O- Objective
- Vital Signs (including pulse-oximetry and what level of $O_2$ the patient is on)
- Physical Exam
- New lab results
- New imaging results (X-rays, ultrasound, etc.)

A-Assessment
- Assessment of the data and any conclusions that can be drawn. Shows medical decision-making.

P- Plan
- A list of the plans for the day including all laboratory and radiology tests that are planned, new medications or discontinued medications, etc.
- List all nursing changes or additions to orders – even though you are writing it in the orders (continue NPO, or advance diet, or continue wound care).
- List anything you want to emphasize (increased activity or pulmonary toilet).
- Discharge or transfer plans. If the patient will be discharged soon, list that so that preparation (patient teaching, financial preparation, etc. can begin).

3. Admission or Post Op or Transfer Orders – A.D.C. VAAN DISML

Admit: Admit to what ward and service and physician
Diagnosis: List the diagnosis (and if post-op list the procedure)
Condition: Condition of the patient – tail, internal, etc.
Vitals: Usually vitals q4 hours or vitals per routine. If the patient is in critical condition (ICU/HDU) then vitals are usually q 1 hr.
Activity: Bed rest, ambulate with assistance, non-weight bearing, etc.
Allergies: List any allergies or sensitivities
Nursing Instructions and Procedures:
- Bed Position: HOB to 45 degrees
- Preps: Enemas, showers, scrubs, etc.
- Monitoring: Strict ins and outs, record drain outputs, continuous pulse oximetry, telemetry, foley catheter, NGT, other drains
- Respiratory Care: Incentive spirometry q1 hr while awake, chest physio, turn, encourage cough and deep breaths
- Dressing changes, Wound care: nature and frequency of wound care
Notify: Notify ______ if temperature > 38 degrees, SBP < 90 or >160, HR < 60 or > 130, $O_2$ sats < 92%, RR > 30, UOP < 120 for 4 hours, etc.
Diet: NPO, regular, diabetic, soft, clear liquid
IVFs: Type of fluid and rate (ex. D5 ½ NS + 20 KCL at 100cc per hour)
Special: Any special needs for the patient – physical therapy, $O_2$, chest physio, etc.
Meds: Think of these categories when prescribing meds – especially on post-op pts:
- Pain meds
- DVT prophylaxis
- Sedation if on vent
- GI prophylaxis
- Respiratory (nebs)
- Glucose control
- Antibiotics
- Home meds
Labs: Order labs for the next day
ALCOHOL INTOXICATION AND WITHDRAWAL

Alcohol Intoxication
Start with ABCs (most concerned with airway protection)
It is preferable to observe the patient until they are sober
Be sure to check vital signs and blood glucose

Alcohol Withdrawal
Must have a high index of suspicion in patients with a history of chronic alcohol consumption

Classification of alcohol withdrawal

<table>
<thead>
<tr>
<th>Minor alcohol withdrawal</th>
<th>Major Alcohol Withdrawal</th>
<th>Delirium Tremens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agitation, anxiety,</td>
<td>24-72hrs from last drink</td>
<td>72-96 hrs after last drink</td>
</tr>
<tr>
<td>restlessness, insomnia,</td>
<td>Marked agitation, tremulousness,</td>
<td>Autonomic hyperactivity</td>
</tr>
<tr>
<td>tremor, diaphoresis,</td>
<td>restless, diaphoresis</td>
<td>(fever, tachycardia, HTN,</td>
</tr>
<tr>
<td>palpitations, fluctuating</td>
<td>GI symptoms: n/v/d, anorexia</td>
<td>agitation, drenching night</td>
</tr>
<tr>
<td>tachycardia or HTN,</td>
<td>HTN, sinus tachycardia,</td>
<td>sweats)</td>
</tr>
<tr>
<td>headache</td>
<td>Patients may be confused or</td>
<td>Hallucination and disorientation</td>
</tr>
<tr>
<td></td>
<td>agitated</td>
<td></td>
</tr>
</tbody>
</table>

Others:
Withdrawal seizures (Rum fits): generalized tonic-clonic convulsions 24-48 hrs after drinking stops, usually single though can occur in groups of two or three. When persists, look for other cause of seizures
Alcoholic hallucinosis: begins within 24 hrs, resolves in 24-48 hrs. Visual hallucinations (more common), tactile or auditory hallucinations

Labs (Directed by clinical presentation):
Serum glucose, CBC, serum electrolytes (K, Na), Renal function tests-Creatinine, BUN, (if rhabdomyolysis is in question, add CK), UA, ALT
If female, consider pregnancy test

*Blood alcohol levels can be done but confirm with lab (often reagents are not available)
*LP if meningitis in question

Management
1. Benzodiazepines: diazepam
2. Thiamine
3. Anticonvulsants: carbamazepine (cheaper) or valproic acid
4. In case need β-blocker: atenolol

*Counsel against alcohol consumption. Should also consult a counselor to assist.
ASTHMA/BRONCHOSPASM

Always start with ABCs! Get a full set of vital signs with pulse ox.

History
If known asthmatic:
  • Medications used and frequency
  • Number of attacks in past few months and severity of attacks
  • Known triggers (dust, cold, exercise, URIs)

If newly diagnosed asthmatic:
  • Shortness of breath of chest tightness
  • Wheezing pattern (episodic vs. continuous)
  • Periodicity (worse at night, early morning, triggers)
  • Other allergic conditions (eczema, food allergies)
  • History of infection (fever, URI sx, sputum, etc.)

Physical Exam
  • Full set of vitals including O₂ sat
  • Note level of consciousness
  • Pulmonary exam: respiratory distress, wheezing, air movement, silent chest

Work up
Orders may include CBC, E/R, I/KS, +/- ABG.
If respiratory therapist is present, pulmonary function testing may be possible.

Immediate management in casualty
  • Nebulize with 5 mg Salbutamol (repeat if no improvement)
  • O₂ supplementation if hypoxic – nasal cannula, face mask, non-rebreather
  • Hydrocortisone 200 mg IV for severe asthmatic attacks
  • May require magnesium bolus (2 gm over 20 minutes) as well
  • IVF as necessary

Inpatient treatment
Moderate attack (usually managed in HDU/ICU):
  • O₂ therapy
  • Salbutamol nebs 5 mg q 2-4 hours (taper as symptoms resolve)
  • Hydrocortisone/prednisone (max 10 days)
  • Antibiotics only if evidence of infection
  • +/- magnesium
Severe attack:

- Admit to ICU/HDU
- Salbutamol nebs 5 mg q 1 hr (taper as symptoms resolve)
- Hydrocortisone/prednisone (max 10 days)
- Antibiotics only if evidence of infection
- +/- magnesium
- +/- bipap
- +/- epinephrine
- Intubate only if severe and not improving (last resort)

*Remember that not all that wheezes is asthma. It could be congestive heart failure.

Treatment options available at Tenwek:

- Reliever (treat acute symptoms): β2 agonist → Salbutamol nebs and metered dose inhaler (MDI)
- Controller (prevent symptoms): Inhaled corticosteroid → Beclomethasone
- Systemic steroids: Hydrocortisone IV, Prednisone po
- Leukotriene inhibitor: Montelukast (expensive)

*It is important to provide education in proper MDI usage, especially soda bottle spacer use, to patients and families.
BOWEL DYSFUNCTION

Constipation
- Make sure the problem is not obstruction, by physical examination (including a rectal exam) and x-ray.

Treatment:
- Dulcolax (bisacodyl)
- Senna
- Liquid paraffin (mineral oil)
- Fleet enema
- NS enema
- Soap suds enema
- Peglec for bowel prep

*Remember, never give anything from above if obstruction is suspected.

Diarrhea
- What is the etiology?
  - Secondary to a medication (i.e. antibiotics)?
  - Infectious cause?
- Does it need to be worked up?
  - Is the patient dehydrated?
  - Is there an associated fever?
- Medicines that can cause or make worse:
  - Antacids
  - Laxatives
  - Theophylline
  - Quinidine
  - Colchicine

Treatment
- Dietary changes
- Oral rehydration salts
- Loperamide (immodium)
- Antibiotics if thought to be infectious
DIABETES MELLITUS

Diagnosis of diabetes mellitus
- Fasting blood glucose >7.0mmol/l (fasting means no calorie intake for 8 hrs)
- Often will have the classic symptoms of hyperglycemia (polyuria, polydipsia, polyphagia) and RBS >11.1 mmol/L

(Other diagnostic tests which are not available at Tenwek: HbA1c >6.5% or 2 hr post OGTT glucose> 11.1mmol/L)

History
- New diagnosis
- If known diabetic: document their current medication regimen (type of medication, dosage, compliance, location used for follow-up, etc.)
- Family history of diabetes
- Diabetic complications - microvascular (retinopathy, nephropathy, neuropathy-sensory including sexual dysfunction and gastroparesis) & macrovascular (coronary heart disease and cerebrovascular disease, peripheral vascular disease)
- Other co-morbidities - hypertension, congestive heart failure, BPH for men, obesity

Physical Examination
- Vital signs (be sure to note BP, pulse and HR)
- Gen: BMI, obese or wasted appearance
- CVS: character of pulse, any signs of heart failure
- Extremities: be sure to check feet and skin for any sign of ulcers or infected wounds, check dorsalis pedis pulses and reflexes.
- Fundoscopic exam: should have eyes checked at least yearly – has this been done?

Treatment options

<table>
<thead>
<tr>
<th>Sulfonylureas</th>
<th>Biguanides</th>
<th>Thiazolidenediones</th>
<th>Insulin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glibenclamide</td>
<td>Metformin</td>
<td>Pioglitazone</td>
<td>Soluble insulin</td>
</tr>
<tr>
<td>(check creatinine)</td>
<td>(expensive)</td>
<td></td>
<td>Mixtard</td>
</tr>
</tbody>
</table>
# ELECTROLYTE IMBALANCES

<table>
<thead>
<tr>
<th>Electrolyte Imbalance</th>
<th>Causes</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hyponatremia</strong></td>
<td>SIADH, hypotonic rehydration, Addison’s disease, cirrhosis, nephrotic syndrome, polydipsia</td>
<td>Treat the cause – free water restriction, NSS if hypovolemic (Don’t correct serum sodium &gt;0.5 meq/hr)</td>
</tr>
<tr>
<td><strong>Hypernatremia</strong></td>
<td>Diuresis, HHNK, skin losses (burns, perspiration), excess sodium (aldosteronism, DI, IVF)</td>
<td>Hypotonic saline or D5W after volume status correction with NS</td>
</tr>
<tr>
<td><strong>Hypokalemia</strong></td>
<td>Diuretics, insulin, GI losses, hypokalemic rehydration</td>
<td>Oral replacement IV replacement – 20-40 meq added to each 1 L of NS (generally not replaced faster than 10 meq/hr)</td>
</tr>
</tbody>
</table>
| **Hyperkalemia**      | RTA, renal failure, decreased excretion, medications | If cardiotoxic – 1 amp calcium gluconate (membrane stabilizer)  
D50 followed by 10 units regular insulin (drives into cells)  
Nebulize 5 mg salbutamol (drives into cells)  
1-2 amps bicarbonate if HCO₃⁻ is low  
Kayexalate (if available) 15-30 gms po (removes K⁺ from the body)  
Furosemide (removes K⁺ from body)  
May require transfer for dialysis |
| **Hypocalcemia**      | Renal failure, acute pancreatitis, rhabdomyolysis, distal RTA, hypoparathyroidism (hypoalbuminemia gives false low Ca²⁺ levels) | Calcium gluconate, calcium carbonate |
| **Hypercalcemia**     | Increased gut absorption, increased mobilization from bone, hyperparathyroidism | IV NaCl followed by Lasix, calcitonin |
| **Hypomagnesemia**   | Dietary malnutrition, redistribution (DKA treatment, acute on chronic pancreatitis, metabolic acidosis correction), increased losses (diarrhea, diuretic use), drugs (aminoglycosides, chemotherapeutics) | 16 meq/100 mL D5W over 2-4 hours |
HUMAN IMMUNODEFICIENCY VIRUS (HIV)/AIDs

Pre-treatment evaluation
- Confirm presence of HIV infection
- Stage HIV disease (see WHO clinical staging)
- Determine presence of co-existing illnesses and manage appropriately (opportunistic infections)
- Ask about other medications: traditional therapies, alcohol, non-prescription meds
- Co-trimoxazole prophylaxis

**HIV/AIDS World Health Organization Clinical Staging**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
</table>
| Stage I | Asymptomatic  
|        | Persistent generalized lymphadenopathy (PGL) |
| Stage II | Moderate unexplained weight loss (<10%)  
|          | Minor muco-cutaneous manifestations  
|          | - Seborrheic dermatitis, papular pruritic eruptions (PPE), fungal nail infections, recurrent oral ulcerations, angular cheilitis  
|          | - Recurrent upper respiratory tract infections  
|          | - Sinusitis, tonsillitis, bronchitis, otitis media, pharyngitis  
|          | - Herpes zoster |
| Stage III | Unexplained weight loss (>10%), diarrhea >1 month, persistent fever (intermittent or >1 month), persistent oral candidiasis, oral hairy leukoplakia, pulmonary TB, disseminated necrotizing ulcerative stomatitis, gingivitis or periodontitis  
|          | Severe bacterial infections  
|          | - Pneumonia, empyema, pyomyositis, bone & joint infections, meningitis, bacteremia  
|          | Hematological  
|          | - Hb <8 gm/dl, neutropenia <0.5, Platelet <50,000 |
| Stage IV | Presumptive diagnosis based on clinical signs and simple tests  
|          | - HIV wasting syndrome, PCP, Recurrent bacterial pneumonias (>2 episodes within a year), cryptococcal meningitis, toxoplasmosis of brain, chronic orolabial, genital, anorectal herpes simplex >1 month, Kaposi’s sarcoma, HIV encephalopathy, extrapulmonary TB  
|          | Confirmatory diagnostic testing necessary  
|          | - Cryptosporidium/isosporidium  
|          | Disseminated  
|          | - Non-TB mycobacterial infection, Cryptococcosis, mycosis (histoplasmosis/coccidiomycosis), CMV including retinitis  
|          | - Candidiasis (tracheal, esophageal), non-typhoidal salmonella septicemia, lymphoma cerebral or B-cell lymphoma, invasive cervical cancer, visceral leishmaniasis, HIV-associated nephropathy, HIV associated cardiomyopathy. |
HYPOTENSION

Examination
- Obtain full set of vital signs, particularly heart rate and temperature.
- Evaluate ABCs first.
- What is the patient’s mental status?
- Symptomatic hypotensive patients should have 2 large bore IVs and, if possible, be on cardiac monitor.

Workup
- Consider CBC, electrolytes, creatinine, EKG, and imaging studies

<table>
<thead>
<tr>
<th>Top 10 Differential Diagnoses for Hypotension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypovemia (post-op patient, volume depletion, over-diureased patients)</td>
</tr>
<tr>
<td>Blood loss (GI bleed, post-op bleeding)</td>
</tr>
<tr>
<td>Sepsis (sources include urine, lungs, lines, wounds)</td>
</tr>
<tr>
<td>Cardiac (MI, tamponade)</td>
</tr>
<tr>
<td>Medication related (β-blockers, calcium channel blockers, nitrates, anti-hypertensives)</td>
</tr>
<tr>
<td>Pulmonary embolus</td>
</tr>
<tr>
<td>Pneumothorax</td>
</tr>
<tr>
<td>Adrenal Insufficiency</td>
</tr>
<tr>
<td>False blood pressure reading (make sure cuff size is appropriate!)</td>
</tr>
<tr>
<td>Anaphylaxis</td>
</tr>
</tbody>
</table>

Treatment
- Treat the underlying cause. Often patients who are hypotensive need IVF.
- NSS bolus 500 mL over 15-30 minutes, repeat as necessary.
- If blood loss is the cause, may require a transfusion.
- If patient does not respond to IVF boluses, may need to start vasopressors through central venous access. At this point, the patient will require transfer to ICU/HDU and you should have spoken to your consultant/senior.

Pearls
- In most cases, hypotension will respond to NSS IVF boluses. The case you do not want to give fluid is cardiogenic shock. You will need to monitor strict I/O’s for these patients to make sure you have adequate profusion.
- Sepsis and medication side effects are major causes of hypotension in hospitalized patients. Don’t forget to remove all anti-hypertensives. If you suspect sepsis, draw labs +/- cultures, treat with broad-spectrum IV antibiotics, and use IVF judiciously and vasopressors if necessary to correct hypotension.
Management

- Uncomplicated malaria
  - 1st line: Artemether (20 mg)-Lumefantrine (120 mg) [AL]
    Dose: 4 tabs twice daily for 3 days
  - 2nd line: Dihydroartemisinin (40 mg)-Piperaquine (320 mg) 3 tabs once daily for 3 days.
- Severe malaria (Parasitemia plus cerebral malaria, severe anemia due to hemolysis, hypoglycaemia, renal failure, black water fever, metabolic acidosis, pulmonary oedema/ARDS, or shock)
  - Artesunate IV/IM however Artemether or quinine is acceptable alternative if parenteral artesunate is not available.
  - IV Artesunate: 2.4 mg/kg stat slow IV injection then 1.2 mg/kg at 12 hrs and 24 hrs then 1.2 mg/kg daily. Change to complete course of AL once able to take PO.
  - IM Artemether: load 3.2 mg/kg stat then 1.6 mg/kg daily to complete course of AL once able to take PO.
  - IV Quinine: load if no prior quinine derivative administered 20 mg/kg max 1200 mg then maintain with 10 mg/kg maximum 600 mg infusion in 5-10% dextrose to run over 4 hours. (Prescribed as 10 mg/kg every 8 hours)

- Malaria in pregnancy
  - Avoid artesiminin derivatives in first trimester unless alternative not available.
  - Quinine + Clindamycin for 7 days. (No doxycycline or tetracycline)
  - AL can be used in 2nd and 3rd trimester.

*Artesunate should always be freshly prepared never stored.

Chemoprophylaxis for non-immune persons (e.g. tourists)

- Mefloquine (1 tab per week): start 2-3 weeks before arrival to malaria risk area, continue throughout the stay and for 4 weeks after departure.
- Atovaquone-Proguanil (250 mg/100 mg-Malarone: 1 tab daily): 1 day prior to arrival, continue throughout stay and continue 7 days after departure.
- Doxycycline (100 mg: 1 tablet): 1 day prior to arrival, continue throughout stay and for 4 weeks after departure.
MENINGITIS

Early diagnosis and treatment are the keys to limiting neurologic damage. Approximately 75-80% of cases worldwide are caused by H. influenzae, N. meningitides, and S. pneumoniae.

History
- Ask about fever/chills (present in >85% of cases), neck stiffness, headache, photophobia, seizures, and rashes (petechiae and purpura → think meningococcemia)
- Determine if there is a ventriculoperitoneal shunt
- Ask about recent head trauma (basilar fractures predispose to meningitis)

Physical
- Fever or hypothermia
- Meningismus/neck stiffness
- Kernig or Brudzinski sign
- Assess GCS
- Sign/symptoms of endocarditis

Workup
- CBC, malaria smear, RBS, HIV screen, serum CRAG
- LP is no contraindications (signs of elevated intracranial pressure, focal neuro deficits)
  - CSF should be sent for cell count, glucose, protein, gram stain, India ink, and cultures
  - Note the opening pressure. Can connect a giving set to the needle and hold it upright. Measure the distance the CSF traveled. Greater than 20 cm is elevated.
  - Note the appearance of the CSF (cloudy, blood tinged)
- Consider CXR, VDRL (if considering neurosyphilis), or head CT

CSF Analysis (for bacterial meningitis)
- Cell count and differential
  - In bacterial meningitis, leukocyte count is high with neutrophil predominance
  - About 10% of patients have lymphocyte predominance
- Glucose (compare to serum level)
  - Usually less than 2.22 mmol/L (and <⅓ of the serum glucose)
- Protein
  - Generally elevated

CSF Analysis (for TB meningitis)
- Initially PML predominance, later lymphocyte predominance
- Glucose levels are low
- Protein levels are high
Labor Induction

1. Check for contraindications for induction:
   - previous cesarean section
   - placenta previa
   - foetal breech presentation
   - any contraindication for vaginal delivery

2. Perform vaginal exam and calculate Bishop’s score:

<table>
<thead>
<tr>
<th>Cervix</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Position</td>
<td>Posterior</td>
</tr>
<tr>
<td>Consistency</td>
<td>Firm</td>
</tr>
<tr>
<td>Effacement</td>
<td>0-30%</td>
</tr>
<tr>
<td>Dilation</td>
<td>Closed</td>
</tr>
<tr>
<td>Baby’s Station</td>
<td>-3</td>
</tr>
</tbody>
</table>

If score is 6 or more -> induce with oxytocin alone
If score is 5 or less -> use foley bulb or misoprostol.

OXYTOCIN:
Order “low dose pitocin” or “high dose pitocin” depending on presence or absence of contractions and multiparity (multips generally are started on low dose protocol).
Goal is 3 contractions every 10 minutes. If contractions last more than 60 seconds, or the patient has more than 4 in 10 minutes, turn the pitocin off and allow fetus to recover.

MISOPROSTOL (Cytotec)
Place 25 mcg (1/8 of tablet – NOT 1/4 of a tablet!) in the posterior fornix of the vagina.
Every 6 hours, assess contraction pattern and cervical dilation:
   - When cervix dilates to 4cm, switch to low dose pitocin
   - If the patient has fewer than 3 contractions in 10 minutes (and cervix is <4cm), you may administer another dose of 25mcg of misoprostol. Do NOT give another dose if the patient has 3 or more contractions in 10 minutes!!

FOLEY BULB (only for patients with intact membranes!)
Use a 26 or 28 French foley bulb that holds 30cc. When balloon is inside internal os, dilate balloon with 50cc normal saline. Check position of balloon every 4 hours and remove if not out at 12 hours.
Puerperal Infections

Definitions:
- **Chorioamnionitis**: infection of amniotic fluid and membranes, usually caused by lower genital tract infection. Ruptured membranes are a significant risk factor.
- **Endometritis**: infection of uterine endometrium after delivery. Chorioamnionitis is a significant risk factor.
- **GBS (Group B Streptococcus)**: a bacteria found in the vagina of approximately 30% of asymptomatic women. A baby born through a vagina with GBS present is at risk for neonatal development of meningitis, sepsis, and pneumonia – complications that are preventable with antibiotics during labor.
- **Pyelonephritis**: urinary tract infection involving kidneys
- **Mastitis**: infection of breast

**Diagnosis of Chorioamnionitis:**
- Maternal fever ≥38 C during pregnancy
- Maternal or fetal tachycardia
- Fundal tenderness
- Foul smelling amniotic fluid in vagina
- Elevated WBC >18,000

**Diagnosis of Endometritis:**
- Maternal fever in the post partum period
- Fundal tenderness
- Exclusion of other causes

**Diagnosis of Vaginal GBS infection:**
- A urine culture that grew GBS some time during current pregnancy
- A vaginal culture positive for GBS

→ Usually neither of these is available in our setting. Instead we screen every woman in labor for the presence of RISK FACTORS, and treat if one or more risk factor is present:
- Prematurity (gestational age <37w0d)
- Rupture of membranes longer than 18 hours
- Intrapartum fever
- History of GBS sepsis in previous neonate

**Diagnosis of Pyelonephritis:**
A UA with bacteria plus one or more of the following symptoms
- Fever ≥38 C
- Costovertebral angle tenderness
- Elevated WBC

**Diagnosis of Mastitis:**
- High maternal fevers in postpartum period
- Painful, erythematous breast with NO areas of fluctuance or pus (If pus is draining, the patient has an abscess which should be drained.)

**Treatment of GBS Risk Factors:**
- Ampicillin 2g IV q 6 hours until delivery OR
- Penicillin G 2 million units q 6 hours until delivery

→ Stop antibiotics as soon as delivery is complete. These antibiotics are only for fetal benefit, not maternal.

**Treatment of Chorioamnionitis/Endometritis:**
Start triple antibiotics:
- Ampicillin 2g IV q 6 hours
- Gentamicin 240mg IV q 24 hours
- Metronidazole 500mg IV q 8 hours

→ Continue antibiotics for 48 hours after delivery or last fever.

**Treatment of Pyelonephritis:**
- Ceftriaxone 1g IV q 24 hours until 48 hours afebrile.
Workup

- Laboratory studies will not lead to a diagnosis of shock but serve as adjuncts; resuscitation efforts take priority over history, physical, labs, or imaging studies!
- CBC, electrolytes, creatinine, glucose
- Consider serum lactate, ABG, cultures
- In setting of trauma, may need serial hemoglobins (don’t forget type & cross!)
- EKG and cardiac enzymes to assess for ischemia/infarction
- CXR → consolidation, pneumothorax, pleural effusions, cardiomegaly
- Bedside u/s → fluid status (IVC assessment), cardiac function, free fluid, etc.
- Formal echo → cardiomyopathy, valvular dysfunction

Treatment

- Start with ABCs and obtain two large-bore IVs for resuscitation!!
- Hypovolemic shock
  - Resuscitation with crystalloid
  - If no improvement after 2 L and with active hemorrhage, transfuse
- Cardiogenic shock
  - Vasopressors and inotropes
- Septic shock
  - Surviving Sepsis Guidelines (we cannot monitor all these criteria at Tenwek)
    - CVP = 8-13 mmHg
    - MAP = 65 mmHg
    - Urine output = 0.5 mL/kg/h
    - Central venous and pulmonary artery mixed venous O₂ saturation = 70% or 65%, respectively
    - If last bullet criteria are not met in first 6 hours, then transfuse to a Hct of 30% and/or administer dobutamine to achieve goals
  - Norepinephrine with or without low-dose vasopressin preferred
    - Consider hydrocortisone
- Anaphylactic shock
  - May require early intubation and respiratory support
  - Epinephrine and IVF for hypotension
  - Steroids and histamine receptor antagonists (ranitidine or cimetidine)
- Hypoadrenal shock
  - Treat with stress-dose steroids in conjunction with treating the underlying disease
- Neurogenic shock
  - Maintain spine precautions
  - IVF resuscitation to ensure adequate preload
  - May require vasopressors
- Obstructive shock
  - Tension pneumothorax – immediate needle decompression
  - Pericardial tamponade – pericardiocentesis +/- catheter drainage and operative intervention
  - Suspected pulmonary embolism – immediate anticoagulation. Consider transfer for thrombolytic therapy/embolectomy
TRANSFUSION REACTION

A reaction to a transfusion of blood/blood product that occurs during, immediately after, or sometimes within a few weeks of the transfusion.

Symptoms

- Acute hemolytic transfusion reaction
  - Fever
  - Chills and rigors
  - Nausea, vomiting
  - Difficulty breathing
  - Pain – particularly flank, back, abdomen, groin, chest, head, and infusion site
  - Anxiety or impending feeling of doom
  - Red or brown urine (not common)

- Delayed hemolytic transfusion reaction
  - Fatigue
  - Jaundice
  - Difficulty breathing

- Allergic transfusion reaction
  - Pruritis
  - Nausea, abdominal cramps, diarrhea
  - Chest tightness
  - Anxiety or impending feeling of doom

- TRALI
  - Respiratory distress → dyspnea, cyanosis
  - Fever

Treatment

- Stop the transfusion immediately
- Support ABCs
- Repeat type and cross
- NS IV for hydration → keep urine output ≥100 mL
- In severe cases, may require epinephrine and corticosteroids
- Manage hypotension with IVF and pressors as needed
- Fill out the transfusion reaction sheet and workup.