

N441 Exam 2 Concepts

Know how to interpret ABG's with compensation. Don't forget that a person can have both metabolic and respiratory acidosis or alkalosis. Hmmm...

- Ph: (acidosis) 7.35- 7.45 (alkalosis)
- Co₂: (alkalosis) 35-45 (acidosis)
- HC₀₃: (acidosis) 22- 26 (alkalosis)
- Still need help with compensation

Fluid Volume Overload (clinical manifestations, see water follow sodium below, review edema)

- Manifestations: acute weight gain, peripheral edema and ascites, distended jugular veins, crackles, elevated CVP, SOB, hypertension, bounding pulse and cough, increased respiratory rate, increased urine output
- Edema: restrict fluid and sodium, elevate extremities, apply anti embolism stockings, may have a paracentesis for ascites in abdomen, treat the cause of edema, diuretic therapy, dialysis or continuous renal replacement therapy
- Its an isotonic solution, the water and sodium are about the same proportion (iffy about this)

Hypokalemia (medications that cause it, recommended diet)

- Meds that cause it: diuretics
- Diet: citrus fruits, citrus fruit juices, bananas

Hyponatremia (clinical manifestations, hint-confusion or mentation changes is a big one, think about what diet we would want and what about fluids?)

- Manifestations: poor skin turgor, dry mucosa, headache, decreased salivation, decreased blood pressure, nausea, abdominal cramping, neurologic changes, CONFUSION
- Diet: sodium replacements
- Fluids: restrict water and fluids, 3% saline

Dehydration (labs, urine output and appearance, BP and HR, things that make a person at risk for it, skin turgor)

- Labs: urine specific gravity (1.010-1.030), BUN (10-20), creatinine (0.7-1.4), Hematocrit (males 42-52, females 35-47), urine sodium
- Output: volume 1-2L, approx 1ml/kg/hr
- BP: hypotension
- HR: tachycardia
- Decreased skin turgor
- People at risk: vomiting, diarrhea, fistulas, fever, excess sweating, burns, blood loss, GI suction, third space fluid shift, decrease intake, diabetes

Respiratory alkalosis (how to fix it)

- Breathe into a paper bag

Water follows sodium (know this, think about it and what we would do in relationship to vascular fluid volume)

- If patient has fluid volume overload you don't want them to have salt

- Remember that water follows sodium

Hypocalcemia (clinical manifestations)

- Tetany
- Circumoral numbness
- Paresthesias
- Hyperactive DTR's
- Trousseau's sign
- Chovstek's sign
- Seizures
- Respiratory symptoms of dyspnea and laryngospasm
- Abnormal clotting
- anxiety

Which electrolyte is the most most important?

- potassium

Hyperkalemia (meds that cause it, telemetry changes I would review some strips..., ways to treat it)

- Meds: Digoxin like drugs and B-adrenergic blockers, heparin, potassium sparing diuretics, angiotensin II receptor blockers (losartan), angiotensin converting enzymes (ACE) lisinopril
- Telemetry changes: wide flat p wave, decreased R wave amplitude, prolonged PR interval, widened QRS , tall peaked T wave, depressed ST segment
- Treatment: loop diuretics, kayexalate, insulin and glucose

Alcohol and magnesium (don't forget this)\

- Alcoholism can cause hypomagnesemia

Know the distinct differences between the shocks (For example, septic shock has a fever, the other shocks do not. MI's usually preclude cardiogenic shock, spinal injuries preclude neurogenic shock and how are vitals different for neurogenic shock than the other shocks??)

- **Hypovolemic Shock**

- Most common
- Cause: reduction in intravascular fluid volume
- External causes: trauma, surgery, vomiting, diarrhea, diuresis, DI
- Internal causes: hemorrhage, burns, ascites, peritonitis, dehydration, necrotizing pancreatitis
- S/S= anxious, decreased urine output
- Patho: decreased blood volume→decreased venous return→decrease stroke volume→decreased cardiac output→decreased tissue perfusion
- Treat underlying cause (ex: if hemorrhage STOP the bleeding)
- Tx blood or fluid replacement, O2, Positioning (modified trendelenburg), LR, redistribute fluid, restore intravascular volume

- **Cardiogenic Shock**

- Cause: hearts ability to contract and to pump blood is impaired and the supply of oxygen is inadequate for the heart and tissue

- Causes are either coronary and non coronary
- Coronary: acute MI
- Non coronary: severe hypoxemia, tension pneumothorax, cardiomyopathies, valvular stenosis or regurgitation, cardiac tamponade, dysrhythmias, blunt cardiac injury
- Systolic dysfunction: most common cause is MI
- Diastolic dysfunction: hearts inability to fill causes tamponade, ventricular hypertrophy, cardiomyopathy
- S/SX: tachycardia, hypotensions, narrow pulse pressure, increased SVR, tachypneic, crackles, cyanosis, pallor, diaphoresis, weak peripheral pulses, cool and clammy skin, delayed cap refill, anxiety, confusion, agitation
- TX: oxygenation, pain control (IV morphine), hemodynamic monitoring, lab marker monitoring (BNP, cardiac profile), fluid therapy
- Pharmacological tx: dobutamine, nitro, dopamine, antiarrhythmic medications, vasoactive medications

Distributive shock:

- Its broken down into 3 different categories. Septic, neurogenic, anaphylactic
- In all types of distributive shocks massive arterial and venous dilation promotes peripheral pooling of blood
- Septic: most common type, tissue hypoxia, persistent hypotension, immunosuppression, invasive procedures, if septic-secure airway and correct hypoxemia, establish venous access, obtain CBC, ABG, serum lactate, aggressive administration of IVF, antibiotic therapy, if septic shock- IV vasopressors (norepinephrine), glucocorticoids
- Neurogenic: can occur within 30 minutes of a spinal cord injury and last up to 6 weeks, S/Sx- hypotension and bradycardia (treated with atropine), monitor for hypothermia, treated based on the cause (if spinal cord, stabilize spinal injury), spinal anesthesia, depressant action of medication
- Anaphylactic: transfusion reaction, food allergies, latex sensitivity, hx of reaction to insect bites/stings, itd acute and life threatening, symptoms can occur within 2-30 minutes after exposed, sx: acute onset of symptoms, presence 2 or more symptoms that include respiratory compromise, reduced BP, GI distress, and skin or mucosal tissue irritation, cardiovascular compromise, TX: prevention, maintain patent airway, IM epinephrine, diphenhydramine and ranitidine (zantac), nebulized bronchodilators, fluid resuscitation

Obstructive shock:

- Develops when a physical obstruction to blood flow occurs with a decreased cardiac output
- Can be caused by restrictive diastolic filling of RV (right ventricle) from

compression, which can cause cardiac tamponade, tension pneumothorax, superior vena cava syndrome, abdominal compartment syndrome, PE, RV thrombi

- TX:
- Mechanical decompression= cardiac tamponade, tension pneumothorax, hemopneumothorax
- Thrombolytic therapy= PE
- Radiation, debulking, or removal of the mass= superior vena cava syndrome

Know the stages of shock and the symptoms that go with that stage. What kind of things do we prepare the family for when our interventions for shock are not working and patients are in the final stage of shock or MODS?

SHOCKS STAGES:

Initial stage: patient moves from aerobic to anaerobic

Stage 1- compensatory: non progressive, no decrease in blood pressure, maintains BP and cardiac output, increased HR of 100, increased peripheral vasoconstriction, pallor, bounding pulse, cool clammy skin, increase heart contractility, ideal time to recognize patient is in shock, decreased urinary output, respiratory alkalosis, confusion

Stage 2- Progressive: de compensated, body is no longer compensating, BP starts to drop and as time goes on it gets lower and lower, condition is going to deteriorate, hypoxic injury that comes from decreased perfusion and the decrease oxygen supply involves all organs, MAP decreases (falls below 70), confusion, lethargy, altered mental status, lungs begin to fail, dysrhythmias, liver and GI and blood are affected, DIC can occur, acute renal failure may occur, mottled petechiae skin, HR over 150, metabolic acidosis, INTERVENE

Stage 3- irreversible or refractory stage: patient will have irreversible physiological changes, renal and liver function begin to fail, BP remains low, goes into complete organ failure, erratic or asystole HR, requires intubation and oxygen, skin is jaundice, no urine output and requires dialysis, patient is unconscious, profound acidosis

Support family members: families may be overwhelmed and frightened, make sure family is comfortably situated and kept informed about patients status, encourage rest and inform that they will be notified of any significant changes in patients status, offer visit from hospital chaplain

Pulse pressure (What it is and what does it do with shock?)

- Pulse pressure is the difference between your systolic and diastolic blood pressure
- You take your systolic BP and subtract it by your diastolic BP= pulse pressure.
- Should be between 30-40 if its less than that its a narrowing pulse pressure and can indicate shock

What do your HR, BP, Resp Rate do with shock (except neurogenic shock)?

How do we stabilize the BP? (hint, fluids and vasoconstrictors)

- HR increases except for neurogenic shock

- BP decreases
- Respiration rate increases
- Stabilize BP with fluids and vasopressors
- Fluids: LR and 0.9 saline
- Vasopressors: norepinephrine (levophed), dopamine, phenylephrine, vasopressin

How do we know the brain has enough MAP to perfuse? How about the kidneys?

- MAP that is greater than 60 mmHg is enough to sustain the organs of an average person
- MAP that is less than 60 mmHg, then the organs are not being adequately perfused and they will become ischemic