

INPATIENT MEDICINE

Alcohol Withdrawal

Condition	symptoms	Timing
Minor withdrawal	tremulous, anxiety, headache, sweating, palpitations, GI upset, normal mental state	6 - 36 hrs
Seizure	Single or brief flurry TC	1/4 to 2 days
alcoholic hallucinosis	hallucinations (usually visual) while oriented and normal vital signs	1/2 to 2 days
Delirium Tremens (risk factors: age >30, prior DTs, sustained drinking, comorbidity)	Delirium, agitation, tachycardia, fever, hypertension, vomiting. ^pH, v K, v Mg, v PO4, rabdo	2 to 4 days

*Death is from arrhythmia, pneumonia, or failure to diagnose pancreatitis, CNS injury, or infection.

Ddx: meningitis, trauma, metabolic problems, drug overdose, GI bleeding, hepatic failure.

Thiamine plus glucose

Treat K, Mg, PO4.

Haloperidol lowers the seizure threshold

Most patients do not require antiepileptics.

CIWA Score (each gets 7)

- Nausea/vomiting Headache
- Sweats Auditory
- Anxiety Visual
- Agitation Tactile
- Tremor Clouding of sensorium (4)

<10 very mild/ 10 - 15 mild/ 16 - 20 modest/ >20 severe

CLOSTRIDIUM DIFFICILE COLITIS. C diff: anaerobe, gram positive rod, spore forming, toxin producing

- *Fecal oral route. Facilitated by disruption of intestinal flora.
- *Exotoxins binding to the intestinal epithelium>> inflammation and diarrhea.
- *BI/Nap1/O27 is a much more virulent strain.
- *Colectomies. Mortality 16%
- *Fomites: hands, clothing, stethoscopes. Between room mates.
- *Risk factors: antibiotics, advanced age, hospitalization, severe illness.
- *Antibiotics disrupt normal flora. Also, increase C diff resistance.
- *Fluoroquinolones, clindamycin, broad spectrum penicillins, cephalosporins (rarely: doxy, metronidazole,

vancomycin)

*Toxin A - enterotoxin and Toxin B - cytotoxin and Binary Toxin (most virulent strain)

*the former is identified by elisa.

*Toxin A: TNF, IL8, 6 & 1. Toxin B: 10x more potent than Toxin A.

*Antibody to Toxin A lowers the likelihood of C diff colitis.

*CMs: Watery diarrhea (asymptomatic \pm protein losing enteropathy to toxic megacolon and/or bowel perforation)

*20% of hospitalized adults are C diff carriers (long term facilities: up to 50%).

*5% of patients with "relapse" of their inflammatory bowel disease actually have C difficile and require metronidazole rather than immunosuppressants (requires high degree of suspicion. Consider if the IBD patient has recently been hospitalized or on antibiotics).

There is an 8% C diff carriage rate in IBD.

*Diarrhea 10 x/day. Crampy abdominal pain, fever, \uparrow WBC. 0 to 10 days post antibiotics (up to 2 months). To high fever, severe abdominal pain, lactic acidosis

*Colonoscopy: Patchy erythema to circumferential pseudomembrane

*CT: thickened wall (non-specific). Severe: 7cm dilation, thumb printing, air fluid levels, small bowel involvement.

*Relapse in 10 to 25%.

*Post infectious: irritable bowel syndrome.

Diagnosis: Toxin B in the stool or pseudo membrane on colonoscopy.

EIA (enzyme immuno assay) for toxin B: S & S=73% and 97%.

Other assays: PCR for toxin b: S&S=93% and 97%; cytotoxicity assay; antigen detection; culture

Colonoscopy is not warranted for classic clinical findings and positive EIA.

Colonoscopy indications: unresponsive to Rx; high clinical suspicion with negative EIA.

TREATMENT: *Stop antibiotic; hand hygiene (washing).

*Non-severe or non-severe with relapse: Oral metronidazole 500 TID OR 250 QID X 14 days.

*Response in 2 to 4 days. Success in 95%.

*Treatment where the inciting antibiotic must be given: continue through course + 7 days.

*Repeat stool assay not indicated as 50% may be positive at 6 weeks.

*Second relapse, non-severe: Oral vancomycin (125 mg QID) with probiotic.

*Third or higher relapse: Oral vancomycin followed by rifaximin (400mg TID). Consider colestipol. Fecal bacteriotherapy.

*Severe disease: Oral vancomycin

*Critically ill: oral vancomycin + i.v. metronidazole (500mg i.v. Q8Hrs).

- *Profound ileus: Intracolonic + oral vancomycin
- *Age 65+ plus WBC 20,000+ or plasma lactate 2.2 to 4.9 meq/L.
- *Peritoneal signs, severe ileus, toxic megacolon: Surgical intervention.

PYELONEPHRITIS

Complicated pyelo:

perinephric abscess (drain it),
 renocorticomedullary abscess (drain it),
 emphysematous pyelonephritis, types:

1:in collecting system only and no obstruction, antibiotics only;

2:in parenchyma (drain)

3a:in perinephric (drain); 3b: in pararenal(drain):in pararenal;

3a or 3b with 2 or more of thrombocytopenia, shock, renal failure or impaired consciousness (nephrectomy)

4:bilateral, papillary necrosis, obstruction. (Drain it)

*Most pyelo has 10^5 organisms but some have $10(3)$ to $10(4)$.

* \pm WBC casts

*E Coli in 3/4; Klebsiella; staph saprophyticus

*Oral treatment: Empiric: Cipro 500 Q12 hr; Levofloxacin 500mg to 750mg Q24 hrs.

*Oral treatment, susceptible bacterium: TMP/SMX DS Q12hrs. Cefpodoxime (3rd gen Vantin) 200mg Q12hrs;

Amoxicillin 875 mg Q12 hours

*IV Rx:

Mild-Moderate: Ceftriaxone 1gm Q24 hrs; Cipro 400 mg Q12hrs. Aztreonam (Azactam) 1gm Q 12 hrs.

Complicated or Severe with immunocompromise or incomplete urinary drainage:

*Ampicillin-Sulbactam (Unasyn): 1.5 gm Q6hrs

*Ticarcillin-Clavulanate (Timentin): 3.1 gm Q6hrs

*Piperacillin-Tazobactam(Zosyn): 3.375 gm Q6hrs

*Meropenem (Merrem) 500mg Q8hrs

Persistent fever after 2 to 3 days: image for complications.

PULMONARY EMBOLUS

Sx's: dyspnea at rest, pleuritic cp, cough, >2 pillow orthopnea, wheezing, and calf or thigh pain.

Signs: ↑RR, ↑P, rales, v breath sounds, increased P2, & JVD.

If DVT is suspected, follow patient with doppler US twice weekly.

Hypercoagulable conditions: see end of Hem-Onc Roushmedicine.com

Duration of anti-coagulation: ditto.

DVT Wells score: ditto

for use of Wells score for DVT, D-Dimer and US: ditto

Ddx of DVT: ditto

Wells score for pulmonary embolus:

Symptoms of DVT = 3

Symptoms and signs of PE, no diagnosis more likely =3

H: Heart rate increased.=1.5

I: immobilization > 3 days or surgery in past month = 1.5

P: prior DVD/PE = 1.5

H:Hemoptysis=1

M: Malignancy=1

Probability:

Low: 0,1

Medium;2-6

Hi: 7+

If low probability, obtain D Dimer (quantitative rapid ELISA or semiquantitative latex agglutination). PE is excluded if D Dimer is negative or <500 ng/ml

If PE is high probability OR PE is medium probability and D Dimer is positive or >500, obtain CT angio

To minimize use of resources, use the PERC. (PE rule out criteria): 8 items.

Age<50/ HR <100/ no surgery in past 4 weeks/no hemoptysis/ no estrogen use/ O2% 95+/no prior DVT or PE/no unilateral leg swelling/

If all of these are negative and Wells probability is low, then no further testing is needed.

CT angio: sensitivity = 83%; specificity = 96%.

Hypercoagulable conditions: see Roushmedicine, hem-onc, final pages.

Treatment: SC LMWH (rather than UFH; lower mortality & complications). There is no evidence for a difference in type. Can use enoxaparin (Lovenox) 1mg/kg Q12hrs or 1.5 mg/kg

daily. BID dosing is recommended for weight of 100 to 150 kg or BMI 30 - 40.

In morbid obesity or low body weight (<45kg or <57 kg in women and men), monitor anti-Xa levels.

Renal failure:

Cr Clearance >30, no dose adjustment.

Cr Clearance <30, use unfractionated heparin or use 50% of the dose and monitor anti-Xa.

Overlap warfarin a minimum of 5 days.

Give 5 mg/day x 2 days, then adjust the dose. (Use smaller initial dose in elderly)

For patients with known protein c deficiency, initiate warfarin gradually.

Target an INR of 2 to 3.

For patients on heparin who bleed, give protamine sulfate.

CHOLECYSTITIS

*Acute cholecystitis = RUQ abdominal pain, fever, & leukocytosis, and an inflamed gall bladder. Patient lies still. Murphy's sign.

Complication: gallbladder gangrene (up to 20%) with perforation.

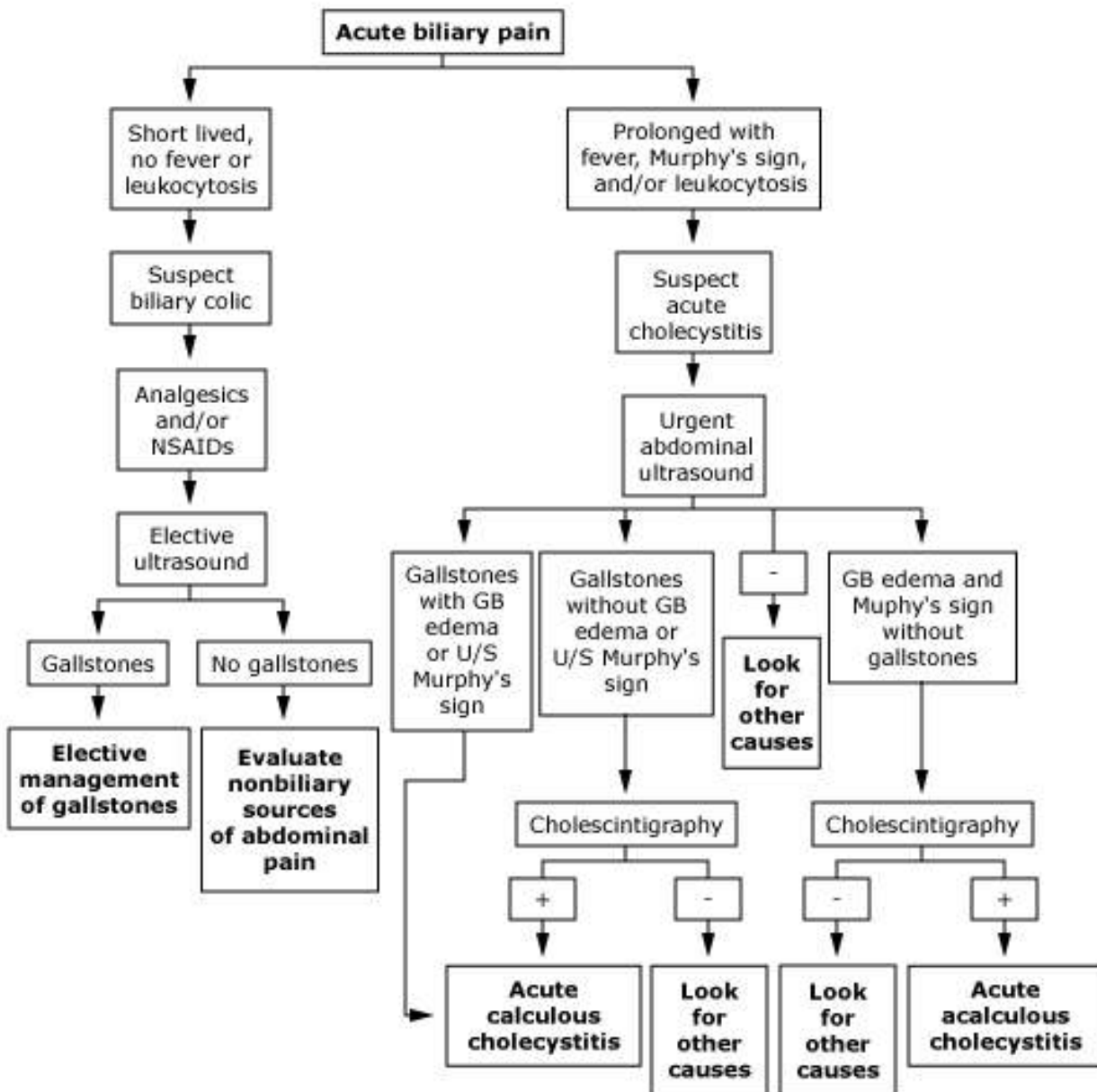
Cholecystoenteric fistula

Gallstone ileus

Emphysematous cholecystitis.

*Differentiate acute cholecystitis from biliary colic (fatty meal > gall bladder contracts & presses stone against gallbladder outlet or cystic duct opening > pain) Purely visceral pain without gallbladder wall inflammation. Resolves completely.

Ddx: Acute pancreatitis/ PUD/ hepatitis/ appendicitis/ Right kidney disease/ right sided pneumonia/ perihepatitis with GC (Fitz-Hugh-Curtis)/ intra-abdominal abscess/ CAD/ perforated viscus/ black widow spider venom/



COMMUNITY ACQUIRED PNEUMONIA

Decision to admit: CURB65: Confusion/Uremia>20/RR>30/BPs<90 or Bpd<60/Age65+

0,1>>outpatient

2>>inpatient non-ICU

3-5>>inpatient, evaluate for ICU

ICU:

Major Criteria: Either Need for vasopressors or Mechanical ventilation

Minor Criteria: 3 or more of:

Vital signs, Non respiratory: BP & Temp: Hypotension requiring fluids/ Hypothermia/

Vital signs, Respiratory: RR30+/ CXR bilateral or multilobar/ (PaO₂/FiO₂≤250)/

CBC: leukopenia/ thrombocytopenia/

CB of CURB65: BUN20+/ Confusion/

AGENTS IN CAP

Agent	Ambulatory	Inpatient, nonICU	ICU
S Pneumonia	12	25 (65 if bacteremic)	17
Mycoplasma	16	6	
Chlamydia	12	3	
Legionnaires	2	3	10
Hemophilus influenza	1	5	3
Viral	15	10	4
Staph Aureus			5
Gram negatives			5
Unknown	44	37	41

Other agents: Anaerobes (Francisella tularemia(gm-coccobacillus), anthrax(gm+rod), Yersinia Pestis (gm-rod), Coxiella Burnetii,TB. Agents associated with specific co-morbidities: alcoholism: Oral anaerobes, Klebsiella; COPD: H flu, pseudomonas; Aspiration: oral anaerobes, enteric gram negatives; Bat or bird exposure: psittaci; HIV: early: TB. Late:pneumocystis, fungi,

Diagnosis: CXR with no infiltrate: think PCP.

Purulent sputum: Strep. Whitish sputum: atypicals.

Usually, tests for specific agents are optional. The following are specific indications for testing:

Flu season: Flu test.

Alcoholism: blood cultures, sputum cultures, Legionella UAT (80%; type 1 only), Strep UAT (82% sens, 97% spec).

COPD: sputum culture; recent travel: legionella UAT.

Treatment:

Hospitalized, non-ICU:

Ceftriazone (Rocephin) 1 to 2 gm/d + Azithromycin 500 mg/d OR

Levofloxacin 750 mg/d OR Moxifloxacin (Avelox) 400 mg/d

For patients with bronchiectasis or COPD in the ICU, add coverage for pseudomonas: piperacillin-tazobactim (Zosyn) 4.5 gm Q6Hr OR Cipro.

Outpatient:

No co-morbidities & no treatment in past 3 months: Azithromycin 500 mg for 3 days.

Co-morbidities or recent treatment: Moxifloxacin (Avelox) 400/d or Levofloxacin 750/d for 5 days (note: may prolong QT interval; give cautiously in patients with cardiac disease or those on other QT prolonging drugs, commonly psycho actives and amiodarone).

Duration as above but patient should be afebrile for at least 2 days.

Cough & fatigue last a median of 14 days.

At least one symptom may be present in 76% of patients for 30 days.

Usually, these do not interfere with activity.

HYPERNATREMIA:

1. Calculate the Water loss = $0.5(\text{for men}) * \text{Lean Weight} * ((\text{Na-obs} - 140)/140)$.

(use 0.4 for women)

2. Calculate the change in sodium required:

Using D5W, the formula for 1 liter would be: $(\text{Na-i} + \text{K-i} - \text{Na-obs}) / (\text{TBW} + 1)$

Example: a 70 kg man has a Na-obs = 165 meQ/L

His water deficit is $0.5 * 70 * ((165 - 140)/140) = 6.25$ Liters

For each liter of D5W, the change in Na concentration would be: $165 \text{meQ} / 36 \text{L} = -4.6 \text{mEq/L}$

Correct at a rate of -12 meQ/24 hours, so give $-12 \text{meQ} / -4.6 \text{mEq/L} / 24 \text{hrs} = 2.6 \text{L}/24 \text{hrs}$

There will be an obligatory loss of 1 Liter /24 hours, so the final amount in 24 hours would be 3.6 Liters. $3.6 \text{Liters} / 24 \text{hours} = 150 \text{cc}/\text{hour}$.

At 2.6 liters/day, it will take $6.25 \text{L} / 2.6 \text{L}/\text{day} =$ about 2.4 days to correct his water deficit.

It will take about 2 days to both rehydrate him and achieve sodium balance.

HYPONATREMIA:

Calculate the change in sodium required to correct hyponatremia.

Using hypertonic saline, 3%, 513 meQ/L

Again use the formula: Change in Na: $(\text{Na-i} + \text{K-i} - \text{Na-obs}) / (\text{TBW} + 1) \text{mEq/L}$

If you want to correct Na at X mEq/L/Hour:

$X \text{mEq/L}/\text{Hr} / \text{Change in Na mEq/L/L}$ gives the infusion rate in L/Hr.

Example: 80 Kg woman is seizing. Na-O=103 mEq/L.

Infuse 3% Saline = 513 mEq Na/L

$(513 + 0 - 103) / (.5 * 80 + 1) = 10 \text{mEq/L/L}$

If you want to change at a rate of 2mEq/L/Hr, then infuse at a rate of

$2 \text{mEq/L}/\text{Hr} / 10 \text{mEq/L/L} = 0.2 \text{L}/\text{Hr} = 200 \text{ml}/\text{Hr}$.

Causes of hyponatremia:

If plasma osmolality > 290 mOsm/L, this would be hyperglycemia.

If plasma osmolality is 275- 290 mOsm/L, this would be hyperproteinemia or hyperlipidemia.

If plasma osmolality reflects purely the concentration of sodium, look first at the urine osmolality. If it is < 100 mOsm/L, this reflects a complete failure of concentrating ability, and

this would occur in primary polydipsia or beer potomania. (If there is inadequate solute intake, there is an attempt by the kidney to hold onto the solute, leading to a dilute urine.)

If urine is > 100 mOsm/L, look at the ECF volume:

Volume	Low	Low	Euvolemic	High	High
Urine Na mEq/L	< 10	>20	>20	>20	<10
Etiology	Extrarenal losses remote vomiting. Remote diuresis	Salt wasting nephropathies Recent diuretic Hypoaldo Bicarbonaturia Ketonuria	Cortisol def hypothyroid SIADH Other causes of increased ADH action	renal insufficiency	CHF Cirrhosis Nephrotic syndrome

Causes of SIADH: neurologic or psychiatric disorders (e.g., encephalitis or CVA), pulmonary disease (TB, acute respiratory failure), malignant tumors (small cell lung ca), or drugs (antidepressants, narcotics, anti-psychotics, chlorthalidone, and NSAIDs).

SIADH is diagnosed when hypothyroidism and cortisol deficiency are excluded. It is also characterized by a Low uric acid (<4 mg/dL) and low BUN (<10mg/dL)[unlike volume depletion and volume excess, where the BUN is elevated]