**BURN APPROACH**

→ % BSA affected (rule of 9’s, palm=1%) - severe if 20% in adult, 10% in kids or elderly → burn unit
→ degree of burn
→ is it circumferential and/or over a joint? (concern for compartment syndrome → escharotomy)
→ are there blisters? Open or closed? Is wound draining? What color?
→ is there sensation at site of burn? distal pulses & ROM intact?
→ management: fluids, morphine/opioids, IV vanco vs. ancef, tetanus
→ Parkland formula = LR @ 4ml x kg x BSA burn (half over 1st 8hrs, rest over next 16hrs)
→ minor burns: debride lost tissue or broken blisters, cool compress, topical abx (Silverdene, Bacitracin)

**Classification of burns by depth of injury**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Appearance</th>
<th>Sensation</th>
<th>Healing time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial (1st degree) Epidermis</td>
<td>Dry, red or pink, no blisters Blanches with pressure</td>
<td>Painful</td>
<td>Days to 1 week, no scar</td>
</tr>
<tr>
<td>Superficial partial-thickness (2nd degree) Epidermis &amp; top dermis</td>
<td>Blisters (clear) Moist, red, weeping Blanches with pressure</td>
<td>Painful to temperature and air</td>
<td>14 to 21 days, some scarring</td>
</tr>
<tr>
<td>Deep partial-thickness (2nd degree) Epidermis &amp; dermis</td>
<td>Blisters (hemorrhagic, easily unroofed) Moist or waxy dry Red, pink, cheesy white Does not blanch with pressure</td>
<td>Perceptive of pressure</td>
<td>&gt;21 days or weeks, usually requires surgical treatment</td>
</tr>
<tr>
<td>Full-thickness (3rd degree) Epidermis &amp; full dermis, hypodermis, nerves</td>
<td>Waxy white to charred leathery Dry, leathery, inelastic No blanching with pressure</td>
<td>Insensate May feel deep pressure only</td>
<td>Full skin &amp; nerve permanently destroyed; Requires excision, heal only with grafting/surgery</td>
</tr>
<tr>
<td>Fourth degree Muscle, fascia, bone</td>
<td>Necrosis is common</td>
<td>Insensate May feel deep pressure only</td>
<td>debridement/amputation common</td>
</tr>
</tbody>
</table>

**DEGREES OF BURN**

First-degree burns affect only the outer layer of the skin. They cause pain, redness, and swelling.

Second-degree (partial thickness) burns affect both the outer and underlying layer of skin. They cause pain, redness, swelling, and blistering.

Third-degree (full thickness) burns extend into deeper tissues. They cause white or blackened, charred skin that may be numb.
SUTURING 101
→ Step 1 = Anesthetize: clean site with alcohol wipe, draw up lidocaine with 18 gauge needle, flush area surrounding site (or proximal to wound on finger) with 27 gauge needle
→ Step 2 = Irrigate wound: use saline in syringe w/ spray guard
→ Step 3 = Suture: create sterile field & use sterile gloves
→ Step 4 = Close: cover site with xeroform & gauze (can use bacitracin)

CELLULITIS
● infx of superficial and deep dermis and subq fat
● Common organisms: GAS, MSSA, MRSA (GNRs in diabetics)
● Clinical dx: erythema, edema, warmth, pain (lymphangitis & regional LAD)
  ○ Blood cx low yield, can get aspirate of bulla or pus
● Predisposing factors: disruption to skin barrier (trauma, IV drug use), preexisting skin infection, venous insufficiency, lymphedema
● Other etiology: community-acquired MRSA (rx bactrim), TSS, cat bites (P. multocida), dog bites (P. multocida, C. canimorsus), penetrating injuries, gardening (sporothrix)
● Treatment
  ○ elevation, hydration of wound
  ○ I & D if abscess also present
  ○ OP / non-purulent: cover GAS & MSSA → 1st generation cephalosporin (Keflex) x5-10d
  ○ purulent: cover for MRSA → clindamycin, Bactrim, doxy, linezolid x5-10d
  ○ Inpatient: vancomycin, linezolid, daptomycin, ceftaroline or strep rx (IV unasyn → PO augmentin) x7-14d

OPEN FX → 2mg IV Ancef (cefazolin) given w/in 3hrs

MENINGITIS MANAGEMENT
● classic triad = fever, nuchal rigidity, mental status change
● other s/sx: HA, photophobia, N/V, seizures, focal deficits, rash, + kernig sign, + brudzinski sign
● send for non-contrast CT → LP
● typical CSF findings: elevated opening pressure (>200), WBCs 1-5k with >80% neutrophils, elevated protein (100-500), low glucose (<40 with a CSF:serum glucose ratio of <0.4)
● Do not wait for CT to treat empirically: Ceftriaxone, Vancomycin, Ampicillin, Acyclovir, Steroids

HEADACHES
→ ED Don't Miss: SAH, metastases, meningitis, temporal arteritis, vascular dissection, acute narrow angle glaucoma, HTN encephalopathy, CO poisoning, CVA, cerebral venous sinus thrombosis, IIH
● SAH: non-contrast CT → LP (xanthochromia) → angiography (ID vessel anatomy)
  ○ Tx: ABCs, pain & emesis control, NSGY consult, Nimodipine to lower BP
● GCA: worse at night, jaw claudication, tender/pulseless temporal artery, vision changes, polymyalgia rheumatica → ESR & temporal artery bx → high dose prednisone
● Pseudotumor cerebri (IIH) - obese women, HA w/ vision loss, LP opening pressure >25
→ General rx: Fluids, Toradol, Reglan/Compazine, Benadryl, prednisone/dexamethasone taper
  → Migraine Abortive: metochlopramide/prochlorperazine (DA blocker), NSAIDs (Toradol), opioids
  → Cluster HA: high flow O2, sumatriptan
→ Migraine Prophylaxis: BB, CCB, 5HT agonists =triptans (sumatriptan), NSAID (naproxen), ergotamine
→ Tension HA
  ○ Mild-mod intensity bilateral pressing or tightening (nonpulsating, not aggravated by physical activity, not associated with N/V or photophobia)
  ○ Tx: NSAIDs (IBF, naproxen, ketorolac), acetaminophen +/- caffeine, heat, ice, massage
→ Cluster HA
  ○ Severe unilateral orbital, supraorbital, or temporal pain lasting 15-180min that present in clusters with up to 8 episodes per day
  ○ Asx with ipsilateral signs such as conjunctival injection, lacrimation, nasal congestion, rhinorrhea, facial sweating, miosis, ptosis, eyelid edema
  ○ Tx: O2 (7lpm x20min), triptans (2nd line = ergotamine, octreotide)
  ○ Prevention: verapamil, glucocorticoids, lithium, topiramate, methysergide

→ Migraine HA
  ○ Mod-severe intensity unilateral pulsating lasting 4-72hrs, aggravated by physical activity
  ○ Asx with N/V, photophobia, +/- auras (visual, sensory, speech sx)
  ○ Tx: headache diary (ID triggers), Triptans (sumatriptan), analgesics (ibuprofen, naproxen, indomethacin), Ergots (ergotamine), antiemetics (Reglan), dexamethasone
  ○ Preventive (4+/mo, >12hrs, significant disability) → BB, CBB, ACEI, amitriptyline or antidepressants, gabapentin or antiepileptics

ALTERED MENTAL STATUS
→ DDx = MOVE STUPID
  ● Metabolic
  ● Oxygen/hypoxemia
  ● Vascular (HTN, CVA, MI)
  ● Electrolytes & Endocrine (hypoglycemia, DKA)
  ● Seizures / postictal
  ● Tumor, Trauma, Toxins, Temp
  ● Uremia, renal or hepatic dysfunction
  ● Psych
  ● Infx/inflammation
  ● Drugs or withdrawal

→ Work up: Pulse ox, Glucose, CBC & Chem7, H&H, UA, Breathalyzer, Drug levels, CXR, EKG, Blood gas, CO level, CT/MRI, Thyroid levels, EEG

SYNCOPE
→ DDx
  ● Cardiac - PE, MI, brugada, dysrhythmia, hypertrophic cardiomyopathy
  ● Hypoglycemia
  ● Orthostatic / dehydration
  ● Vasomotor - vasovagal, pain
  ● Neuro - seizure, CVA, SAH
  ● Bleeding/hemorrhage
  ● Medications
  ● Reflex - carotid sinus sensitivity
  ● Psychogenic
  ● Toxic

→ Work Up
  ○ Orthostatic vitals
  ○ Blood glucose, CBC (lytes, hgb, renal fnx)
  ○ EKG & telemetry
  ○ Echo
  ○ Consider CT and carotid doppler (to check for TIA) if clinically indicated
  ○ Consider EEG if clinically indicated
  ○ Interrogate pacemaker if present
**EMERGENCY MEDICINE**

**DIZZINESS DDX**
- Peripheral Vertigo / Peripheral vestibular dysfunction (40%)
- Presyncope or disequilibrium (25%)
- Psychiatric (15%) → depression, anxiety, somatization
- Central Vertigo / Central vestibular lesion (10%)
- Idiopathic / unknown (10%)

**VERTIGO**

<table>
<thead>
<tr>
<th><strong>PERIPHERAL</strong></th>
<th><strong>CENTRAL</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysfunction of vestibular n. (CN VIII) or inner ear</td>
<td>Dysfunction of medullary vestibular nuclei or connections to cerebellum</td>
</tr>
<tr>
<td>Mild-severe vertigo episodes</td>
<td>Chronic &amp; unremitting</td>
</tr>
<tr>
<td>Sudden onset</td>
<td>Gradual onset</td>
</tr>
<tr>
<td>Mild-mod imbalance</td>
<td>Severe imbalance</td>
</tr>
<tr>
<td>Severe N/V</td>
<td>Varying N/V</td>
</tr>
<tr>
<td>Common auditory sx like hearing loss</td>
<td>Rare auditory sx, typically no hearing loss</td>
</tr>
<tr>
<td>Rare neurologic deficits</td>
<td>Common neurologic deficits</td>
</tr>
<tr>
<td>Infrequent change in MS</td>
<td>Sometimes changes in MS</td>
</tr>
<tr>
<td>Rapid compensation/resolution</td>
<td>Slow compensation/resolution</td>
</tr>
</tbody>
</table>

**Vestibular Neuritis** (+ hearing loss = Labyrinthitis)
- Most common cause of peripheral vertigo
- Etiology: viral or post-viral inflammation affecting vestibular n.
- Sx: acute vertigo that may last for days and is continuous, N/V, gait instability, horizontal nystagmus (auditory sx usually absent)
- Dx: HPI (consider MRI if hx suggests vascular causes)
- Tx: steroids, diazepam

**Meniere’s Disease**
- Etiology: over-accumulation of endolymph in vestibular sys
- Sx: sudden episodic attacks of vertigo, aural fullness, sensorineural hearing loss that fluctuates, tinnitus, nystagmus
- Dx: clinical hx of triad: vertigo + hearing loss + tinnitus
- Tx: meclizine, anti-emetics, diuretic (acetazolamide)
- Reduce salt intake, surgery / labyrinthectomy

**BPPV – benign paroxysmal postural vertigo**
- Etiology: canalithiasis (otoliths) accumulate in semicircular canal and cause movement of endolymph
- Sx: short bursts of vertigo triggered by position; severe rotational vertigo; N/V; nystagmus usually beats away from affected side & resolves with upright position; uncommon to have pain, hearing loss, tinnitus
- Dx: Dix-Hallpike maneuver
- Tx: Epley maneuver or Antihistamines → Meclizine (=Dramamine)
- Antineutics → metochlopramide, promethazine
- Anticholinergics → Scopolamine
- Benzos → diazepam, lorazepam
- **Others**: vestibular schwannoma, aminoglycoside toxicity, otitis media, Ramsay-Hunt syn (herpes zoster oticus), perilymphatic fistula

**Brainstem Ischemia**
- Cause: embolic, atherosclerotic (TIA), rotational vertebral artery syndrome, Wallenberg (lateral medullary infarction – vertigo & disequilibrium)

**Cerebellum infarction & bleed**
- Sudden, intense vertigo with N/V

**Chiari malformation**
- Cerebellar tonsil extended below foramen magnum

**Others**: migraine, multiple sclerosis
SEIZURES
→ New Onset DDx: Infx, Toxic, Metabolic (liver, kidney), Structural (mass), Vascular (bleed, ischemia), Eclampsia, Febrile, Mimics (hyperventilation, syncope, rigors, narcolepsy)
→ ED before neuro consult: Keppra 1000mg IV loading dose
→ Treatment: 1: benzos  2: phenytoin, valproic acid  3: propofol, phenobarbital  Status: intubate

SEPSIS WORKUP
→ CBC, Chem7, blood cx (2 sets), UA/urine cx, lactate, LFTs; lipase
→ SIRS criteria (>2): fever >100.4, WBC >12 or <4, tachycardic >90, tachypneic >20
→ Sepsis = SIRS + source of infection;  Severe sepsis = lactic acidosis + SPB <90 or drop >40
→ Septic Shock = sepsis + refractory hypotension (despite adequate fluid resuscitation)

PHARYNGITIS
● Dx: Throat culture* or RADT
● Centor clinical criteria (for strep throat): tonsillar exudates, tender anterior cervical lymphadenopathy, fever history, absence of cough (3+ do RADT or throat cx)
● Pain control and sx relief options (if viral): Hurricaine mouth spray (benzocaine 20%), PO Motrin, IM/IV Toradol, prednisone, IM dexamethasone for severe sx
● Tx options for strep throat:
  → Oral Penicillin V: 500 mg two to three times daily for 10 days
  → Amoxicillin: 500 mg twice daily for 10 days
  → IM Penicillin G (benzathine): single dose injection (Bicillin L-A) 1.2 mil units
  → Clinda: IV, or PO 300 mg orally three times daily for 10 days
  → Azithromycin: z-pak or multi-day course
● Causes of acute pharyngitis: bacterial (20%, group A beta-hemolytic strep 15% of time), viral (50% - rhinovirus, adenovirus, influenza, EBV, HSV, RSV), no pathogen isolated (30%)
  → less likely ddx: pharyngitis caused by gonorrhea/chlamydia, diphtheria, fungi
● Complications of GAS: rheumatic fever, glomerulonephritis, pharyngeal space infx
  → dx rheumatic fever w Jones criteria  → tx w PCN, steroids for carditis, NSAIDs for arthritis
    ● Jones Criteria = 2 major, or 1 major + 2 minor, w/ evidence of preceding GAS infx
    ● 5 major manifestations: carditis & valvulitis (mitral or aortic regurg), arthritis (usually migratory polyarthritis of large joints), CNS involvement (chorea), subcutaneous nodules, erythema marginatum
    ● 4 minor manifestations: arthralgia, fever, elevated ESR/CRP, prolonged PR interval
ABDOMINAL PAIN DDX:

**ABD CT w/ out contrast** for kidney stones, allergies, elevated creatinine

- **Dysphagia / Odynophagia ddx** → achalasia, esophagitis, Mallory-Weiss tear, Boerhaave syn
  - Complications: esophagitis, strictures, Barrett esophagus → adenocarcinoma
  - rx = avoid triggers, antacids (Tums), PPIs (omeprazole), H2 blockers (Ranitidine/Zantac)

- **GERD** → heartburn, dysphagia, cough, laryngitis, asthma, chest pain
  - Complications: esophagitis, strictures
  - Tx: antacids, PPIs, H2 blockers

- **PUD** → burning epigastric pain often d/t NSAIDs, H. pylori → endoscopy, barium XR
  - Gastric (mucosal breakdown): pain shortly after eating (pain worse with food)
  - Duodenal (acid hypersecretion): pain 2-3hrs after meals & at night (relieved with food)
  - Rx = avoid triggers, antacids (Tums), PPIs (omeprazole), H2 blockers

- **Cholelithiasis** → biliary colic w/ radiation to back or R shoulder (80% are cholesterol stones)
  - Meperidine (Demerol) or NSAIDs, elective cholecystectomy

- **Cholecystitis** → RUQ pain, fever, N/V, fatty food intolerance, jaundice, radiation to back or shoulder, (+) Murphy sign, ↑ leukocytosis w/ L shift
  - US* (stones, gallbladder wall thickening, dilated ducts), HIDA scan, CT
  - Refer to hospital → NPO, IVF, opioids or ketorolac, empiric abx, cholecystectomy

- **Cholangitis** → Charcot Triad = fever, jaundice, RUQ pain
  - + hypot and AMS = Reynold Pental → suppurative cholangitis

- **Pancreatitis** → epigastric pain w/ radiation to back; ↑ lipase or amylase, m/c EtOH & gallstones
  - Ultrasound or CT → pain control and consider sending to ED

- **Hepatitis** → jaundice, fatigue, malaise, anorexia, N/V, fever, ascites, pruritus, organomegaly
  - etiologies: alcoholic (AST > ALT 2:1 = cirrhosis), viral, idiopathic, triglycerides

- **Appendicitis** → periumbilical to RLQ pain, N/V, anorexia, fever, pain at McBurney point, (+) Rosving, Psoas, Obturator signs → CT w/ contrast*, US

- **Diverticulosis** → painless rectal bleeding, usually self-limited → colonoscopy, ↑fiber intake

- **Diverticulitis** → LLQ pain, fever, N/V/D, constipation, urinary sx, distension →CT, IVF, ABX
  - Complications: abscess, fistula, obstruction, perf, peritonitis → surgery

- **Peritonitis / ascites** → perf, ruptured ulcer/appendix/diverticulitis, pancreatitis, SBP (cirrhosis)

- **Hernia** → sx = mass, occlusion; reducible vs. incarcerated (surg) vs. strangulated (surg + abx)

- **Obstruction** → most commonly d/t adhesions, hernia, malignancy → xray, US?

- **IBD** → recurrent abd pain, fever, fatigue, diarrhea (bloody), weight loss, extraintestinal sx
  - Antibodies: P-ANCA (UC), ASCA (Crohn dz)
  - Complications: toxic megacolon, obstruction, perf, abscess, fistulas, colon CA (>UC)
  - Tx: 5-ASA (sulfasalazine for colon, mesalamine for small bowel), glucocorticoids, IVF, immune modulators (azathioprine, MTX, cyclosporine, infliximab)

- **IBS** → chronic abd pain, altered bowel habits, abd bloating, w/ no structural or biochem disorder

- **Intussusception** → crampy pain, vomiting, blood & mucous in stool (currant jelly stool)

- **Gastroparesis** → bloating, feeling full quickly, heartburn, nausea, poor blood sugar control

- **AAA**

- **Mesenteric Ischemia** (CHF, hypotension, dysrhythmia/AFib, MI, VTE) → angio, IVF, abx, surg

- **Nephrolithiasis or urolithiasis** → US or CT

- **Pelvic pain** → ectopic pregnancy, PID, TOA, ovarian torsion, ruptured ovarian cyst
DIARRHEA:
→ FLUIDS, BRAT diet, antidiarrheals if no systemic sx (Loperamide, Peptobismol, Lomotil)
→ abx + stool studies if bloody diarrhea, high fever, systemic toxicity
  ● Viral**: Norwalk virus, rotavirus, adenovirus, astrovirus
    ○ Suggested with relation to food, travel, hospitalization, day care, sick contacts
    ○ Usually acute, lasts <2wks
  ● Bacterial Toxin-producing: B. cereus, S. aureus (food poisoning); C. diff pseudomembranous colitis (classically related to clindamycin → rx Flagyl or vanco PO)
    ○ Avoid steroid use when concern for c. diff
  ● Bacterial Invasive: Salmonella, Shigella (bloody, mucoid), Vibrio (profuse watery), Campylobacter (watery bloody stool), E. coli, Yersinia
  ● Parasites (acute, watery): Giardia (→Flagyl), entamoeba histolytica, cryptosporidium
  ● Traveler’s diarrhea (profuse watery stool): Enterotoxigenic E. coli (from water, food)
  ● Bloody, mucoid (dysentery): Shigella, Salmonella, Enterohemorrhagic E. coli (0157:H7), campylobacter
  ● Inflammatory/Functional: UC/Crohn, IBS (can be bloody)

CONSTIPATION: <3 stools per week, often hard and difficult to pass stool
  ● IBS, Occlusion (hernia, adhesions), Malignancy
  ● rx = 20g/d fiber (psyllium → Metamucil), PEG, water, exercise, fruits, veggies

GI BLEED: DRE, FOBT, EGD, colonoscopy → vitals, fluids, packed RBCs (if hgb ~ <7g/dL)
  ● Upper (melena): PUD*, gastritis or esophagitis, varices, Mallory-Weiss tear, Borhaav’s, angiectasias, dieulafoy’s lesion
  ● Lower (hematochezia): hemorrhoids*, IBD, diverticulosis, polyps, fissures, ulcers, colitis
  ● Other: malignancy, AVM, ischemic colitis, celiac dz
  ● Work up: vitals (tachy, decreased BP, pale), Hgb (can take 4-6hrs to show signs of decrease)
    ○ ↑↑↑ BUN > Cr
  ● Management: IV access (peripheral lines x2), T&S, transfusion consent, pantoprazole, ocreatide (for variceals), EGD

LOWER GI PROBLEMS:
  ● Hemorrhoids → fiber, steroid creams, sitz baths, anesthetic creams-suppositories, tucks pads
    ○ Refractory → rubber band ligation, laser photoagulation, cryosurgery, etc.
  ● Anal fissures → fiber, stool softeners, sitz baths, topical vasodilators (nifedipine, nitro), botox
    ○ Atypical or crohn’s related → refer to GI, possible surgery
  ● Anal abscess → usually d/t infected anal gland → I&D +/- abx
  ● Anorectal fistula = connection between two epithelial structures and connects the anal abscess from the infected anal crypt glands to the perirectal skin, and occasionally to other pelvic organs
  ● Polyps - hyperplastic are m/c non-neoplastic; ~½ of colonic polyps are adenomatous and thus neoplastic with malignant potential
  ● Stool softeners / Laxatives: Colace (Senna Docusate), Bisacodyl (Dulcolax), Lactulose
DIABETIC KETOACIDOSIS

→ DKA is characterized by hyperglycemia, elevated anion gap metabolic acidosis, ketonemia
→ when insulin deficient, liver breaks down lipids into ketone bodies, resulting in decreased blood pH
→ common causes: infx, infarction, insulin (med non-compliance, adjustment), intraabdominal process (pancreatitis), intoxication, idiopathic, physical stress, drugs
→ common early signs: N/V, abd pain, polyuria, polydipsia, weight loss, hyperventilation (Kussmaul)
→ later signs: neurologic sx like lethargy, focal deficits, obtundation, seizure, coma
→ serum glucose typically >250 and <800 mg/dL
→ dehydration and potassium deficits often severe
→ Treatment
  → replace fluid deficits: IV isotonic saline (0.9% NS → 0.45% NS)
  → switch this to dextrose in NS (D5½NS) when BG reaches 250mg
  → If K+ >3.3: give insulin 0.1 U/kg IV drip, then start a continuous IV infusion 0.1 units/kg per hour; OR do not give bolus and start a continuous IV infusion at a rate of 0.14 units/kg/hr
  → replete K+ if giving insulin w/ potassium chloride
  → give sodium bicarb if pH <6.9 or intubation needed (questionable benefits)
→ 6 l’s of DKA (etiology):
  - Ischemia/Infarction (MI, CVA)
  - Infection
  - Intoxication
  - Iatrogenic (change in insulin dose)
  - Insulin missed
  - Incision (surgery)

ALCOHOL WITHDRAWAL

- CIWA protocol
- Multivitamin (1 tablet daily), thiamine (100mg daily), folic acid (1mg daily)
- Valium 10mg IV prn (longer acting) or Ativan (shorter acting, bypasses liver)
- Don’t give dextrose without thiamine! May precipitate wernicke-korsakoff syndrome
- Consider ICU if withdrawal requiring ~40mg ativan daily or ~80mg valium daily
  - ICU can give continuous infusion of benzos, phenobarbital, precidex
- Check LFTs, lipase, Mg and Phos
- Screening for hepatitis → Hep C IgG, Hep A IgG, HBV surface antigen (indicates active infx), HBV IgG surface antibody (indicates immunity), HBV core antibody (indicates prior infx)

### Timing of alcohol withdrawal syndromes

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Clinical findings</th>
<th>Onset after last drink</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor withdrawal</td>
<td>Tremulousness, mild anxiety, headache, diaphoresis, palpitations, anorexia, GI upset; Normal mental status</td>
<td>6 to 26 hours</td>
</tr>
<tr>
<td>Seizures</td>
<td>Single or brief flurry of generalized, tonic-clonic seizures, short post-ictal period; Status epilepticus rare</td>
<td>6 to 48 hours</td>
</tr>
<tr>
<td>Alcoholic hallucinosis</td>
<td>Visual, auditory, and/or tactile hallucinations with intact orientation and normal vital signs</td>
<td>12 to 46 hours</td>
</tr>
<tr>
<td>Delirium tremens</td>
<td>Delirium, agitation, tachycardia, hypertension, fever, diaphoresis</td>
<td>48 to 96 hours</td>
</tr>
</tbody>
</table>
ACETAMINOPHEN TOXICITY

- hepatotoxicity typically with \(>10\text{g}\), may not be apparent for 2-6d
  - toxicity likely to occur with single ingestions greater than 250 mg/kg or those greater than 12g over a 24-hour period
  - virtually all patients who ingest doses in excess of 350 mg/kg develop severe liver toxicity (defined as peak aspartate aminotransferase (AST) or alanine aminotransferase (ALT) levels greater than 1000 IU/L) unless appropriately treated
- Labs: 4hr acetaminophen level; salicylate level; ethanol level; hepatic panel; CBC, BMP; UA
- EKG: possible QTc prolongation
- Monitor vitals with close attention to respiratory drive
- Refer to psychology after medically clearing pt
- Therapy
  - Antidote: N-acetylcysteine → can administer up to 72hrs post-ingestion (or if time ingestion unknown or chronic ingestion \(>4/g\); have a low threshold for giving!)
    - *PO NAC 140mg/kg loading dose → 70mg/kg q4hrs x17 additional doses
    - IV NAC 150mg/kg over 1hr → 50mg/kg over 4hrs → 100 mg/kg over 16hrs
    - Rumack-matthew nomogram to predict risk of hepatotoxicity from serum acetaminophen levels when time of ingestion is known
  - NG lavage, activated charcoal if within 4hrs, consider need for transplant center
- **Opioids** (methadone, heroin, codeine, demerol)
  - Findings: respiratory depression, pinpoint pupils, minimally responsive
  - Key problems: hypoxia
  - Treatment: Naloxone/Narcan (IN, IM, IV, rectal – don’t tube w/ Narcan)

- **Sympathomimetics** (cocaine, amphetamines, caffeine, thyroid meds, etc)
  - Findings: Anxious, agitated, tachycardic, tachypneic, HTN, diaphoretic, febrile, large pupils, tremor
  - Problems: ICH, MI, arrhythmias, severe hyperthermia, CV collapse, seizure*
  - Treatment: BENZOS (bring the patient down)

- **Cholinergic** (insecticides, organophosphates, pyridostigmine, nerve agents)
  - Findings: SLUDGE (salivation, lacrimation, urination, defecation, GI, emesis)
  - Problems: Killer B’s = bronchorrhea, bronchoconstriction, bradycardia → respiratory muscle weakness, hypoxia, seizures
  - Treatment: Atropine + Pralidoxine

- **Anti-cholinergic** (TCA, antihistamine, atropine, jimson weed)
  - Findings: Dry as a bone, mad as a hatter, red as a beet, hot as a hare, blind as a bat (large pupils), quiet as a mouse (GI), full as a flask (bladder)
  - Key problems: dysrhythmias, confusion, seizures
  - Treatment: physostigmine ; sodium bicarbonate for TCA OD

- **Sedative-Hypnotics OD (benzos)** → flumazenil
- **Aspirin OD** → sodium bicarbonate, IVF, activated charcoal
- **Beta Blocker & CCB OD** → high dose insulin + glucagon (if BB) or calcium (if CCB)
OCULAR COMPLAINTS

**EYE EXAM**: visual acuity, external eye, pupils, EOM, confrontation of visual fields, fundoscopic exam, anterior segment, intraocular pressure

→ **APD (afferent pupillary defects)**: optic neuritis, severe retinal disease

→ **retinal hemorrhages**: CRVO, Hypertensive Retinopathy, DM

→ **papilledema** = optic disc swelling secondary to increased intracranial pressure

<table>
<thead>
<tr>
<th>Bilateral disc abnormalities*</th>
<th>Unilateral disc abnormalities*</th>
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**Differential diagnosis of papilledema**

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**GENERAL MANAGEMENT**: erythromycin abx ointment, cycloplegia

**CORNEAL FOREIGN BODIES**: superficial can be removed in ED, full thickness requires ophthalmology

**CORNEAL ABRASIONS**: use fluorescein staining with cobalt blue lighting

  S/sx: eye pain, photophobia, tearing

**CORNEAL ULCER**

  S/sx: eye pain, photophobia, tearing, redness

  Slit lamp shows epithelial defect with possible hypopyon

  Tx with topical aminoglycoside or FQ, topical cycloplegic for pain

**CHEMICAL BURNS**: pH should be 7.5, use Morgan lenses to irrigate with NS

**BLUNT INJURIES**: do not check IOP if ruptured globe suspected

  Sx of ruptured globe: full thickness lac, blindness, flat anterior chamber, irregular pupil, hyphema

**HSV KERATITIS**: can infect conjunctiva, cornea, lids; concern is corneal scarring

  Fluorescein staining shows linear branching pattern with terminal bulbs

  Tx with viroptic drops and erythromycin, avoid steroids
HERPES ZOSTER OPHTHALMICUS: iritis with pain and photophobia, possible cutaneous lesions, tx with topical steroids, topical cyclopregia, possible IV acyclovir

INCREASED IOP: (n=12-22mmHg) topical beta blocker, topical alpha agonists, acetazolamide, mannitol
- Acute angle closure glaucoma → steamy cornea, fixed mid-dilated pupil, crescent shadow
  - Timolol, mannitol, pilocarpine, acetazolamide → laser peripheral iridotomy

HYPERTENSIVE RETINOPATHY:

ACUTE VISUAL LOSS
CENTRAL RETINAL ARTERY OCCLUSION (CRAO)
- sudden, painless, profound monocular vision loss
- amaurosis fugax = warning sign of loss of vision in one eye, caused by temporary ischemia
- causes: embolus* (afib), giant cell arteritis, thrombosis, trauma, sickle cell disease
CENTRAL RETINAL VEIN OCCLUSION (CRVO)
- thrombosis of central retinal vein
- sudden, painless, monocular involvement with variable vision loss
- diffuse retinal hemorrhages, optic disc edema

ACUTE NARROW-ANGLE GLAUCOMA
- s/sx: headache, eye ache, cloudy vision, N/V, ↑ IOP, pupils mid-dilated & non-reactive
- tx: in ED lower IOP + decrease aqueous humor production; definitive tx = peripheral laser iridectomy

OPTIC NEURITIS = an inflammatory, demyelinating condition (optic nerve dysfunction) that causes acute, usually monocular, visual loss
- Optic neuritis is the presenting feature of MS in 15 to 20 percent of patients and occurs in 50 percent at some time during the course of their illness
- Etiology: ischemia, embolus, MS, lupus, nerve compression
- S/sx: rapid (and sometimes painful but not always) reduction of visual acuity; APDs, commonly affects color vision; optic disc swelling
ACUTE PULMONARY EDEMA
- Precipitating factors: MI, ↑sodium diet, med non-compliance, COPD, cor pulmonale, arrhythmias
- CXR findings: enlarged cardiac silhouette, pleural effusions, cephalization, perihilar infiltrates

PNEUMOTHORAX / HEMOTHORAX
- Primary spontaneous typically occurs in healthy people (often tall, hx of smoking) – results from rupture of bleb
- Secondary spontaneous is d/t underlying lung dz (COPD & asthma most common)
- S/sx: sudden onset SOB & pleuritic chest pain, decreased BS, hyperresonance on affected side
- Dx: CXR, ABG considered
- Management: O2, observation & serial CXR if small, if >20% indication for tube thoracostomy
- Complication = tension pneumothorax → hypotension, absent BS, JVD, tracheal deviation (to opposite side) → immediate needle decompression (@ 2-3rd ICS mid-clavicular or anterior axillary line) followed by a chest tube (@ 4-5th ICS in the anterior or mid-axillary line)

POSTERIOR WALL MI
→ deeply inverted downward sloping ST depression in V4
→ flip EKG upside down and will look like a STEMI
→ can put leads 7,8,9 posteriorly

VTACH (absent P, wide QRS) → amiodarone, procainamide, lidocaine + electrical cardioversion @ 100J

TORSADES DE POINTES (polymorphic VT) → magnesium sulfate, overdrive pacing

VFIB & pulseless VT → defibrillation w/ 1mg epi q3-5min + amiodarone (ACLS)

PEA & Asystole → epi + amiodarone (ACLS)

WPW (delta waves) → DO NOT GIVE BETA BLOCKERS → cardioversion, procainamide or amiodarone
THORACIC AORTIC DISSECTION (TAD)

- Aortic media degeneration/necrosis leads to tear in aortic intima → tear/dissection can spread
- Risk Factors: uncontrolled HTN, connective tissue dz (Marfan’s), Turner syn, infx, cocaine & BP-raising drugs, trauma
- Factors affecting dissection propagation: BP, ventricular contraction rate
- S/sx: chest pain (abrupt, tearing, radiation to jaw/arm/back), abd pain, flank pain or GU sx, CVA (dissection of carotid), MI (dissection of coronary), CHF, syncope, spinal cord deficits
- Exam findings: unequal/absent pulses, 20mmHg BP difference, focal neuro deficits
- Dx: CXR, EKG → confirm w/ MRI, transesophageal echo, CT aortography
- Tx: BP control (Nitroprusside), HR control (BB i.e. esmolol), opioids
  - Type A (ascending aorta) → surgery
  - Type B (descending aorta) → meds to control HTN, stent placement

ABDOMINAL AORTIC ANEURYSM (AAA)

- Progressive weakening of aortic wall results in dilatation and eventual aneurysmal rupture
- Risk factors: age (>70), male, smoking hx, HTN, CAD or PVD, FHx
- S/sx of rupture: sudden onset severe abd, back, or flank pain; may have syncope; may radiate to labia/testicles
- Exam findings: tender pulsatile mass in epigastric area, bruits, distal extremity ischemia
- Tests: CT w/ contrast, US
- Management of rupture: fluid, blood transfusion, immediate operative intervention if unstable
  - Surgery - open procedure for graft, reimplantation of vessels
  - Percutaneous - endovascular repair
  - Size correlates with risk of rupture for asymptomatic aneurysms:
    - AAA: >5.5 should be repaired
    - Ascending TAA > 5.5 should be repaired
    - Descending TAA: >6cm should be repaired
    - Marfan’s or bicuspid valve → repair at 5cm