Slipped Capital Femoral Epiphysis.
  
  – Imaging: Plain films to evaluate for widening of the epiphysis.
  

Selected Differential and Treatment in Adults:

• *Pain over greater trochanter? Pain with transition from sitting to standing? Adult patient?* Consider trochanteric bursitis.
  
  – Imaging: Not indicated.
  
  – Treatment: Ice, NSAIDs, Iliotibial band stretches, consider PT if conservative treatment fails.

  
  – Imaging: Plain films. If negative and suspicion is high, bone scan would be appropriate.
  
  – Treatment: refer to ortho.

• *Lateral hip or thigh pain? Positive Ober’s test?* Consider iliotibial band syndrome.
– Imaging: Not indicated.
– Treatment: NSAIDs, ice, stretching program, and modification of footwear. Consider PT if pain does not improve with conservative treatment.

• **Dull ache or throbbing in groin? History of steroid use? Pain with walking, abduction, and internal/external rotation?** Consider Avascular necrosis of the femoral head.

  – Imaging: Plain films or MRI.
  – Treatment: Refer to ortho. Patient should be counseled to be non-weight bearing. Will likely require surgery, but if caught early there may be conservative treatments to try.

  – Avascular necrosis is seen more commonly in patients with the following conditions which can be remembered by the mnemonic ASEPTIC: Alcohol, Steroids/Sickle cell/SLE, Erlenmeyer flask (Gaucher disease), Pancreatitis, Trauma (hip dislocation), Infection/Idiopathic, Chemotherapy, Caisson’s disease (“The Bends”)

• **Dull posterior pain that radiates down leg? Pain with palpation of sciatic notch?** Consider Piriformis syndrome.

  – Imaging: None indicated. If diagnosis unclear, EMG studies may be helpful. MRI of the lumbar spine if nerve root compression is suspected.
  – Treatment: Stretching, NSAIDs, rest.

• **Pain or paresthesia of anterior or lateral groin and thigh? Abnormal distribution of lateral femoral cutaneous nerve on sensory exam?** Consider Meralgia paresthetica.

  – Imaging: Nerve conduction velocity testing.
  – Treatment: Avoid compression of nerve (clothing, equipment, pannus).
Chapter 17

Fatigue [121, 130, 62]

History:

• Ask detailed description of sleep habits including how much, where, when, any disturbances, snoring, what person is doing as they fall asleep, when they wake up and why.
• Ask about what patient thinks is wrong with them.
• Ask about use of hypnotics, tranquilizers, alcohol, and illicit drugs
• Ask about predisposing, precipitating, or perpetuating factors. Symptoms of sleep apnea, reflux, or rhinitis.
• A complete review of symptoms should be performed in any clinic visit, but is critical when trying to work up fatigue:
  - Pulm: Shortness of breath? History of smoking? (COPD).
  - Psych: Symptoms of depression? Anxiety? Current stressors?
  - Environmental: Exposure to heavy metals? Exposure to Carbon monoxide? Exposure to pesticides?
• Ask about systemic symptoms of disease, the following is an incomplete list of systemic diseases that may present with fatigue:
  - Cardiopulmonary: CHF (including diastolic dysfunction), angina (anginal equivalent), bradycardia, peripheral vascular disease, COPD, arrhythmia, and pulmonary insufficiency.
  - Hematological/Oncological: anemia, malignancy, para-neoplastic syndrome
  - Neuro: primary nerve diseases, primary sleep disorders, Multiple sclerosis
  - Endocrine: diabetes, hypo/hyper-thyroidism (incl. apathetic hyperthyroidism of elderly), hypo/hyper-parathyroidism, electrolyte imbalance (hyponatremia, hypercalcemia), Addison’s disease, chronic kidney disease, pituitary insufficiency, hepatic failure
CHAPTER 17. FATIGUE

- Infection: TB, endocarditis, chronic encephalitis/meningitis, chronic hepatitis, pneumonia (elderly), mononucleosis, parasitic disease, HIV, CMV, syphilis, Lyme disease
- Drug-induced: sedative hypnotics, analgesics, antihypertensives, antidepressants, muscle relaxants, opioids, antibiotics, or substance abuse
- Inflammatory: rheumatoid arthritis, SLE
- Environmental: heavy metal poisoning, carbon monoxide exposure, pesticides
- Unknown: Chronic Fatigue Syndrome


Physical exam:

- Vitals: Pulse (Rate AND Rhythm), postural pulse, blood pressure, temperature, and weight. If no fever evident in office, may suggest to patient to measure temperature at home.
- Skin: Evaluate for changes in pigmentation, purpura, jaundice, dryness, pallor (esp conjunctival, mucosal: suggestive of anemia), splinter hemorrhages or petechiae (endocarditis)
- HEENT: Funduscopic (Roth’s spots, diabetic retinopathy), sclerae evaluation for icterus. Evaluate for lymphadenopathy. Evaluate thyroid for goiter/nodules. Look for petechiae at the junction of the hard and soft palate (suggestive of mononucleosis).
- Cardio: Evaluate for murmurs, rubs, gallops, and rhythm disturbances.
- Pulm: Effusions, crackles (bilateral suggests CHF) consolidations (pneumonia).
- Abdomen: Palpate for masses, hepatosplenomegaly. May include rectal exam, examination of genitalia for masses.
- Musculo-skeletal: Evaluate for joint pain/tenderness/redness/warmth, truncal weakness.
- Mental status exam: If disoriented may suggest metabolic or endocrine disorder or pseudo-dementia resulting from depression.
- Neuro: DTR (if low suggest hypothyroid)

Diagnostic studies:

- If patient is overtly depressed with otherwise completely normal physical and history and has had appropriate screening for thyroid function and CBC, no further lab work up may be required.
- Full blood count, ESR/CRP, liver function tests (hepatitis panel follow up if transaminase levels are elevated), urea and electrolytes, TSH, creatinine kinase, urine and blood tests for glucose, and urine tests for protein.[130] Women of childbearing age should have a pregnancy test.[121]
- If fatigue is persistent and presenting with lymphadenopathy, a Heterophile test (mono-spot test) for EBV should be performed. Lyme titers should be performed if there is evidence of Lyme disease including polyarthritis, history of tick bite, or erythema chronicum migraines. HIV serology should be performed if concerned for HIV.[62]
Selected differential and treatment:

- Fatigue despite rest? No medical explanation for fatigue? Consider chronic fatigue syndrome.
  - Diagnostic criteria: Clinically evaluated, medically unexplained fatigue of at least 6 month’s duration that is of new onset **and**: not result of ongoing exertion, not substantially alleviated by rest, and associated with substantial reduction in previous levels of activity **with occurrence of 4 or more of the following symptoms**:
    * Subjective memory impairment
    * Sore throat
    * Tender lymph nodes
    * Muscle pain
    * Joint pain
    * Headache
    * Unrefreshing sleep
    * Post exertional malaise lasting more than 24 hours
  - **Exclusion Criteria**: Active unresolved or suspected medical disease or psychotic, melancholic, or bipolar depression (but not uncomplicated major depression), psychotic disorders, dementia, anorexia or bulimia nervosa, alcohol or other substance misuse, severe obesity
  - Treatment:
    * Emphasize to the patient that this is a legitimate disorder that is often self limiting.
    * Help patient to overcome perpetuating factors, educate, reduce stress, gradually increase activity, and offer assistance as appropriate to discuss solutions for social and occupational problems.
    * Cognitive behavior therapy: More than 75% of patients receiving CBT will return to normal functioning within 12 months compared to only 25% receiving medical therapy alone. Patient will be taught to identify and reverse harmful beliefs and coping mechanisms.
    * Graded exercise therapy: 30 minutes of daily walking improves all cause fatigue, in fact it should be considered first line therapy as it has a more positive impact than any other intervention studied. However, without concurrent CBT, drop out rate is high. [121]

  - Diagnostic criteria:
    * Widespread pain including axial pain for at least 3 months **AND**
    * Pain (not described by patient as mere tenderness) in at least 11 of 18 possible tender point sites (see below) **AND**
      * Occiput: bilateral at the suboccipital muscle insertions.
      * Low cervical: b/l a the anterior aspects of the intertransverse spaces at C1-C7.
      * Trapezius: b/l at the midpoint of the upper border.
      * Supraspinatus: b/l at the origins, above the scapula spine near the medial border.
      * Second rib: b/l at the second costochondral junctions, just lateral to the junctions on the upper surfaces.
      * Lateral epicondyle: b/l, 2 cm distal to the epicondyles.
      * Gluteal: b/l in the upper outer quadrants of buttocks in anterior fold of muscle.
      * Greater trochanter: b/l posterior to the trochanteric prominence.
      * Knee: b/l at the medial fat pad proximal to the medial joint line.
CHAPTER 17. FATIGUE

- Ruling out of similarly presenting syndromes. Myofascial syndrome presents similarly but with focal rather than diffuse pain/stiffness and no fatigue. Rheumatoid disease will have abnormal serological studies and focal tenderness will be less exaggerated on exam.

- Treatment

  - Educate patient that they have an actual disorder that is chronic but can benefit from treatment and that more serious underlying pathologies have been ruled out.
  - Control pain: Tramadol and acetaminophen have been shown to give significant improvements in pain. Lidocaine injections at tender points have not proven to give significant change.
  - Medications:
    - Antidepressants: Amitriptyline (25-50 mg) shows improvement in pain, sleep, and overall functioning.
    - Cyclobenzaprine (Flexeril): similar effectiveness to amitriptyline.
    - Pregabalin (Lyrica) and gabapentin: improvements in pain, sleep, fatigue, and quality of life. Major side effect is drowsiness.
    - Ineffective/inappropriate medications: opioids, benzodiazepines, NSAIDs, antibiotics, steroids
  - Enhance functional capacity:
    - Cardiovascular and/or strengthening exercise: significant improvements in pain and global functioning.
    - Cognitive behavioral therapy: Most effective when started early in course of disease, but results in sustained and significant improvement in pain and functioning.[62]


  - Comments: PMR tends to be self limited and resolves after 1-2 years. Increases risk of Giant Cell (Temporal) Arteritis: 10-15% of patients with PMR will develop Giant Cell Arteritis.

  - Diagnostic criteria:
    - Bilateral pain in association with morning stiffness for at least one month in any two of the following areas: neck, shoulder girdle, and hip girdle.
    - ESR above 40 mm/hr (if patient meets all other criteria besides this one, diagnosis of PMR may still be made).
    - Age older than 50 years.
    - Exclusion of other diagnoses except for giant cell arteritis.
    - Marked clinical improvement in response to 1 week of treatment with less than 15 mg of prednisone per day.

  - Treatment:
    - Patient should be evaluated for temporal artery tenderness (begin just anterior to ears and follow course along temples and feeling entire scalp as any cranial artery may be involved) at time of presentation and should be informed about symptoms of Giant Cell Arteritis (including fever, temporal headache, jaw claudication, and diplopia).
    - PMR generally responds quickly to 10-15 mg/d doses of prednisone, however, patients with severe PMR at time of diagnosis or very high ESR may require higher initial doses 20-30 mg/d with tapering as ESR falls.
    - Symptomatic flares may require repeat dosing with prednisone.
    - Patients may require daily prednisone for months or years and so lowest possible dose of steroids and patients with prolonged therapy should be given osteoporosis prophylaxis.

- Difficulty getting to sleep or staying asleep? Consider primary or secondary insomnia.

  - Diagnostic criteria for primary insomnia based on DSM-IV criteria:
* Predominant complaint is difficulty initiating or maintaining sleep, or non-restorative sleep for at least one month.
* Sleep disturbance (or associated daytime fatigue) causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
* The sleep disturbance does not occur exclusively during the course of narcolepsy, breathing-related sleep disorder, circadian rhythm sleep disorder, or parasomnia.
* The disturbance does not occur exclusively during the course of another mental disorder (e.g. major depressive disorder, generalized anxiety disorder, a delirium).
* The disturbance is not due to the direct physiological effects of a substance (e.g. a drug of abuse, a medication) or a general medical condition.

- Evaluation: Should evaluate patient for underlying medical/environmental cause of insomnia. A sleep diary may be helpful in discerning whether there is an underlying cause of the insomnia.
  * Medications/drugs: Caffeine, diet pills, nicotine, methylphenidate, theophylline, albuterol, quinidine, pemoline, dextroamphetamine, pseudoephedrine, SSRIs.
  * Medical conditions: sleep apnea, periodic limb movement disorder, restless leg syndrome, nocturnal myoclonus, thyrotoxicosis, dyspnea (from any cause), arthropathies, chronic pain, GERD, HIV/AIDS, nocturia, stroke, cancer
  * Psychological Causes: Depression, anxiety, life stressors, bedtime worrying, conditioning (associating the bed with wakefulness), mania
  * Environmental cause: bedroom too hot/too cold, noise, eating/exercing/caffeine/alcohol before bed, jet lag, shift work, daytime napping.

- Treatment:
  * Any underlying medical/psychological condition should be treated as appropriate.
  * Lifestyle modifications:
    - Proper sleep hygiene: restricting caffeine use especially after noon, avoiding alcohol/tobacco near bedtime, avoiding heavy meals prior to sleep, avoiding vigorous exercise 3–4 hours before sleep, keeping to a consistent schedule for going to bed/getting up, avoiding daytime naps, keeping temperature in bedroom as comfortable with minimal light and noise.
    - Cognitive behavior therapy: correct incorrect beliefs about sleep, decatastrophizing insomnia
    - Moderate exercise: though not near bedtime
    - Relaxation therapy: tensing and relaxing different muscle groups, biofeedback or imagery to reduce somatic arousal, meditation, hypnosis.
  * Pharmacologic:
    - Antihistamines- diphenhydramine (Benadryl), doxylamine (Unisom). Side effects: urinary retention, dry mouth, and constipation, and can result in residual drowsiness. Patients should be discouraged from using these on a regular basis as they may reduce sleep quality.
    - Melatonin receptor agonist (ramelteon, Rozerem): mostly useful in insomnia caused by disruptions in the circadian rhythm (jet lag, shift work). Side effects: sleep disruption, daytime fatigue, headache, dizziness, and suicidal ideations. Contraindicated with fluvoxamine and liver failure.
    - Hypnotics (Do not exhibit rebound or tolerance at 5 weeks. Decrease sleep onset latency); zolpidem (Ambien)- may cause rebound insomnia, controlled release formula better for sleep maintenance. Eszopiclone (Lunesta)- amnesia, hallucinations, worsening depression, FDA approved for longer than 35 days of use. Zaleplon (Sonata)- better for sleep maintenance, altered color perception, short half life enables readministration with nocturnal awakening.
    - Benzodiazepines (Increase sleep time and improve sleep. Should be used with caution due to their association with developing tolerance and dependence. Should not be used for more than 4 weeks and should not be used in patients with history of addiction to
drugs/alcohol. Withdrawal is also seen in 50% of users): triazolam (Halcion)- rapid onset, short half life, anterograde amnesia, REM sleep rebound. Estazolam- rapid onset, intermediate half-life, daytime sleepiness. Temazepam (Restoril)- medium onset, intermediate half-life, daytime sleepiness, less effective sleep induction.

- Antidepressants: Amitriptyline and Trazodone (side effects: anticholinergic, morning sedation, daytime sleepiness, accidents, cardiac toxicity, sexual dysfunction, serotonin syndrome, exacerbates RLS and periodic limb movement.) Mirtazapine (side effects: anticholinergic, dyspnea, edema, hyper/hypokinesia, increased appetite).[116, 47]
Chapter 18

Chest pain [9, 62]

History

- Red flag questions: Does it feel like an elephant is sitting on your chest? Associated with shortness of breath? Greater than 20 minutes duration (though lasting hours to days is not indicative of cardiac origin)? Of crescendo-like quality? (MI). Is the pain relieved by rest or come on with exercise? (Angina). Sudden, maximum intensity ripping pain? Pain radiating to jaw or lower back? New neurological deficit or syncopal episode? (Aortic dissection). **If patient answers yes to one or more of these historical questions, immediate referral to emergency care should be strongly considered.**

- General questions: Timing of pain in relation to alleviating and precipitating factors (exercise, movement, laying down, eating, resting)? How long have you had pain? Previous episodes? Location of pain (be specific, have pt point with one finger to where the pain is worst)? Radiation of pain (to left arm or jaw)? Focal chest wall tenderness worsened with deep inspiration? (Pleuritic chest pain). Brief (instantaneous) self limited pain in younger healthy person? (Precordial catch syndrome).


Physical exam:

- Red Flag physical exam findings:
  
  - Ominous signs (if new) of MI: mitral regurg murmur, hypotension, pulmonary rales, a third or fourth heart sound, and jugular venous distention.
  
  - Ominous signs of aortic dissection: hoarseness, neurological deficits, horner syndrome, asymmetric pulses
  
  - Ominous signs of tamponade: pulsus paradoxus, pain improved by leaning forward.
  
  - Ominous signs of pulmonary embolism: Tachycardia, tachypnea
  
  - Ominous signs of pneumothorax: Hyperresonance/absent breath sounds/tracheal deviation
  
  - In general: Hypotension in the setting of chest pain is an ominous sign and should, unless very compelling reasons otherwise, result in immediate referral to emergency care.

- Should perform:
  
  - Vitals: pulse (in both arms), assess for pulsus paradoxus (difference in systolic blood pressure during expiration and inspiration is greater than 10 mmHg), blood pressure.
  
  - Skin: check for herpetic rash.
– CV: jugular venous distention (suggestive of pump failure), palpate for point maximal left ventricular impact (assess for hypertrophy), heart sounds (new S3 or S4 suggests ischemia), murmurs especially new murmurs, friction rub (pericarditis).

– Pulm: Hyperresonance/absent breath sounds/ tracheal deviation (pneumothorax). Rales (suggest pump failure).

– Abdomen: epigastric and RUQ tenderness, look for pulsatile masses (dissection)

– Extremities: look for unilateral or new onset leg edema (pulmonary embolism)

– Neuro: look for evidence of focal neural deficit especially horner’s syndrome or hoarseness (dissection).

– Musculo-skeletal: Palpate for replication of pain at costo-sternal junction and location of pain (if pain is replicated, suggestive of costochondritis/ musculoskeletal etiology).

Diagnostic studies:

- If there is immediate concern and high index of suspicion for ACS, only essential diagnostic tests should be performed prior to immediate referral to emergency care. If clinical suspicion is high enough based on history and/or physical exam, even an EKG may be unnecessary. If the diagnostic test would not change clinical decision to refer to emergency care, it is not necessary to perform it.

- Any patient whose symptoms are concerning for ACS should have an EKG and chest x-ray.

- If stable angina: patient should receive EKG and referred for echo.

- In a low risk patient: testing will likely be negative and positive results are more likely to be false positive. But some anxious patients, for peace of mind, will require objective reassurance and and EKG may be useful in those situations.

- Serum cardiac markers can be considered, but in practice if there is enough suspicion to perform the test, the patient should be sent to the ER
  
  – Myoglobin: first becomes positive at 2 hours peaks at 6 hours.
  
  – CK: first becomes positive at 3-8 hours, peaks at 12-24 hours.
  
  – CK-MB: first becomes positive at 4-6 hours and peaks at 12-24 hours. Sensitive but not specific as can be elevated in other causes of myocardial injury. Useful for assessing reinfarction.
  
  – Troponin I and T: first becomes positive at 4-10 hours and peaks at 8-28 hours. Sensitive and specific.
    * Levels remain elevated for days and so not useful to determine reinfarction.

- If there is concern for aortic dissection- pt should immediately be sent to the ER, where a chest x-ray will be performed, and likely a CT scan.

- If there is high concern for PE, patient should immediately be sent to the ER. In low or intermediate risk patients: chest x-ray (nonspecific, but only 15% of people with PE will have a normal chest x ray: may see atelectasis or effusion in addition to the much less common “Hampton’s hump” a wedge-shaped pleural based infiltrate or pulse oximetry, and EKG may be obtained if readily available.

  – D-dimer will be performed: less than 0.5 microgram/dl is considered normal and has 99% NPV for PE.
  
  – V/Q scan: can be performed to confirm PE if d-dimer is elevated. Less useful in patients with known pulmonary dysfunction (malignancy, pneumonia, etc).
  
  – Venous ultrasound of lower extremities.
Selected differential and treatment:


- Rouan Decision Rule for Myocardial Infarction

  * Clinical Characteristics (one point for each of the below):
  
  · Age greater than 60 years
  
  · Diaphoresis
  
  · History of MI or angina
  
  · Male sex
  
  · Pain described as pressure
  
  · Pain radiating to arm, shoulder, neck, or jaw

  * Score Risk of MI (%)
  
  · 0 Up to 0.6
  
  · 1 Up to 3.4
  
  · 2 Up to 4.8
  
  · 3 Up to 12
  
  · 4 Up to 26

- Who needs to go to the ER?

  * Any person whose history leads to a high degree of suspicion for unstable angina or MI.

  * Any person with new onset mitral regurg murmur, pulmonary rales, a third or fourth heart sound, or jugular venous distention.

  * Any pt whose vital signs are unstable should be taken immediately to the ER.

  * New diagnostic EKG changes.

- Who might not need to go to the ER?

  * A pt under the age of 60 who does not describe pain as “pressure” or pain radiating to arm, shoulder, neck, or jaw with normal EKG odds of acute MI are 1.1% or less. If EKG shows nonspecific changes, likelihood is 2.6 percent or less.
### EKG findings

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV (%)</th>
<th>NPV%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST segment elevation greater in lead III than in lead II plus ST-segment depression of &gt;1 mm in lead 1, lead aVL, or both</td>
<td>right coronary artery</td>
<td>90</td>
<td>71</td>
<td>94</td>
</tr>
<tr>
<td>Absence of the above findings, plus ST-segment elevation in leads 1, aVL, V5, and V6 and ST segment depression in leads V1, V2, and V3</td>
<td>Left circumflex coronary artery</td>
<td>83</td>
<td>96</td>
<td>91</td>
</tr>
<tr>
<td>ST segment elevation in leads V1, V2, and V3 plus any of the features below</td>
<td>Proximal LAD coronary artery</td>
<td>12</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>ST-segment depression of &gt;1 mm in leads II, III, and aVF</td>
<td>Proximal LAD coronary artery</td>
<td>34</td>
<td>98</td>
<td>93</td>
</tr>
<tr>
<td>ST-segment depression of &lt;1 mm or ST-segment elevation in leads II, III, and aVF</td>
<td>Distal LAD coronary artery</td>
<td>66</td>
<td>73</td>
<td>78</td>
</tr>
</tbody>
</table>

### Diagnosis

<table>
<thead>
<tr>
<th>Clinical finding / Positive Likelihood ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial infarction</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Heart Failure</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Panic disorder</td>
</tr>
<tr>
<td>Chest wall pain</td>
</tr>
</tbody>
</table>


- Evaluation: Patient will require EKG and referral for stress test. However, evaluation should be performed in emergent care setting when symptoms have not previously been evaluated.
- Treatment: Immediate referral to emergent care to rule out acute MI.
  * When outpatient:
    - Patient may take nitrates when acute anginal symptoms recur.
    - Atenolol or Metoprolol should be used to decrease the amount of episodes and improve exercise tolerance unless contraindicated (see hypertension pharmacotherapy for contraindications). Titrate dose to resting heart rate between 50 and 60 beats per minute.
Calcium channel blockers (diltiazem or verapamil): may be used in combination with beta-blockers when mono-therapy is not successful.

- Patient should be treated with aspirin unless there are contraindications. Clopidogrel can be used as an alternative in allergy to aspirin.
- Angiography and revascularization in select patients once medical therapy is optimized, but angina persists.[73, 156]

- **Substernal pain? Pain not relieved by rest?** Consider unstable angina.
  - Refer for emergent care immediately.

- **Sudden onset maximal intensity ripping chest pain? Asymmetric pulses?** Aortic dissection until proven otherwise.
  - If there is true clinical suspicion, patient should immediately be referred for emergency care. Do not delay to obtain chest x-ray.
  - In ED, patient will likely have chest x-ray followed by angiography, CT with contrast, or MRI based on institution preference.

- **Sudden chest pain in a young pt? Cocaine use? Methyamphetamine use?** Consider coronary vasospasm (Prinzmetal angina).

- **Positional chest pain? Sharp stabbing pain? Worse with deep inspiration?** Consider pleuritic chest pain.
  - If sudden onset and shortness of breath: consider pneumothorax.
  - Brief self limited episodes in otherwise young healthy patient: consider precordial catch syndrome.
  - If recent upper respiratory tract infection: consider pleurisy.
  - Relieved by sitting up or leaning forward: consider pericarditis.
  - Tachycardia and tachypnea: consider pulmonary embolus.

- **Sharp chest pain? Pain relieved by sitting up and leaning forward?** Consider pericarditis.
  - A friction rub may be heard on auscultation.
  - May see diffuse ST elevations of EKG.
  - Evaluation for cardiac tamponade should be performed. Beck’s triad: hypotension, jugular venous distension, and muffled heart sounds are indicative of tamponade and will require emergent echo to confirm and will need immediate pericardiocentesis for treatment.

- **Racing heart? Shortness of breath?** Consider pulmonary embolism.
  - It is important to establish the pretest probability for pulmonary embolism. Wells Model for Clinical Diagnosis of Pulmonary Embolism
    - **Clinical Finding (points)**
      - Objectively measured leg swelling or pain with palpation of deep leg veins (3.0)
      - PE as likely or more likely than an alternative diagnosis (3.0)
      - Heart rate more than 100 bpm (1.5)
      - Immobilization for 3 days or surgery in the past 4 weeks (1.5)
      - Previously diagnosed DVT or PE (1.5)
      - Hemoptysis (1.0)
· Malignancy (1.0)
· Total points/ Risk of PE/ LR+ / Probability of PE (%)
  · <2 points/ Low /0.13/1-28
  · 2-6 points/ Moderate /1.82 /28-40
  · >6 points / High / 6.75 /38-91 [33]

– Evaluation:

* EKG may show the classic S1Q3T3 pattern, right ventricular strain, or new incomplete right bundle branch block, but these findings are unusual unless PE is massive or cor pulmonale is present.
* Chest X-Ray: Only 12% of patients with PE have normal chest x-ray, but not helpful as they are similar to patients without PE. Common findings are atelectasis (69% in patients with PE and 58% without PE) and pleural effusion (47% of patients with PE and 39% without).
* If pre-test probability is low: a D-dimer is the test of choice. If negative, PE is excluded. If positive, immediate VQ scan is indicated if institution is inexperienced at CT. If institution is experienced at CT, a spiral CT pulmonary angiogram is indicated.
* If pretest probability is moderate: If institution is experienced at CT, spiral CT pulmonary angiogram should be performed. If institution is inexperienced at CT, a d-dimer assay should be performed and a VQ scan should be performed regardless of result as if results of VQ scan are equivocal and no DVT is detected on ultrasound, management will be based on d-dimer test. If d-dimer was positive, angiography should be performed, if negative ultrasound should be repeated in one week.
* If pretest probability is high: patient should be immediately admitted and heparinized pending the results of the tests as stated above for the moderate pretest probability.

– Treatment: Patient can be treated with heparin (titrate to three times normal PT) or low molecular weight heparin (cannot use in renal failure patient).[62, 143]

• History of anxiety? Onset of pain with increased stress? Consider anxiety or panic attack. Diagnosis of exclusion, critical to rule out other more immediate etiologies.

– Two questions have shown high sensitivity for panic disorder. If the answer to either is yes, consider it a positive screen:
  * In the past 6 months, did you ever have a spell or an attack when all of a sudden you felt frightened, anxious, or very uneasy?
  * In the past six months, did you ever have a spell or an attack when for no reason your heart suddenly began to race, you felt faint, or you couldn’t catch your breath?

– If other etiologies have been sufficiently ruled out, patient may be referred for CBT or give pharmacotherapy per patient preference.

• Burning sternal pain? Metallic taste in mouth? Pain comes on when pt lies down? Consider GERD. See section on abdominal pain for treatments of GERD.

• Pain reproducible by pressing on area where pain is felt? Consider costochondritis.
Chapter 19

Dermatologic Complaints

Rash:

History:


Physical Exam:

- A good description of the dermatologic complaint is the hallmark of the derm physical exam. In general a primary lesion should be sought out: one that looks the way it did when it first started (before patient picked at it, etc). Description should include:
  
  - Primary Morphology:
    
    * **Macules**: entirely flat lesions <10 mm in diameter. If you can identify the lesion or any part of it with your eyes closed, than it is **not** a macule. A **patch** is a macule 10 mm or greater.
      
      - Examples: Freckles, flat moles, tattoos, port wine stains, rashes of Rickettsia, rubella, and measles.
    
    * **Papules**: elevated lesions <10 mm in diameter. A plaque is a papule that is 10 mm or greater.
      
      - Examples: Nevi, warts, lichen planus, seborrheic and actinic keratosis, and acne
    
    * **Maculopapular**: a loose term that describes a lesion that has areas that are macular and areas that are papular. It is not very specific and should be avoided.
    
    * **Nodule**: firm papule where the diameter of the base is less than the height.
      
      - Examples: Cysts, lipomas, and fibromas.
    
    * **Vesicle**: <10 mm clear, fluid filled blisters. **Bullae** are vesicles that are greater than 10 mm.
      
      - Examples: herpes, acute allergic contact dermatitis, dermatitis herpetiformis, pemphigus vulgaris, and bullous pemphigoid.
    
    * **Pustules**: vesicles that contain pus.
      
      - Examples: bacterial infections, folliculitis, and pustular psoriasis.
    
    * **Petechiae**: nonblanchable punctate foci of hemorrhage.
      
      - Examples: Platelet abnormalities (thrombocytopenia, platelet dysfunction), vasculitis, and infections (meningococcemia, Rocky Mountain Spotted fever, and rickettsioses.)
    
    * **Purpura**: large area of hemorrhage that may be palpable.
      
      - Examples: Henoch Schonlein Purpura.
  
  - Additional morphologic descriptors:
*Scales*: heaped accumulation of epithelium. Usually very rough and thicker than crust.

*Crust*: dried serum, blood, or pus.

*Erosion*: open areas of skin that results from loss of all or part of epidermis.

*Ulcere*: open area of skin that results from loss of the epidermis and at least part of the dermis.

*Atrophy*: thinning skin.
  - Examples: Can occur with long term use of topical corticosteroids, aging, chronic sun exposure, lichen planus.

*Scar*: area of fibrosis that replaces normal skin after injury. May become hypertrophic (stays within original wound margin) or keloid (extends beyond original wound margin).

*Telangiectasia*: small permanently dilated blood vessels.
  - Examples: Rosacea, scleroderma, ataxia-telangiectasia, long term therapy with fluorinated corticosteroids, and see in basal cell carcinoma.

- Configuration:
  *
  * Linear*: straight line.
    - Examples: contact dermatitis, lichen striatus, and linear epidermal nevi.

  * Annular*: rings with central clearing.
    - Examples: granuloma annulare, ring worm, and syphilis.

  * Nummular*: circular or coin shaped.
    - Examples: Nummular eczema and coining.

  * Target*: rings with central duskeness.
    - Examples: Erythema multiforme.

  * Serpiginous*: snake like.
    - Examples: Include some fungal and parasitic infections (cutaneous larva migrans).

  * Dermatomal*: describes lesions distributed in a dermatome.
    - Examples: Herpes.

  * Confluent*: many lesions adjacent to one another.

  * Reticulated lesions*: lacy network.
    - Examples: Fifth disease (HPV B19), livedo reticularis, and cutis marmorata.

- Texture:
  *
  * Verrucous*: irregular, pebbly, or rough surface.
    - Examples: Warts and seborrheic keratosis

  * Lichenification*: thickening of the skin with accentuation of normal skin markings.

  * Umbilicated*: Central indentation
    - Examples: molluscum contagiosum and herpes simplex

- Location: Describe location on body.


- Special signs:
  *
  * Darier’s Sign*: Refers to rapid swelling of a lesion when stroked.

  * Nikolsky’s sign*: epidermal shearing that occurs with gentle lateral pressure.

  * Auspitz sign*: the appearance of pinpoint bleeding after scale is removed from plaques of psoriasis.[91]

**Diagnostic studies:**

- Microscopic evaluation: if tinea is suspected, a scraping should be performed at potassium hydroxide should be applied and observed under microscope for characteristic “spaghetti and meatballs” appearance.
Selected differential and treatments:

- **Clear cause (change in soap, exposure to chemicals/plants, etc)? Pink-red papular rash? Often itchy?** Consider Contact dermatitis. Rash may not appear until 24-72 hours after exposure.

  - Treatment: If mild calamine lotion or oatmeal baths may help to relieve itching. Oral antihistamines (diphenhydramine- Benadryl) or hydrocortisone cream may also be used. If does not improve or more severe initially, prescription strength corticosteroids or antihistamines can be given. Patient may benefit from allergy testing if exposure not clear.

- **Corticosteroid use:** Ointments are more potent than creams and creams are more potent than lotions. High potency corticosteroids should never be used on the face or the groin due to concern about skin thinning. Corticosteroids should be used for the minimum amount of time with the minimum potency required for efficacy. If there are stubborn areas of lesion, potency of corticosteroid can be increased with occlusion (increases potency ~10x). Apply corticosteroid and then cover with plastic wrap, shower cap, etc. Clinical judgment may be used to assess how long to leave occlusive dressing on.

<table>
<thead>
<tr>
<th>Potency</th>
<th>Topical steroid preparations</th>
</tr>
</thead>
</table>
| Group 1 (highest) | - Betamethasone dipropionate 0.5% cream, ointment, or solution (Diprolene)  
- Clobetasol 0.05% cream, ointment, or solution (Temovate)  
- Halobetasol 0.05% cream, ointment (Ultravate)  
- Diflorasone 0.05% cream, ointment (Psorcon) |
| Group 2 | - Amcinonide 0.1% ointment (Cyclocort)  
- Betamethasone 0.05% ointment (Diprosone)  
- Desoximetasone 0.25% cream and ointment (Topicort)  
- Fluocinonide 0.05% cream, gel, ointment, solution (Lidex)  
- Halcinonide 0.1% cream, ointment (Halog) |
| Group 3 | - Amcinonide 0.1% cream (Cyclocort)  
- Betamethasone 0.05% cream (Diprosone, Maxivate)  
- Diflorasone 0.05% cream, ointment (Florone, Maxiflor) |
| Group 4 | - Desoximetasone 0.05% cream (Topicort LP)  
- Flurandrenolide 0.05% ointment (Cordran)  
- Hydrocortisone 0.1% ointment (Locoid)  
- Hydrocortisone 0.2% ointment (Westcort)  
- Mometasone 0.1% cream, ointment (Elocon)  
- Triamcinolone 0.1% ointment (Aristocort, Kenalog) |
| Group 5 | - Alclometasone 0.05% cream (Aclovate)  
- Betamethasone 0.1% (Valisone)  
- Flurandrenolide 0.05% cream (Cordran)  
- Fluocinolone 0.025% cream (Synalar, Synemol, Fluonid)  
- Hydrocortisone 0.1% cream (Locoid)  
- Hydrocortisone 0.2% cream (Westcort)  
- Triamcinolone 0.1% cream or lotion (Aristocort, Kenalog) |
| Group 6 | - Desonide 0.05% cream (Tridesilon)  
- Fluocinolone 0.01% solution (Fluonid, Synalar) |
| Group 7 (lowest) | - Dexamethasone 0.1% gel (Decadron)  
- Hydrocortisone 0.5%, 1%, 2.5% cream, ointment, lotion (Hytone, Synacort, Nutracort) |

- **Pink-red papular rash along belt line? Geographic shape?** Consider Nickle Dermatitis.

  - Comments: Nickle can be in buttons, belts, and cell phones. It is possible to test for the presence of nickle with Dimethylglyoxime test (can be purchased at drug store: will turn purple in the presence of nickle).

  - Treatment: As above for contact dermatitis, in addition, recommend patient either swap snaps for buttons, avoid wearing belts, avoid wearing less than 18 karat gold jewelry and may use clear nail polish.
  
  – Treatment: Topical antifungals: clotrimazole, econazole, ciclopirox, miconazole, ketoconazole, and nystatin.

• Red papular rash? May have serpiginous borders with leading edge of scale? Consider Tinea capitis (head)/corpus (body)/cruris (groin)/pedis (feet).
  
  – Treatment: Undecylenic acid (Crux, Desenex) apply twice daily or tolnaftate 1% (Aftate, Tinactin) apply twice daily or Clotrimazole 1% (Lotrimin, Mycelex) apply twice daily or Miconazole, Econazole, Ketoconazole, Oxiconazole. Oral antifungals may also be used (terbinafine, itraconazole, fluconazole, and ketoconazole).[105]

• Intensely itchy macular-papular rash on flexural surfaces primarily? Either long standing or episodes of flaring and resolution? Consider Atopic dermatitis.
  
  – See section below on atopic dermatitis.

• Red, scaling plaques, erythematous plaque with silvery scale with symmetric distribution? Chronic issue with periods of flare-ups? Consider psoriasis.
  
  – See section below on psoriasis.

• Dandruff with erythema? Scaly plaques surrounded by moderate erythema? Scales may appear greasy or yellow? May have involvement of the hair, eyebrows, nasal folds, and retroauricular and presternal areas? Consider Seborrhieic dermatitis.
  
  – Treatment:
    * Mild cases: Often responsive to over the counter dandruff shampoos. Allow to remain on skin for 5-7 minutes before washing off.
    * Refractory to treatment tinea or moderate cases: 2.5% selenium sulfide shampoo, chloroxine (Capitol), or 2% ketoconazole shampoo (Nizoral). Heavy crusts may be softened with keratolytic shampoo (Sebizon, Sebucare) or oil based agents (Dermasmoother, F/S liquid, P & S liquid).
    * Severe cases: may benefit from topical corticosteroid creams (moderate potency). Wash as above twice daily until symptoms clear.

**Atopic dermatitis (Eczema): Usually appears as redness with/without scaling seen in the flexural areas and on cheeks and buttocks.**

**History:**

• Asthma? Allergies? Family history of eczema, asthma, or allergies? Disturb sleep?
  
  – Atopic triad: Asthma, allergies (allergic rhinoconjunctivitis), and eczema.

**Diagnostic criteria:**

• Evidence of itchy skin plus 3 or more of the following:
  
  – History of involvement of the skin creases.
  – History of asthma or hay fever (or history of atopic disease in first-degree relative if the child is under four years of age).
  – History of generally dry skin the past year.
  – Onset in a child under two years of age (criterion not used if the child is under four years of age).
  – Visible flexural dermatitis (including dermatitis affecting the cheeks or forehead and outer aspects of limbs in children under four years of age).
Physical exam:

- Classic: Macular-papular red-pink lesions along flexural surfaces characteristically on neck, wrists, area behind antecubital and popliteal flexural areas. Often see lichenification.
- Nummular eczema: coin shaped lesions on external aspects of the extremities, buttocks, and posterior aspect of the trunk.

Diagnostic studies:

- None indicated. If diagnosis is unclear, a biopsy may be taken.

Treatments:

- In general: there is no indication for changing diet unless there is a clear dietary trigger.
- Symptomatic management: emollient creams (ointments at night, lotions should be avoided), antihistamines (for itching)
- Flare-ups:
  - Topical corticosteroids: may be used for up to 4 weeks. Oral corticosteroids are only to be used in adults for short term as they may cause rebound flares and have diminishing effectiveness.
    * Long term use can have many adverse effects: striae, petechiae, telangiectasia, skin thinning, atrophy, and worsening acne.
    * Topical calcineurin inhibitors: pimecrolimus (Elidel) and tacrolimus (Protopic)
      - As effective as potent corticosteroids and more effective than mild corticosteroids.
      - Common adverse effects: skin burning and irritation (proper sun protection should be used) and increased rate of malignancy
      - Long term use is not advocated as it is unclear whether they increase the rate of malignancy
      - Not to be used in patients younger than 2 years.
    * Antibiotics if there is an acutely infected lesion, primary infection is with S. aureus.
    * Systemic therapy: cyclosporin (Sandimmune) and interferon gamma 1b (Actimmune) may be effective for severe atopic dermatitis. Mycophenolate mofetil (CellCept) Azathioprine (Imuran) and IV IgG have conflicting evidence for their effectiveness. NO evidence for use of leukotriene inhibitors, methotrexate, desensitization injections, theophylline, or oral pimecrolimus.
    * Other therapies: UVB, UVA treatments may be effective for severe disease.[28]

Psoriasis
CHAPTER 19. DERMATOLOGIC COMPLAINTS

History:
- Ask about joint pains, previous medications, ask about systemic illness (fevers, chills), and for most recent PPD.

Physical exam:
- Red, scaling plaques, erythematous plaque with silvery scale with symmetric distribution. Evaluate for nail and scalp involvement.

Selected differential and treatment:
- Red thick scaly lesions with silvery scale? Exacerbated by stress, infection, dryness? Consider plaque type psoriasis.
  - Treatment: topical treatment with corticosteroids, calcipotriene, coal tar, anthralin, or tazarotene. Photo-therapy and systemic agents may be used for lesions that are refractory to treatment.
  - Treatment: Ultraviolet B photo-therapy, natural sunlight.
- Erythematous papules or plaques with pustules? May be on palms or soles? Consider pustular psoriasis.
  - Treatment: same as for plaque type psoriasis. If lesions are more generalized, may require systemic therapy and/or hospitalization.
- Severe intense generalized erythema and scaling covering entire body? Consider erythrodermic psoriasis.
  - Treatment: Systemic therapy or hospitalization usually required.

Acne

History:
- In general: Ask about duration of symptoms, locations of acne, usual type of acne (inflammatory, comedonal), previous treatments, general skin care.
  - If female, any tough hairs growing on chin, upper lip? Consider Hyperandrogenism.

Physical Exam:
- Should attempt to classify acne based on type as well as severity.
  - Type:
    * Primarily large lesions (>5 mm)? Nodulocystic acne
    * Primarily pustules and cysts? Consider inflammatory acne.
  - Severity:
    * Mild: few–several papules, but no nodules
    * Moderate: several to many pustules and few to several nodules
    * Severe: numerous to extensive papules and pustules as well as many nodules.
Diagnostic studies:

- If concerned about possibility for hyperandrogenism:
  - Testosterone level.
  - DHEAs for Congenital Adrenal Hyperplasia (CAH).
  - LH/FSH ratio of >2/1 indicative of PCOS.
  - U/S imaging of ovaries to evaluate for cysts.

Treatment:

- Antibiotics:
  - All carry the small but significant risk of pseudotumor cerebri, inform patients of this risk when initiating medication and tell them to seek medical care if they have a long lasting headache.
  - All medications carry the risk of phototoxicity and sun should be avoided and sun protection be used (Minocycline is less phototoxic than others- rarer and less serious rxn).
  - Effectiveness: can be judged after 6-8 weeks.
  - Resistance: Some pts will develop resistance after 6 months of treatment. Benzoyl peroxide should be continued as it will minimize resistance. Pts should be continued on abx for 3-4 months.
  - Tetracycline:
    * must be taken on an empty stomach, common side effect is GI upset
    * can not be used in children younger than 9 and pregnant women (discolors teeth, inhibits skeletal development)
  - Doxycycline: can cause sensitivity to sun and elevated liver enzymes.
  - Minocycline: rarely causes drug induced lupus. Can cause sensitivity to sun and elevated liver enzymes. Tends to work better than doxycycline as it achieves higher concentrations in the tissues.

- Retinoids: Recommended in practically all pts with acne as they speed the course of recovery
  - Topical: do not require monitoring and can be effective as monotherapy.
  - Oral: Require pt to sign “I-Pledge” agreement and agree to be on two types of birth control and have 2 negative pregnancy tests prior to initiation of therapy and monthly repeat pregnancy tests throughout treatment.
    * Pt should be advised that it can cause abnormal scarring so no tattoos, piercing, dermabrasion, leg waxing, or laser resurfacing should be done within one year of treatment.

- Mild acne: topical retinoids, benzoyl peroxide, and azelaic acid can be used
- Mild inflammatory acne: topical antibiotics and bacteriostatic and anti-inflammatory medications.
- Moderate to severe inflammatory acne: oral antibiotics.
- Primarily comedonal acne: retinoids.
- Moderate and severe comedonal acne: isotretinoin.
- Maintenance therapy: topical retinoids are the treatment of choice as antibiotics will tend to develop resistant microorganisms.[145]
Pigmentation

History:

- Any new medications?
  - An incomplete list of medications that can cause hyperpigmentation: Busulfan, Minocycline, cyclophosphamide, clofazimine, 5-fluorouracil, psoralens, zidovudine, hydroxyurea, and methotrexate.

Physical exam:

- Skin exam: Pigmentation changes well circumscribed or generalized? Color of pigmentation changes? Location of changes: on general body surface or located in mucosal membranes, palmar creases, or intertriginous folds.

Diagnostic studies:

- Biopsy may be indicated if diagnosis is unclear and patient fails conservative treatment.
- If tinea versicolor is suspected: hypopigmented area should be scraped onto a slide and potassium hydroxide wet mount should be performed. A positive test will show characteristic “spaghetti and meatball” appearance.
- Wood’s light: can distinguish hypopigmentation from depigmentation.
  - Ivory white: Depigmentation of vitiligo.
  - Orange red: Erythrasma.
  - Green: microsporum (a cause of tinea), but the more common Trichophyton does not.

Selected differential and treatments

Hyperpigmentation:

- *Darkening at area of previous injury or inflammation? Irregular darkly pigmented macules?* Consider post inflammatory hyperpigmentation.
  - Treatment: Hydroquinone 3% or 4% twice daily, or azelaic acid 20% twice daily, or salicylic or glycolic acid peels. If monotherapy is ineffective, glycolic acid peels can be added to hydroquinone twice daily and tretinoin 0.05% at bedtime can speed up lightening. If conservative treatment fails, then laser resurfacing with carbon dioxide laser may be attempted. Patient should be counseled to wear sunscreen.

- *Hyperpigmentation on sun exposed areas? History of pregnancy, use of oral contraceptives or anticonvulsants? Darkening on the face?* Consider melasma.
  - Treatment: Hydroquinone 3% or 4% twice daily, or azelaic acid 20% twice daily, glycolic acid 10% peels, or tretinoin 0.05% or 0.1% or adalapene 0.1% or 0.3%. If monotherapy is ineffective, glycolic acid peels can be added to hydroquinone twice daily and tretinoin 0.05% at bedtime along with topical steroids can speed up lightening. If patient is refractory to conservative treatment, laser therapy or intense pulsed light therapy may be used. Patient should be counseled to wear sunscreen. If melasma is induced by pregnancy or oral contraceptives then melasma will likely clear within months of delivery or cessation of medication.

- *1-3 cm macular well circumscribed lesions on sun exposed surface of skin?* Consider solar lentigines.
– Considerations: proliferation of solar lentigines can be normal especially in older patients but can be associated with other disorders especially in younger patients.
  
  * Peutz-Jeghers syndrome: associated with gastrointestinal hamartomas, buccal, lip, perioral, or digital macules, onset at birth or early childhood.
  
  * LEPARD syndrome: Multiple lentigines, ECG abnormalities, ocular hypertelorism (wide spaced eyes), pulmonic stenosis, abnormal genitalia, retarded growth, and sensorineural deafness.
  
  * LAMB syndrome: Multiple lentigines, atrial and/or mucoscutaneous myxomas, myxoid neurofibromas, ephelides, and blue nevi.

– Treatment: Hydroquinone 3-4%, 2% mequinol/tretinoin, Chemical peels (30-35% trichloroacetic acid), liquid nitrogen, and Neodymium-doped yttrium aluminum garnet laser therapy.

• **Light brown or tan macules ranging from 1-20 cm present from birth?** Consider Cafe-au-lait macules.

– Considerations: If more than 6 lesions > 5 mm prepubertal or >15 mm postpubertal, should raise suspicion for tuberous sclerosis, neurofibromatosis, Albright syndrome, or Fanconi anemia.

– Treatment: For cosmesis only. Laser therapy or surgical excision are effective.[138]  

• **Velvety hyperpigmented patches around the neck, axillae, groin, an inframammary folds? Patient obese?** Consider acanthosis nigricans.

  – Patient should be screened for diabetes.
  
  – Can also be associated with underlying malignancy.

• **Diffuse coppery hyperpigmentation most noticeable in the palmar creases and body folds?** Consider Addison’s disease. Other systemic illnesses such as Wilson’s disease, von Gierke’s hemochromatosis, alkaproteinuria, biliary cirrhosis, and porphyria cutanea tarda.

**Hypopigmented lesions**

• **Unpigmented sharply defined macules? May have chronic worsening with stress, illness, or trauma?** Consider vitiligo.

  – Treatment: Patient should be counseled to wear sunscreen. Topical steroids (betamethasone, fluocinonide), immune modifiers (tacrolimus), depigmentation (monobenzone 20% twice daily for 6-18 months only for patients with 40% of body surface area), and Psoralen UVA therapy or narrow band UVB therapy, or surgical grafting.

  – Comment: Often related to other conditions including diabetes, Hashimoto’s thyroiditis, pernicious anemia, and hypogonadism. If a patient presents with new vitiligo, a workup for these conditions including diagnostic studies and physical exam should be undertaken.

• **Papulosquamous eruptions with subtle scale? Older lesions hypopigmented?** Consider tinea versicolor.

  – Treatment: Apply selenium shampoo once a day for one week, allow to dry for 10 minutes before the patient showers. Or, patient can apply selenium sulfide shampoo once per week for a total of four weeks and leave on skin for 12-24 hours before showering. Or, 2% ketoconazole shampoo can be left on for five minutes before rinsing and if normally effective after one treatment.[113]

• **Note:** There are many congenital causes of hypopigmentation which are beyond the scope of this review including: albinism, phenylketonuria, homocystinuria
Cancer

History:

- Ask about unintentional weight loss and fatigue, ask about any lesions that are concerning to them. Any lesions that itch or bleed or are painful? Any lesions that have rapidly grown or recently changed? Any previous history of skin cancer? History of melanoma in the family? History of exposure to radiation therapy or arsenic?

Physical exam:

- For complete skin check, examine all areas of the skin including: scalp, ears, eyes, eyelids, lips, gluteal cleft, palms of hands and soles of feet, fingernails, genitalia, and toenails. Abnormal lesions: look for “ugly ducklings” lesions that do not look like other lesions on the body. Look for lesions that meet one or more of the following ABCDE criteria: Asymmetry, irregular borders, irregular coloration, diameter >6 mm, and evolving (changing, growing)

Diagnostic studies:

- Shave or punch biopsy if indicated. Punch biopsy will be required if melanoma is suspected to evaluate Clark level and Breslow thickness.

Selected Differential and Treatment:

- Ill-defined irregular macular-papular lesions generally with scaly appearance? Occur on sun damaged area? Consider actinic keratosis. However, squamous cell carcinoma in situ (Bowen’s Disease), lichen planus, and superficial basal cell carcinoma should be considered.

  - Though the rate of malignant transformation is less than 1/1000 per year, cryotherapy with liquid nitrogen is indicated to decrease risk of progression to squamous cell carcinoma.
* If there are multiple superficial lesions especially on face and head, 5-fluoro uracil (1-5%) creams may be applied twice daily for 2-5 weeks.
* If diagnosis is unclear or if lesions are refractory to treatment consider biopsy (generally shave).

- **Pink, reddish-brown, or flesh colored nodular or papular lesion? Area with previous actinic keratosis? Area of skin with sun exposure?** Moderate growth over several months? **Definitive edge difficult to discern when lesion is stretched? May have crusting?** Consider squamous cell carcinoma. However should consider basal cell carcinoma, amelanotic melanoma, keratoacanthoma, and actinic keratosis.

  - **Treatment:**
    * A full thickness skin biopsy should be employed to confirm diagnosis.
    * Lesions are generally removed by elliptical excision with margins of 4-6 mm.
    * Mohs micrographic surgery (using gradual lesion excision using serial frozen section analysis until a tumor free plane is reached): should be used for cosmetic reasons or to maximize function.
    * Superficial tumors may be treated with curettage and dessionation.
  - **Comments:** 2/3 develop in sun exposed area. However, those that develop in sun exposed area tend to be less aggressive than those that develop in non-sun exposed areas.[62]


  - **Treatment:**
    * Incisional or excisional biopsy is required to confirm diagnosis.
    * For tumors less than 1.5 cm curettage and electrodesicication may be used.
    * Excisional biopsy with margins of 2-5 mm can be used and has a 95-99% cure rate.
    * Mohs micrographic surgery can be used for cosmesis and should be used for sclerosing basal cell carcinomas.
    * Patient’s who have 1 BCC have a 20% chance of developing a second in one year. If two have developed, there is a 40% likelihood that a third or more will develop: therefore, it is critical that patients have annual repeat examinations. cite\/pmc
  - **Comments:** Basal cell carcinoma is the most common malignancy in humans. Rarely metastasize or cause death. Distinctly sun related.

- **Irregularly colored, irregularly bordered, macular-papular lesion with dark brown or reddish-brown pigmentation?** Consider melanoma.

  - **Treatment:** to evaluate for potential melanoma an excisional biopsy or punch biopsy should be performed so as be able to evaluate Clark’s level or Breslow thickness. An excisional biopsy may be diagnostic as well as therapeutic.
  - **Comments:** Much less common than either BCC or SCC but account for 75% of skin cancer deaths. There are four types of melanoma:
    * Superficial spreading melanoma: most common: 70% of all melanomas, superficially spreads prior to penetration, if removed during superficial spreading phase 5 year survival rate approaches 100%.
    * Nodular melanoma: No radial growth, blue-black or gray nodule with discrete borders. Poorer prognosis. Metastasis will have occurred in many patients even with early recognition. 15% of melanomas.
    * Lentigo maligna melanoma: Freckle like lesion that slowly expands with irregular borders and pigmentation. Occurs in sun damaged skin in elderly patients. Least aggressive melanoma. 5% of melanomas.
    * Acral lentiginous melanoma: Occurs on palms, soles, subungual, and mucous membranes. Generally a flat lesion with irregular coloration and irregular borders. Most common type to affect non-white patients.
Chapter 20

Ophthalmology Complaints

Evaluation of a Red Eye

History:

- History of trauma or introduction of foreign body or liquid? Rapidity of onset? Pain? Location of redness? Itching? Deep pain? Associated symptoms: visual changes, pain, itching, crusting in the morning, tearing, discharge, photophobia?

Physical Exam:

- Observe: lids and lashes, conjunctiva and cornea, lens, optic nerve, and retina. Look for anisocoria (unequal pupil size) or tear drop shaped pupil (sign of iris prolapse).

- Confrontation visual fields

- Pupillary light reflex: afferent (cranial nerve II), efferent (cranial nerve III)

- Swinging flashlight test: if there is a difference to discriminate between afferent and efferent damage (afferent injury- pupil constricts consensually but not to direct light, efferent injury- prevents direct and consensual constriction)
CHAPTER 20. OPHTHALMOLOGY COMPLAINTS

- Visual acuity of both eyes: assess with Snellen visual acuity chart with best spectacle corrected vision.
- Funduscopic exam to evaluate red reflex (will be obscured by bleeding- sign of occult rupture of globe).
- If suspicion for corneal abrasion: Fluorescein dye and a cobalt blue filtered light to detect corneal abrasions. Gently irrigate eye after to limit risk of adverse reaction to dye.
  - To dilate eye: use only a short acting mydriatic agent (tropicamide- Mydriacyl) as long acting agents will impair patients vision for several days.
  - Anesthetic: tetracaine or procaaine can be used before fluorescein to decrease pain. Only for use in office, as use at home can increase risk of complications and delay healing.

- Eyelids should be everted by placing a cotton swab on upper eyelid and rolling the eyelid over the swab to inspect for foreign bodies.
- If there is history of trauma: Examine for periorbital ecchymosis, edema, proptosis, bony step offs of the orbital rim, trismus (pain when opening mouth which occurs with fractures of the lateral wall of orbit), paresthesia of V2 (suggests fracture of orbital floor). [118]

Diagnostic studies:
- If suspicion of corneal injury: refer for immediate slit lamp examination.
- Intra-ocular pressure: should be determined if glaucoma suspected.
- If cellulitis suspected: white blood cell counts, and blood cultures are indicated.
- If purulent discharge: perform a culture of discharge.

Selected differential and Treatment:
- Unilateral redness? Sharply circumscribed? Vision unaffected? History of trauma (may be so minor that the patient does not recall- prolonged coughing, Valsalva)? Consider Subconjunctival hemorrhage.
  - Treatment: will clear gradually in 2-3 weeks. If does not resolve, refer to optho. May represent Kaposi’s sarcoma.
  - Viral (more likely with palpable preauricular lymph node and watery discharge often accompanied by history of URI, sore throat, or fever), staph, strep, and Haemophilus common causes. If eye is hyper-purulent, consider gonorrhea as cause. If both eyes are involved with hyper-purulence and preauricular lymphadenopathy, chlamydial infection is likely.
  - Treatment:
    * Bacterial: Erythromycin ophthalmic ointment four times a day or polymixin/trimethoprim drops four times a day. Improvement may be noted in several days. If resistant to treatment: requires slit lamp evaluation to evaluate for herpes.
    * Viral: Contagious and shed in tears for up to 2 weeks. Instruct patient to avoid rubbing eyes. Most cases will resolve within 2-3 weeks. However, antibiotics are commonly prescribed for 7-10 days as they tend to shorten the duration of illness. Reduced risk of spread with frequent hand washing. Avoid close contact, do not share towels, no not use swimming pool for approximately two weeks.[36] Adenovirus: survives on surfaces for 72 hours, may be disinfected with hypochlorite spray. Should not return to work for 7-10 days after onset of symptoms.[110] If resistant to treatment: evaluate with slit lamp for herpes.
• **Itching? Redness of conjunctiva?** Consider Allergic conjunctivitis.
  
  – Treatment: Ice can be quite soothing. Other topical treatments include: decongestants (oxymetazoline and naphazoline), antihistamines (azelastine), mast-cell stabilizers (cromolyn), corticosteroids, and NSAIDs (ketorolac).

• **Burning? Irritated more in the afternoon to evening? Symptoms worse with reading, computer use, watching television?** Consider dry eye.
  
  – Treatment: Artificial tears, cyclosporin drops

• **Swelling of eye with vascular redness in well demarcated area?** Consider episcleritis.
  
  – Treatment: Benign, does not require treatment. Patient may have relief of symptoms with artificial tears.

• **Yellow nodule on sclerae? Vascularized? History of exposure to strong sunlight?** Consider Pterygium.
  
  – Treatment: Benign, does not require treatment. Patient may have relief of symptoms with artificial tears.

• **Sensation of foreign body in eye?** Consider foreign body or corneal abrasion.
  
  – See section below on eye trauma

• **Deep intense pain? Photophobia?** Consider corneal abrasion.
  
  – See section below on eye trauma

• **Halo Vision?** Consider corneal edema (acute glaucoma or uveitis).

• **Swelling of eyelid? Acute onset? Burning of eyes early in the morning?** Consider Hordeolum or chalazion.
  
  – Treatment: Warm compresses of eye lid three times a day. If refractory to treatment, consider referring to ophtho for drainage or course of doxycycline.

• **Flaky skin on eyelids in the morning? Dry eyes? Inflammation of lid margin?** Consider blepharitis.
  
  – Treatment: Lid hygiene: Warm compresses, gentle scrubbing. If refractory to treatment, may attempt course of doxycycline.

• **Redness of eye and surrounding structures? Swelling of lid? Blurry vision?** Consider preseptal cellulitis. Important to distinguish form orbital Cellulitis which requires immediate hospitalization for IV antibiotics and possible surgical debridement. Distinguished from periorbital cellulitis in that pt will be unable to move eye in orbital cellulitis.
  
  – Evaluation: If unable to clinically distinguish between periorbital cellulitis and orbital cellulitis, refer for emergent ophtha evaluation and hospitalization. MRI will likely be used to distinguish.
  
  – Treatment: *Streptococcus pneumoniae, H influenza, and Moraxella catarrhalis* are most likely bugs. In trauma, *Staph aureus* should be covered.
  
  * Amoxicillin/clavulanic acid is first line or a first generation cephalosporin. If patient does not respond within 48-72 hours, IV antibiotics should be initiated.[134]

• **Red tender mass along ala of nose? Unilateral?** Consider dacryocystitis.
  
  – Treatment: warm compresses and oral antibiotics, if persistent may require incision and drainage by ophthalmologist.[36]
Pediatric Eye Evaluation:

History:

Physical exam:
- Evaluate for whether eyes line up when straight ahead
- Assess red reflex: assess in darkened room with ophthalmoscope from distance of 1-2 ft.
- Perform eye exam as possible based on patients age as stated in above physical exam section.

Selected Treatments and Diagnosis:
- Poor eyesight? Cross eyed? Consider Amblyopia (lazy eye). A reduction in best corrected visual acuity not attributable to any structural abnormality. More common in pts with family history. This may affect one (anisometropic amblyopia) or both eyes (isometropic ambylopia). May present as late as 6 years
  - Treatment:
    * Patch normal eye. Alternatively, some practitioners will use atropine to blur dominant eye and reapply periodically. More effective if started early, can begin as early as 4 months of age.
- Alteration of pupillary light reflex? May indicate corneal opacity, blood (hyphema), cataract, vitreous opacity, retinal disease, or retinoblastoma.
  - Assess by checking for red reflex
  - Refer urgently if reflexes are not bright or symmetric
  - Treatment: Refer to ophtho.
  - Children at increased risk: previous cataract surgery, neurofibromatosis, Sturge-Weber syndrome.[131]

Evaluate a Traumatized Eye:

History:
- Mode of injury: Foreign body, scratching, chemical burn? Tearing? Pain with movements?

Physical Exam:
Refer to physical exam for evaluation of red eye.

Selected Differential and Treatment:
- Eye pain after trauma by foreign body, rubbing, or scratch? Tearing? Blurry vision? Pain with eye movement? Consider corneal abrasion with or without foreign body.
  - Treatment:
    * Ointment (erythromycin or bacitracin) as it will soothe the patient longer than eye drops. Gentamicin is not preferred as it may be toxic to corneal epithelium. Neosporin has a high allergy rate.
    * Topical NSAIDs: ketorolac and diclofenac. However, may delay healing.
* Oral analgesics.
* Refer to ophthalmologist if:
  · Moderate sized abrasion not resolving by third day
  · Cornea not improved at any follow up examination
  · Symptoms do not decrease each day
  · Edge of abrasion is white or gray (indicating possible infection)

- **Superficial foreign body visible?** Consider foreign body.
  - Treatment: can use anesthetic, then remove superficial foreign body with saline soaked cotton swab. May also irrigate with eyewash solution.
  - Visualize foreign body embedded in cornea: using slit lamp, remove with hypodermic needle. Refer to optho if not easily removed. “Rust rings” should be removed with gentle scraping with the hypodermic needle until ring is no longer visible.

- **History of blunt trauma?**
  - Treatment:
    * Refer to ophthalmologist if: dark curtain covering part of visual field as might indicate retinal detachment or eyelid laceration as improper healing may cause retraction or impair tearing

- **Chemical burn?**
  - Treatment:
    * Immediately begin copious irrigation with 1 L of NS using IV drip tubing
    * May use pH paper to evaluate effectiveness of treatment, when pH is 6-8 irrigation may be d/ced.

- **Blood in iris?** Consider hyphema.
  - Treatment: Patient needs immediate referral to optho as may result in increased intraocular pressure.

- **Acute pain? Proptosis? Afferent pupillary defect?** Consider retrobulbar hemorrhage.
  - Treatment: Emergent lateral canthotomy. Refer to optho. High dose IV steroids

- **Intense pain? Photophobia? Water or snow sport? Delay in onset of symptoms?** Consider burn.
  - Evaluation: Fluorescein- should see fine punctate staining.
  - Treatment: systemic analgesics and topical antibiotics. If epithelial defect is present, refer to optho. [110, 118]

**Evaluation of Acute Loss of Vision or Blurred vision**

**History:**

- Time course (gradual or acute)? Transient loss? Ask what they were doing when they noticed change in vision (many patients will report that they have had an acute loss of vision, but they have really had a worsening of a longstanding problem.) Clarify whether person has lost vision in one eye or whether they have a hemi-field deficit. Any hemi-field complaints? Pain?

**Physical exam:**

- Refer to physical exam for evaluation of red eye. In addition, palpate for tenderness of temporal arteries.
Selected differential and treatment:

  - Evaluation: Patient will require MRI.
    * If no lesions on MRI, 25% 15 year risk of MS. 72% 15 year risk of MS if one or more lesions.
    * Treatment: May resolve on own, patient will likely benefit from course of corticosteroids.
    Refer to ophtho.

- **Hemi-field loss of vision?** Consider stroke.
  - Depending on timing of presentation, patient may require emergent evaluation by neurologist.

- **Red encircling iris? Painful loss of vision?** Consider acute glaucoma.
  - Treatment: Refer to ophtho emergently.

- **Transient loss of vision lasting only seconds?** Likely hemodynamic in nature. Consider Orthostasis or arrhythmia.
  - Evaluate for orthostatic hypotension and for presence of arrhythmic.

- **Transient loss of vision lasting minutes?** Consider TIAs
  - Patient should be evaluated for further neurologic deficits
  - Work up for embolic risk factors including: lipid panel, hypertension, arrhythmia.

- **Transient loss of vision lasting 10-30 minutes? Preceded by scintillating scotoma?** Consider migraine.
  - Patient should be fully assessed for presence of migraines and treated as appropriate.

- **Acute painless visual loss?** Consider retinal artery occlusion, retinal vein occlusion, cholesterol plaque, retinal detachment, anterior ischemic optic neuropathy. Diagnosis can often be made with funduscopic evaluation.
  - Treatment: Refer to ophtho emergently.

- **Chronic decrease in visual acuity? Only able to see close objects in focus?** Consider Myopia (near-sightedness).
  - Treatment: Refer to ophtho/optometry for glasses. May be eligible for surgical intervention.

- **Chronic decrease in visual acuity? Only able to see far objects in focus?** Consider Hyperopia (farsightedness).
  - Treatment: Refer to ophtho/optometry for glasses.

- **Blurred vision?** Consider astigmatism.
  - Treatment: Refer to ophtho/optometry for glasses.

- **Blurred vision in center of visual field? Progressively worsening?** Consider Macular degeneration.
  - Treatment: Patient should be counselled to stop smoking. Nutritional supplementation with high doses of vitamin C, E, beta-carotene, and zinc can slow the progression by 25%.

- **Visible clouding of lens? Blurred vision with decreased color vision?** Consider cataracts.
  - Refer to ophtho for possible surgical correction.[62]
Bibliography


BIBLIOGRAPHY


BIBLIOGRAPHY


Index

5-ASA, 105
5-fluoro uracil, 162

Aaroxolyn, 15
Abdominal Aortic Aneurysm, 110
Abdominal aortic aneurysm, 22
Acanthosis nigricans, 163
Acarbose, 6
Accolate, 43
Accupril, 17
ACE inhibitor, 10
ACE-Inhibitor, 17, 85
Acebutolol, 16
Aceleon, 17
Acetaminophen, 84
Achilles tendinitis, 133
Actimune, 159
Actinic keratosis, 164
Actonel, 30
Actos, 7
Acute Bacterial Sinusitis, 100
Acute Mesenteric Ischemia, 109
Adalat, 18
Adenovirus, 168
ADHD, 55, 57
Adhesive Capsulitis, 126
Aerobid, 42
Albuterol, 42
Aldactone, 15
Aldomet, 18
Aldosterone Receptor Blockers, 15
Alendronate, 30
Alfuzosin, 90
Alkaptonuria, 163
Alii, 60
Alosetron hydrochloride, 105
Alpha-2 blockers, 18
Alpha-Glucosidase Inhibitors, 6
alpha-methyldopa, 86
Altace, 17
Aluminum hydroxide, 85
Amaryl, 6
Ambien, 147
Amblyopia, 170
Amiloride, 15, 91
Aminoglycoside, 85
Aminophylline, 44
Amitriptyline, 54, 114, 146, 148
Amiodipine, 18
Amoxicillin, 95, 100, 107
Amoxicillin-clavulanate, 95
amoxicillin/clavulanate, 100
Anafranil, 54
Angina, 21
Prinzmetal, 153
stable, 152
unstable, 153
Angioedema, 17
Angiotensin II receptor antagonists, 17
Ankyloglossia, 76
Ankylosing spondylitis, 28
Anorexia, 28
Anterior Drawer, 132
Anti-hyperglycemic, 8
Anticonvulsants, 28
Antiendomyosial antibodies, 4
Anxiety disorder, 51
Aphthous ulcers, 106
Apolipoprotein B, 22
appendicitis, 110
Appley Grind Test for meniscal injury, 127
Apprehension test for glenohumeral instability, 122
Apresoline, 18
ARB, 10, 85
Arthritis, 28
Ascending cholangitis, 111
Aspart, 9
Aspirin, 84
Astigmatism, 172
Atacand, 17
Atenolol, 16
Atorvastatin, 25
Atropine, 85
Atypical depression, 50
Augmentin, 100
Auspitz sign, 156
Avanda, 7
Avapro, 17
Avascular necrosis of the femoral head, 142
Aventyl, 55
Azathioprine, 159
Azelaic acid, 161
Azithromycin, 86, 96, 100
Azmacort, 42
Conjunctivitis, 168
COPD, 44
Coreg, 16
Corneal abrasion, 169, 170
Costochondritis, 154
Cox-2 inhibitors, 12, 107
Cozaar, 17
Crank Test for Labral Injury, 123
Crohn’s Disease, 106
Cromolyn, 43
Cross arm test for DJD, 122
Cushing’s syndrome, 13, 160
Cyclobenzaprine, 146
Cyclophosphamide, 162
Cyclosporin, 12, 28, 159
Cymbalta, 56
Cyproheptadine, 115

Darier’s Sign, 156
DASH, 13
de Quervain’s tenosynovitis, 137
Demadex, 15
Depakote, 114
Depression, 47
Dermatitis
  Atopic, 158
  Contact, 157
  Nickle, 157
  Seborrhoeic, 158
Desipramine, 55
Desmopressin, 91
Detemir, 9
DEXA, 27
Dexamethasone suppression test, 13
Dextromethorphan, 84
DHEAs, 161
Diabetes, 3, 21
Diabetes insipidus, 15, 89, 91
Dicyclomine, 105
Diethylpropion, 60
Diethylstilbestrol, 86
Dihydroergotamine, 114
Dilacor, 18
Diltiazem, 18
Diovan, 17
Diphenhydramine, 85, 147
Diphenoxylate, 85
Disk herniation, 135
Diuril, 15
Diverticulitis, 111
DMSA, 95
Double depression, 51
Doxazosin, 18, 90
Doxepin, 55
Doxycycline, 96, 161
Doxylamine, 147

DPP-4 Inhibitors, 7
Drop Arm Test for Supraspinatus Tears, 123
Duloxetine, 56, 93
Dynacirc, 18
Dyrenium, 15
Dysbeta- lipoproteinemia, 25
Dyslipidemia, 10, 21
Dyspepsia, 25
Dysthymia, 48

E. toxicum, 76
Ebstein’s pearls, 76
Effexor, 56
Elavil, 54
Elidel, 159
Empty can test, 120
Enalapril, 17
Endometriosis, 96
Enterococcus, 95
Enuresis, 55
Ephedra, 12
Epididymitis, 96
Episcleritis, 169
Eplerenone, 15
Epo, 12
Eprosartan, 17
Ergotamine, 114
Erythema nodosum, 106
Erythrasma, 162
Erythromycin, 86, 168
Escitalopram, 52
Esophageal strictures, 30
Estrogen, 30
Estrogen, topical, 93
Eszopiclone, 147
Evista, 30
Excedrin, 114
Exenatide, 8
Ezetimibe, 26

FABER test, 134
Famotidine, 85, 106
Felodipine, 18
Femoral neck stress fracture, 141
Fenofibrate, 25
Fibric Acid, 25
Fibromyalgia, 145
Fibromyalgia, 56
Finasteride, 90
Finkelstin’s test, 137
Fioricet, 114
Fiorinal, 114
Flexeril, 146
Flomax, 90
Flovent, 42
Flunisolide, 42
Fluoxetine, 52, 60, 86
Flushing, 25
Fluticasone, 42
Fluvastatin, 25
Fluvoxamine, 52
Formoterol, 42
Forteo, 31
Fosamax, 30
Fosinopril, 17
Framingham Risk Score, 22
Frozen Shoulder, 126
Furosemide, 15

Gabapentin, 116
GAD, 56
Galant reflex, 76
Gallstones, 25
Gastric Bypass, 28
Gastric ulcers, 30
Gastroenteritis, 109
Gemfibrozil, 25
Gestational diabetes mellitus, 3
Giant Cell Arteritis, 146
Giant cell arteritis, 115
Gliargin, 9
Glaucoma, 172
Glaucoma, 42, 55
Glimepiride, 6
Glucophage, 61
Glucotrol, 6
Glulisine, 9
Glyburide, 86
Glyburide, 6
Glycolic acid, 162
Glyset, 6
Golfer’s elbow, 140
Golfer’s elbow test, 139
Gonorrhea, 168
Gout, 117
Gout, 25
Grasp reflex, 76
Grind test, 137
Guaiifenesin, 84
Guanfacine, 18
Gynecomastia, 15
Gyrocaps, 44

H. pylori, 107
H1N1, 102
Hawkin’s Test for impingement, 121
HbA1C, 4
HCTZ, 15, 91
HDL, 24
HDL cholesterol, 21
Headache, new daily persistent, 116
Hematuria, 89
Hemicrania continua, 116
Heparin, 28, 85
Hepatitis, 107
Hepatotoxicity, 25
Herpes, 96
Heterophile test, 144
Hill–Sachs lesion, 125
Hip dysplasia, 141
HMG CoA Reductase Inhibitor, 25
Homocysteine, 12
Homocystinuria, 163
Hordeolum, 169
Hydralazine, 18, 86
Hydrodiuril, 15
Hydroquinone, 162
Hydroxyurea, 162
Hyoscyamine, 105
Hyperandrogenism, 160
Hyperopia, 172
Hyperparathyroidism, 28
Hypertension, 10
Hyperthyroidism, 28
Hyperuricemia, 25
Hyphema, 170
Hypogonadism, 28
Hytrin, 18
Hytrin, 90
Ibandronate, 30, 31
IBD, 28
Ibuprofen, 84
Iliotibial band syndrome, 130, 141
Imipramine, 55
Impaired Fasting Glucose, 10
Impaired Fasting Glucose:, 3
Impingement, 125
Imuran, 159
Incretin Mimetics , 7
Indapamide, 15
Indomethacin, 91, 116
Infliximab, 106
Influenza, 101
Influenza vaccine, 5
Infra spinatus, 120
Insomnia, 146
Inspra, 15
Insulin, 9, 85
Intal, 43
International Prostate Symptom Score, 90
Interstitial cystitis, 96
Intussusception, 112
Iodine, 86
Ipratropium, 44
IPSS, 90
Irbesartan, 17
Irritable Bowel Syndrome, 104
Isotretinoin, 86
Isotretinoin, 161
Isradipine, 18

Januvia, 7

Kaolin, 85
Kaposi’s sarcoma, 168
Kegel exercises, 92
Kerlone, 16
Ketoconazole, 163
Ketoprofen, 84
Kidney disease, 28
Kidney stones, 15
Klebsiella, 95

Labetalol, 16
Labral tear, 126
Lachman’s Test, 128
LAMB syndrome, 163
Lansoprazole, 106
large bowel obstruction, 109
Lasix, 15
LDL, 23
LDL, 4
Legg-Calve Perthes disease, 141
Lentigines, solar, 162
LEOPARD syndrome, 163
Leukotriene modifiers, 43
Levatol, 16
Levofloxicin, 96
Lexapro, 52
Lichen simplex chronicus, 55
Licorice, 12
Lisinopril, 17
Lispro, 9
Lithium, 28, 86, 91
Loniten, 18
Loop Diuretics, 15
Loperamide, 85
Lopressor, 16
Lorarcabef., 95
Losartan, 17
Lotensin, 17
Lovastatin, 25
Lozol, 15
Lunesta, 147
Lunotriqueatual shear test, 137
Lupron, 91
Luvox, 52
Lymphogranuloma venereum, 96
Lyrica, 146

Ma Huang, 12
Macrolides, 100, 101
Macular degeneration, 172
Major depressive disorder, 48

Manning criteria, 105
Mavik, 17
Maxair, 42
McBurney’s point, 104
McMurray’s test, 137
McMurray’s Test for meniscus tear, 127
Mediterranean diet, 59
Meglitinide, 7
Melancholia, 48
Melanoma, 165
Melasma, 162
Meralgia paresthetica, 142
Meridia, 60
Metabolic Syndrome, 4
Metatarsal Syndrome, 131
Metformin, 61, 86
Metformin, 6
Methotrexate, 28, 86, 162
Methyldopa, 18
Methylxanthine, 44
Metoclopamide, 107
Metolazone, 15
Metoprolol, 16
Metronidazole, 106
Miacalcin, 31
Micardis, 17
Miconazole, 85
microalbumin/creatinine ratio, 4
Microsporum, 162
Microzide, 15
Midamor, 15
Midrin, 114
Miglitol, 6
Migraine, 114, 172
Migraine, 54, 55
Migranal, 114
Milia, 76
Minipress, 18, 90
Minocycline, 161, 162
Minoxidil, 18
Mirtazapine, 58, 148
Mitiglumide, 7
Moexipril, 17
Mongolian spots, 76
Mono- amine oxidase inhibitor, 57
Mono-clonal Anti- IgE Antibody, 44
Monopril, 17
Montelukast, 43
Moro reflex, 76
Murphy’s sign, 104
Mycophenolate mofetil, 159
Myeloma, 28
Mykrox, 15
Myocardial ischemia, 22
Myofascial syndrome, 146
Myoglobin, 150
Myopathy, 25
Myopia, 172
Myositis, 25

Naproxen, 84, 114
Nateglinide, 7
Nedocromil, 43
Neers test for impingement, 121
Nefazodone, 53
Neomycin, 26
Neonatal acne, 76
Nephrototoxicity, 26
Neurontin, 114
Neuropathy, 52, 54–56
Niaspan, 25
Nicardipine, 18
Nicotinic Acid, 25
Nicotinic Acid, 25
Nifedipine, 18
Nikolsky’s sign, 156
Nisoldipine, 18
Nissen fundoplication, 107
Nitrofurantoin, 95
Nizatidine, 85
Nobel’s test, 129
Noble’s test, 141
Normal Pressure Hydrocephalus., 92
Normodyne, 16
Norpramin, 55
Nortriptyline, 55
Norvasc, 18
NPH, 9

Ober test, 129
Ober’s test, 140
Obesity, 59
Obsessive Compulsive Disorder, 51
Obturator sign, 104
Ofloxacin, 96
Olmesartan, 17
Omalizumab, 44
Omeprazole, 106, 107
Omnicell, 100
Open retropubic colposuspension, 93
Ophthalamic zoster, 116
Optic Neuritis, 172
Oral glucose tolerance test, 3
Orchietomy, 91
Orchitis, 96
Orlistat, 60
Orthostatic hypotension, 16
Ortolani maneuver, 140
Oxelamivir, 101
Osgood-Schlatter, 129
Osteoarthritis, 117, 130
Osteochondritis Dissecans, 129

Osteonecrosis, 30
Osteopenia, 28
Osteoporosis, 27
Osteosarcoma, 31
Otitis Media, 100
Otoxicity, 15
Otoxicity, 26
Overflow incontinence, 92
Oxybutynin, 93

Paget’s disease, 28
Paget’s disease, 31
Pancreatitis, 110
Panic disorder, 154
Parathyroid, 31
Parathyroid disease, 13
Paroxetine, 53
Patellar subluxation, 129
Patellar tendinitis, 129
Patellofemoral pain syndrome, 130
Paxil, 53
PCOS, 160
Pectin, 85
Penbutolol, 16
Penicillin, 86, 101
Pentosan polysulfate, 97
Peptic Ulcer Disease, 107, 110
Peptic ulcer disease, 25
Periactin, 114
Pericarditis, 153
Perindopril, 17
Periorbital cellulitis, 169
Peripheral arterial disease, 22
Peroxide, 161
Pes anserinus bursitis, 130
Peyronie’s disease, 89
Pharyngitis., 100
Phenazopyridine, 95
Phenobarbital, 28
Phentermine, 60
Phenylketonuria, 163
Phenytoin, 28, 86
PID, 112
Pigmentation, 162
Pimecrolimus, 159
Pimozide, 52
Pindolol, 16
Pioglitazone, 7
Pirbuterol, 42
Piriformis syndrome, 142
Plantar fasciitis, 133
Plegine, 60
Plendil, 18
Pica syndrome, 130
PMDD, 53
Pneumococcal vaccine, 5
INDEX

Polycystic Ovarian Syndrome, 160
Polymyalgia rheumatica, 146
Popliteal cyst, 130
Porphyria cutanea tarda, 163
Post inflammatory hyperpigmentation, 162
Post-void residual, 92
Pramlintide, 8
Prandin, 7
Pravastatin, 25
Prazosin, 18, 90
Precose, 6
Prednisone, 85, 105
Prednison, 43
Pregabalin, 146
Prehypertension, 13
Prelu-2, 60
Premenstrual dysphoric disorder, 52
Preseptal cellulitis, 169
Primary Aldosteronism, 12
Prinivil, 17
Procardia, 18
Propanolol, 16, 86
Proscar, 90
Prostate cancer, 89
Prostatitis, 96
Prostodynia, 96
Proteus, 95
Protopic, 159
Proventil, 42
Prozac, 52, 60
PSA, 90
Pseudoephedrine, 84, 93
Psos sign, 104
Psoralens, 162
Psoriasis, 158, 160
Psychosis, 50
Pterygium, 169
PTSD, 53, 55
Pulmicort, 42
Pulmonary Embolism, 153
Pulmonary embolism, 153
Pyelonephritis, 93, 95
Pyoderma gangrenosum, 106
Pyridium, 95
Quinapril, 17
Radial tunnel syndrome test., 139
Radionuclide cystography, 95
Raloxifene, 30
Ramelteon, 147
Ramipril, 17
Ranitidine, 85, 106
Rebound headache, 116
Reclast, 31
Reiters, 96
Remeron, 58
Remicade, 106
Repaglinide, 7
Reserpine, 18
Retin-A, 161
Retinal migraine, 114
Retinoids, 161
Retinopathy, 5
Rhabdomyolysis, 25
Rheumatoid arthritis, 118
Rimonabant, 60
Risedronate, 30
Rocephin, 100
Rofecoxib, 107
Rome III, 105
Rooting reflex, 76
Rosiglitazone, 7
Rosuvastatin, 25
Rosving’s sign, 104
Rotator Cuff Tear, 125
Rouan Decision Rule, 151
Rozerem, 147
Salmeterol, 42
Sandimmune, 159
Sansert, 114
Scaphoid shift test, 137
Sciatica, 135
SCORE, 27
Seasonal Affective Disorder, 49, 51
Sectral, 16
Selective Estrogen Receptor Modulator, 30
Selenium sulfide, 163
Serevent, 42
Sertraline, 53
Serzone, 53
Sibutramine, 60
Simethicone, 85
Simvastatin, 25
Sinequan, 55
Singulair, 43
SLE, 28
Sleep Apnea, 12
Slipped Capital Femoral Epiphysis, 129, 141
small bowel obstruction, 109
Social anxiety disorder, 52
Social anxiety disorder, 56
Sonata, 147
Speed’s Maneuver for Bicipital Tendinitis, 122
Spinal stenosis, 135
Spironolactone, 15
Spondyloarthropathy, 96
Spondylolisthesis, 135
Spondylosis, 134, 135
Squamous cell carcinoma, 165
Staph saprophyticus, 95
INDEX

Starlix, 7
Statins, 25
Status migranicus, 114
Stork test, 134
Straight leg raise, 134
Strep throat, 100
Stress predominant incontinence, 92
Sturge-Weber syndrome, 170
Subconjunctival hemorrhage, 168
Subscapularis, 120
Suburethral sling, 93
Sudafed, 89
Sular, 18
Sulcus Sign for multidirectional instability, 123
Sulfonylureas, 6
Supination lift test, 137
Supraspinatus, 120
Syphilis, 96
Tacrolimus, 12, 28, 159
Talar tilt, 132
Tamponade, 153
Tamsulosin, 90
Telmisartan, 17
Temporal arteritis, 115
Tenex, 18
Tennis elbow, 139
Tennis elbow test, 139
Tenormin, 16
Tension headache, 115
Tension type chronic daily headaches, 116
Tenuate, 60
Teplanil, 60
Terazosin, 18, 90
Terbutaline, 42
Teres Minor, 120
Teriparatide, 31
Tetracycline, 86, 161
Tetracyclines, 101
Teveoten, 17
Theo-Dur, 44
Theophylline, 44
Thiazide diuretic, 10
Thiazide Diuretics, 15
Thiazolidinediones, 7
Thioridazine, 52
Thompson test, 132
Thromboembolic, 30
Thyroglobulin antibodies, 4
Thyroid Stimulating Hormone, 4
TIA, 22
Tiazac, 18
Tibial Apophysitis, 129
Tilade, 43
Tinea versicolor, 163
Tioconazole, 85
TMJ, 116
Tofranil, 55
Tolterodine, 93
Topamax, 61
Topiramate, 61
Toprol-XL, 16
Tornalate, 42
Torsemide, 15
Total cholesterol, 21
Total cholesterol/HDL ratio, 22
Trandate, 16
Trandolapril, 17
Transformed migraine, 116
Transurethral resection of the prostate, 91
Trazodone, 54, 148
Triamcinolone, 42
Triamterene, 15
Triceps tendinosis, 139
Tricyclic antidepressants, 97
Trigeminal neuralgia, 116
Triglycerides, 21, 24
Trimethoprim-Sulfamethoxazole, 95
Trochanteric bursitis, 141
Troponin, 150

Ulcerative Colitis, 105
Ultran, 114
Uni-Dur, 44
Unisom, 147
Univasc, 17
Unstable angina, 22
Urethritis, 96
Urethral predominant incontinence, 92
Urinary Tract Infection, 95
Uristat, 95
Urosepsis, 96
UroXatral, 90
UTI, 92

Valproic acid, 86
Valsartan, 17
Vanceril, 42
Vantin, 100
Vasotec, 17
Venlafaxine, 56
Ventolin, 42
Very Low Calorie Diet, 60
Vioxx, 107
Vitamin D, 28
Vitamin D deficiency), 28
Vitiligo, 162, 163
 Voiding cystourethrogramy, 95
Volvulus, 109
von Gierke’s hemachromatosis, 163
Vulvovaginitis
atrophic, 96
inflammatory, 96

Warfarin, 85
Watson’s test, 137
Wellbutrin, 57, 60
Wells Model, 153
Wilson’s disease, 163
Wood’s light, 162

X-Trozine, 60
Xenical, 60

Yergason’s test for Biceps Tendinitis, 121

Zafirlukast, 43
Zaleplon, 147
Zanamivir, 101
Zebeta, 16
Zestril, 17
Zidovudine, 162
Zileuton, 43
Zithromax, 100
Zoledronic acid, 31
Zoloft, 53
Zolpidem, 147
Zonisamide, 61
Zyflo, 43