Exam 4- FINAL

Inotropic drugs: ↑Contractility (dopamine) & Dobutamine give in central line ((+) inotropic effect = ↑ BP

Inotrophy Contraction strength & contractility

SHOCK

1. Low Blood Flow
   a. Cardiogenic Shock: compromised CO
      i. Causes: MI, cardiomyopathy (systolic), blunt injury, severe HTN, cardiac tamponade(diastolic), pulmonary HTN
      ii. S&S: tachycardia, hypotension, narrow pulse pressure, INC myocardial O2 consumption, tachypnea, pulmonary congestion, pallor, cool/clammy, dec cap refill, anxiety/confusion/agitation, dec renal perfusion/UO – PAWP (pulmonary catheter to monitor pressures in left atrium)

Hypoxemia Metabolic acidosis

      iii. Collaborative Care: restore blood flow, Thrombolytics, angioplasty, emergent revascularization, valve replacement (treat cause), drugs (diuretics, vasodilators, antidysrhythmics, norepi) circulatory assist devices, positioning **Electrolyte Imbalance:** pay attention to K+, Na+, Mg+ ↑ Retention

Reflective Shock Results when fluid volume moves out of vascular space into extra vascular space (i.e. interstitial or inter cavity space —> 3rd spacing - similarly seen in sepsis & burns)

   b. Hypovolemic Shock: volume loss
      i. Causes: hemorrhage, GI loss, fistula drainage, DI, hyperglycemia, diuresis, third-spacing
      ii. S&S: anxiety, tachypnea, inc HR, dec stroke volume-dec UO (loss>30%=transfusion), electrolyte imbalances
      iii. Collaborative Care: stop fluid loss, fluid replacement (3 ml fluid: 1 ml blood loss), positioning (flat or modified trendelenburg)

MODS: Multiple organ dysfunction syndrome

2. Distributive Shock (when compensating these patients are experiencing vasodilation not vasoconstriction)
   a. Anaphylactic Shock: hypersensitivity rx – massive vasodilation
      i. S&S: anxiety, confusion, dizziness, impending-doom, chest pain, incontinence, swelling of tongue/lips, wheezing/stridor, pruritus, urticaria, resp distress
      ii. Collaborative Care: Epi (vasopressin), Benadryl (diphenhydramine), positioning (flat or modified trendelenburg) maintain airway (nebulizers, intubation/trache), fluid replacement, IV steroids for BP (corticosteroids)

Shock Nursing Interventions:
1. Airway patency
2. Hemodynamic management
3. Vasopressin's (Norepi & Dopamine)
4. Vasodilators (Nitro for cardio shock)
5. Nutrition

   b. Septic Shock: systemic infection, sepsis+ hypotension (despite fluid resuscitation)
      i. Warm vs Cold

systemic vasodilation

Early 1. —> Warm (hyper-dynamic — early): fever, low BP in spite of high CO, wide pulse pressure

Late 2. —> Cold (hypo-dynamic, progressive or late)

SIRS Criteria
Fever > 100.4 or < 96.8 (38) (36)
HR > 90 bpm
RR >20 or PaCO2 < 32
WBC > 12,000 or < 4,000 >10% immature
- check lactate

      ii. SIRS: systemic inflammatory response syndrome inflammatory response to infection - trauma, or burns
      iii. Sepsis: SIRS + documented or suspected infection
      v. Risk factors: Foley catheter, IV sites, integrated pt are at risk for pneumonia
      vi. S&S: inc coagulation and inflammation, microthrombus formation, inc CO/dec SVR, tachypnea, temp dysregulation, dec UO, altered neuro, GI dysfunction, resp failure, warm/flushed
      vii. Collaborative Care: culture to find the source of infection —> antibiotic ASAP, fluid replacement (iso and colloid), vasopressors, antibiotics, steroids (maintain BP), glucose <150, H2 blockers for stress ulcers, DVT prophylaxis)

LR or NS 30 mL/kg

Norepi & Dopamine & Nitroprusside — Cardio shock

Vancomycin originally until C&S comes back

DIC: Findings: ↑ clotting factor anywhere w/ signs of ↓ perfusion (organ failure)
Labs: prolonged or ↑ PTT, PT, & INR (takes longer to clot) —> treat underlying cause
: Thrombocytopenia —> supportive treatment, monitor for bleeding
: ↓ Fibrinogen —> Heparin controversial : ↑ Fibrin split products —> bleeding precautions
: (+) D diner—> give clotting factors

3. Stages of Shock
   a. Initial: lactic acid accumulation begins
   b. Compensatory: neural, hormonal, biochemical
      i. Impaired GI motility, cool/clammy, shunting blood from lungs (dec arterial O2, inc rate/depth), SNS stimulation = inc heart O2 demands, releases epi/norepi, dec CO – can see resp alkalosis
   c. Progressive: dec cell perfusion/altered permeability
      i. Systemic edema, anasarca = massive edema, dec blood flow to pulmonary capillaries, pulmonary edema, bronchoconstriction, tachypnea, crackles, inc WOB, CO decreases (dec perfusion, hypotension, weak pulses, distal ischemia, dysrhythmias, MI), GI ischemia (ulcers, bleeding, translocation of bacteria, dec absorption), Liver failure (jaundice, elev enzymes, loss of immunity, risk for DIC/bleeding), GU (AKI), neuro (confused, dec LOC, lethargic) – met acidosis
   d. Irreversible:
      i. Profound hypotension, hypoxemia, inc tachycardia, dec coronary perfusion, cerebral ischemia, organ failure – worsening met acidosis
4. Diagnostics: H&P, H&H, lactate, ECG, chest x-ray
5. Collaborative Care:
   a. maintain airway/O2 delivery
   b. fluid resuscitation/volume expansion (2-3 L, if no response = blood admin) – hypothermia/coagulopathy
   c. Drugs: norepi, vasopressin, dopamine, vasodilators (nitro), digoxin (contractility of heart)
   d. Nutrition: enteral feeding w/in 24 hrs, parenteral feedings if needed, monitor protein/nitrogen, BUN, glucose, electrolytes

BURNS

1. Types
   a. Thermal: flame/flash/scald
   b. Chemical: remove chemical, flush eyes well – FLUSH IMMEDIATELY W/ water or LR
   c. Smoke Inhalation: inhaled hot air/noxious chemicals (close quarters), resp damage
      i. S&S:
      ii. Types: Carbon monoxide, above glottis – thermal, below glottis – chemical
   d. Electrical: damage occurs beneath skin (ice burg effect), risk for dysrhythmias, met acidosis, myoglobinuria, & ATN

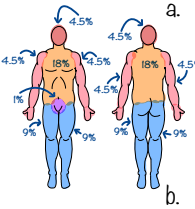
May take up to 72 hrs for tissue destructions tops

Major predictor of mortality in burn victims —> treat quickly

Acute tubular nectosis

Fracture of long bones and vertebrae

2. Classifications KNOW S/S!!
   a. Depth of Burn: 1-4th degree, partial or full thickness
      i. Superficial(partial): 1st degree, epidermis only – sun burn, red, blanch, mild swelling
      ii. Deep(partial): 2nd degree, epi & dermis – swelling/edema, blisters, PAINFUL
      iii. Full-Thickness: 3rd degree, dermis/fat – white, leathery, hard skin, no pain (may need graft)
      iv. Full-Thickness: 4th degree, fat/muscle/bone
   b. Extent of Burn: **Rule of Nines (legs 9%, arms 4.5%, back/torso 18%, head 4.5%, groin 1%)**
   c. Location of Burn: location = severity of injury, circumferential = circulatory compromise (escharotomy)
   d. Risk Factors: elderly & young, pre-existing diseases, DM



Treatment: stop the burning process, cool burn with running COOL water (not cold!). DO NOT put ice on it, butter, or ointments (may trap heat)

Assess for arterial insufficiency

3. Phases of Burn Management

STOP, DROP, ROLL!

< 20% burn of body: will be able to eat on their own
> 20%: require nutritional support
↳ May develop ileu's
—>NPO & gastric compression

Burn Center Criteria
- Partial-thickness >10% of total body surface area (TBSA)
- Burns on face, hands, feet, genitalia, periosteum, major joints
- 3rd degree burns
- Electrical burns
- Chemical burns
- Inhalation injury

a. Prehospital-Immediate: remove from source
   i. Small: cover w/ clean/cool water
   ii. Large: ABCs, no cool water/ice, remove burnt clothing, wrap in dry blanket

We don't want them to become hypothermic

b. Emergent-Resuscitative-Burn Shock: 72 hrs, fluid shifts (hypotension, tachycardia), 3rd spacing/edema, hyponatremia/hyperkalemia, RBC hemolysis, Thrombosis, Elevated Hct
   i. Hypovolemic shock, pain, blisters, adynamic ileus, shivering, AMS

Increased capillary permeability d/t leaking fluid into interstitial space

   ii. Complications: Nursing Dx: impaired circulation to extremities to extremities & impaired respiratory excursion
      1. Cardio: Dysrhythmias, dec circulation, tissue ischemia/necrosis
      2. Respiratory: Upper (edema, obstruction, asphyxia) Lower (direct alveoli damage, edema), pneumonia, pulmonary edema

LOC changes are d/t not the burn

         a. Smoke Inhalation: Carbon monoxide – hypoxia, carboxy, death, cherry red skin, black colored secretions (carbonaceous sputum), darkened oral & nasal membrane (were they in a closed space?)
            i. Give 100% humidified O2

May need to intubate ← Reassure pt

Respiratory failure —> may need to intubate

            ii. S/S: initially - HA, dizzy, N then agitation V, seizures decreased LOC, late - cherry pink/red skin, increased HR & RR —> death
      3. Renal: dec blood flow, renal ischemia, myoglobinuria, ATN-AKI

Pt care w/o intubation
- 100% humidified O2
- High Fowlers
- C&DB every hr
- Reposition q 1-2 hr
- Chest physiotherapy & suction if needed

   iii. Management:
      1. Airway: ET tube, escharotomy of chest wall, bronchoscopy, 100% hum O2
         a. Ventilator Drugs: propafol, fentanyl drip, iron supplement in acute phase
      2. Fluids: Lactated Ringers, 2 large bore IV's, 24 hrs – 4ml * % burns * kg

>15% TBAS: Adult formula: Fluid first 24 hrs = 4 mL x % total body surface x body weight kg (one 1/2 in first 8hrs)

1 L/kg for fluid retention

         a. 0.5 to 1 mL/kg/hr (or > (equal to) 50mL/hr) 75 to 100 mL/hr for electrical burn pt w/ evidence of hemoglobinuria or myoglobinuria
            i. Monitor urine output
      3. Wounds: cleansing & debridement, prevent infection, skin grafting
         a. No pillows for burns on ears or neck (could remove skin)

PAIN MANGEMENT!
↳ treatment induced pain
- analgesic & IV & PO

Midazolam — Anxiolytics — Lorazepam

      4. Other: facial/eye care, extend extremities, do not use pillows
      5. Drugs: analgesics/sedatives (Morphine, Dilaudid, Haldol, Ativan, Versed), tetanus, **topical** antimicrobials (silver, mafenide), VTE proph
         a. Pre-medicate (IV opioids) pt before dressing changes. PAINFUL!
            i. Clean gloves during all wound care

Continuous drip IV infusion w/ opioid = steady therapeutic level of meds

      6. Nutrition: fluid replacement, early/aggressive support

Pt is hypermetabolic

      7. Pt's at most risk: older adults & children, per existing CV, res, KD, DM, other injuries

Nutrition
Early enteral feedings, usually small bore tubes preserve GI function
- high calorie
- high protein
- vitamin & mineral supplements

c. Acute-Wound Healing: begins w/ mobilization of ECF & dieresis. Ends when burned area covered by skin grafts, or when wounds are healed (weeks or months)
   i. S&S: edema subsides, wound healing begins, bowel sounds return, electrolyte imbalances
   ii. Complications: infection (local or systemic), cardio/resp, neuro (hypoxia, drugs), muscle/skeletal contractures, GI (ileus, diarrhea, constipation, ulcers), Endo (inc glucose)
   iii. Management: wound care, grafting (donor or CEA), pain management, therapy, nutrition (high protein/carb/calorie), psych

d. Rehabilitative-Restorative: burn wounds healed, 4-6wks burns become raised/hyperemic, 6mo-2yrs = mature healing.
   i. Complications:
      1. Skin/Joints: contractures —> positioning, splinting, & exercise to minimize contracture
      2. ROM! If not instituted the new tissue will shorten, healed areas must be covered from direct sunlight
   ii. Management: education (water-based cream/vaseline, sun screen, exercise), cosmetic surgery
      1. Inter professional team approach (social worker & myself) —> assess psycho emotional cues, family & pt support groups

Oncology

Males: Prostate	Females: Breast	Both: Lung & Bronchus

1. Neoplasia: benign (solid tumors in capsule) and malignant (metastasize, blood-borne, lymphatic, local)
   a. Tissues of origin:
      i. Benign: (prefix + oma), Fibro/Adeno/Lipo (encapsulated [localized], do not spread to other organs) usually removed by surgery
      ii. Malignant: (Sarcoma or carcinoma + oma) (spreads to other parts of the body)
   b. Grading
   i. Differentiated from normal looking cells
   c. Classification: Tumor, Nodes, Metastasis

Grading of Malignant Neoplasms

Grade	Definition
I	Well differentiated
II	Moderately differentiated
III	Poorly differentiated
IV	Nearly anaplastic

2. 7 warning signs of cancer: CAUTION
   a. **C**-changes in bowel/bladder habits
   b. **A**: sore throat that doesn't heal
   c. **U**: unusual bleeding or discharge
   d. **T**: thickening or a lump
   e. **I**: indigestion or difficulty swallowing
   f. **O**: obvious change in wart/mole
   g. **N**: nagging cough/hoarseness
3. Diagnostics: screenings
   a. Labs: WBC, Platelet, RBC H/H, Hypercalcemia, uric acid levels, tumor markers
   b. Surgical: diagnosis, prevention, clinical staging, cure/control, supportive device placement, rehab, palliation
4. Prevention & Detection
   a. Decrease exposure to carcinogens, balanced diet, regular exercise, rest, routine physical, decrease stressors, know warning signs, participate in cancer screenings, self exams, follow-up of changes noted

5. Treatments:
    a. Chemotherapy: administer in PICC/portacaths – can cause vesicant tissue necrosis, targets fast-growing cells
        i. Administration: often labeled with a yellow sticker, closed footwear, globes, gown, (sometimes mask &/or goggles)
            1. In the events of chemo infiltration —> turn off infusion immediately, follow protocols for drug-specific extravasation
            2. **pt receives IV treatment before, during & after. Monitor for s/s of overload —> increased BP, crackles in lungs etc.**
        ii. Nursing Care:
            1. Check availability to process info. Educate pt about treatment regiment (antiemetics, Antidiarrheals, etc) & what to expect during the treatment to decrease fear & anxiety
            2. Withhold Chemo: Nadir, bone marrow

Alopecia: hair loss
Educate pt

    b. Radiation: free radicals cause broken bonds in DNA – cannot proliferate
        i. Internal: implantation/insertion of radioactive materials into/close to tumor – pt remains radioactive – limit exposure
            1. Time, Distance, Shielding: wear film badge to monitor exposure, flush toilet twice
        ii. External: common, megavolt machine using ionizing radiation
            1. Simulation: size/orientation, immobilize pt/skin markers
            2. No sun, do not wash marker off, no lotion w/out orders
    c. Implications:
        i. Pain Management:
            1. pt should receive scheduled dosages of pain meds & should also have pain meds for breakthrough pain
            2. If opioid naïve, do not begin with topical patches (such as Fentanyl)
            3. May develop tolerance to opioids over time and require higher dosages (monitor for side effects)
            4. Use non-pharm as well as pharm methods to control pain
        ii. Bone Marrow Suppression: leukopenia, neutropenia, thrombocytopenia, anemia

On Neutropenic precautions

            1. Nadir-lowest point
            2. Neupogen SQ – stimulates neutrophils
            3. To do: vitals, hand hygiene, no rectal anything, neutropenic precautions (<2000)
                a. **Neutropenic Precautions:** no fresh flowers/fruits/veggies, avoid people with cold/flu, wear mask if leaving the room, private room, q4 vitals, hand hygiene
                b. Thrombocytopenic Precautions: no IM injections, apply pressure to venipuncture sites, soft swabs for oral care, electric razor, monitor platelets, monitor for GI bleeds
                c. Anemic Precautions: monitor H&H, transfusions, activity intolerance, Epogen
        iii. Nursing Considerations/Dx:
            1. Fatigue: Rest/assistance, maintain nutrition/hydration

iii. Nursing considerations/Dx cont.

2. GI:
   a. NV: prophylactic antiemetics, look for dehydration/alkalosis/I&O, low-fiber/high-calorie/high-protein diet
   b. Anorexia: monitor weight, small/frequent meals, nutritional supplements
   c. Diarrhea/Constipation: antidiarrheal/laxatives
   d. Stomatitis/Thrush: drink water frequently, soft foods, avoid extreme temps/alcohol/tobacco
      i. Oral Care: swab, bicarb rinse, nystatin/Mycelex
   e. Skin: dry skin (non-irritating lotion), wet skin (clean and protected), prevent infection, wound healing, avoid constriction/chemicals/deodorants
   f. Alopecia: hair loss
   g. Reproduction: possible sexual SE, appropriate shielding
   h. Organ Toxicity: Kidneys (BUN, creatinine, Allopurinol for uric acid) Neuro (Inc ICP, peripheral neuropathy, chemo brain - give steroids), Cardio (Pericarditis/Myocarditis)

iii. Oncologic Emergencies

1. Obstructive
   a. Superior Vena Cava Syndrome: edema, vein distention (usually related to lung cancer)
      i. S/S: SOB, DOE, coughing, swelling of face, neck,upper body & arms
      ii. Management: (palliative) raise HOB, diuretics, thrombolytics to break up clot in vein, surgical: stents or other procedure to bypass blockage
   b. Spinal Cord Compression
   c. Third Space Syndrome: hypovolemic
2. Metabolic
   a. SIADH
   b. Hypercalcemia – parathyroid like hormone secreted from cancer cells
      i. S&S: apathy, depression, fatigue, weakness, ECG changes, polyuria, nocturia, anorexia, NV – hydration (isotonic saline)/diuretics (loop-once volume is restored, blocks sodium & calcium reabsorption/bisphosphonates should (inhibit calcium release by interfering with osteoclast bone reabsorption), calcitonin (reduce serum calcium by increasing renal calcium excretion (used for 48hrs)
   c. Tumor lysis syndrome – massive cellular destruction leads to hyperkalemia, hyperuricemia, hyperphosphatemia, **hypo**calcemia
      i. Treatment: fluids, protect kidneys, allopurinol, fix electrolytes
         1. **Allopurinol: monitor serum uric acid levels** ← KNOW!
   d. Septic Shock
   e. DIC

Kidney Transplant: **know rejection symptoms – select all that apply**

1. Acute
   a. Occurs days to months after transplantation
   b. Primary activation of T cells
   c. S & S: Fever, malaise, tenderness over the graft site, swelling of the grafted kidney, acute HTN, edema, oliguria, azotemia, weight gain, proteinuria, hematuria

Post Kidney Transplant Rejection Signs

Acute

- 1 week to 2 years post op
- OLIGURIA, ANURIA
- ↑ Temp (>37.8 C)
- ↑ BP
- FLANK TENDERNESS
- LETHARGY
- ↓ SP. GRAVITY
- FLUID RETENTION

Chronic

- GRADUAL OVER MONTHS
- GRADUAL ↑ in BUN & CREATININE
- IMBALANCES IN ELECTROLYTES
- FATIGUE

Phases of Burn Management

Prehospital care (immediate) First Aid

Emergent (Resuscitative) (Burn Shock Phase)
- lasts up to 72 hrs - begins fluid loss & edema formation
- ends fluid mobilization & dieresis begins

Acute (Wound Healing) (Immediate)
- weeks to months
- begins w/ mobilization of extracellular fluid & diuresis
- ends when burn area covered by skin graph or healed

Rehab: Restorative (convalescent)
- 2 weeks to 7-8 months after injury
- begins when burn wounds are healed & pt is able to resulted self care
  1. Assist pt in resuming a functional role in society
  2. Rehabilitate from function & cosmetic reconstruction surgery

Shock Break Down

Cardiogenic Shock
Cardio
↑HR (Tachy)
↓ BP
↓ Cap refill
Chest pain may or may not be present
Resp
↑RR (Tachy)
Crackles
Cyanosis
Renal
↑Na+ & H2O
↓ Renal blood flow
↓ Urine output
Skin
Pallor
Cool, clammy
Neuro
↓Cerebral perfusion
Anxiety, confusion, Agitation
GI
↓ bowel sounds, N&V
Dx Findings
Cardiac bio marker
BNP
Blood glucose
BUN
ECG dysrhythmias (Left ventricular)
Chest X-ray
↳ Pulmonary infiltrates

Hypovolemic Shock
Cardio
↓Preload
↓SV (stroke volume)
↓Cap refill
Resp
Tachypnea—>then bradycardia (late)
Renal
↓ Urine output
Skin
Pallor
cool, clammy
Neuro
↓Cerebral perfusion
anxiety, confusion, Agitation
GI
absent bowel sounds
Dx Findings
Hct
Hemoglobin
Lactate
Urine specific gravity, changes in electrolytes

Anaphylactic Shock
Cardio
Chest pain
Third spacing fluid
Resp
Shortness of breath
Edema of larynx & epiglottis
Wheezing, strider, rhinitis
Renal
Incontinence
Skin
Flushing, priorities, urticaria, Angioedema
Neuro
Anxiety, impending doom, confusion, ↓LOC, metallic taste
GI
Cramping, abdominal pain
Dx Findings
Sudden onset, Hx of allergies
Exposure to contrast media

Septic Shock
Cardio
↑/↓Temp
Myocardial dysfunction
Bio ventricular dilation
↓Ejection fraction
Resp
Hyperventilation crackles
Resp alkalosis —>resp acidosis
Hypoxemia, Resp failure, ARDS, pulmonary HTN
Renal
↓ Urine output
Skin
Warm & flushed —> —> cool & mottled (late)
Neuro
Alteration in mental status
↳Confusion, agitation, coma (late)
GI
GI bleed, paralytic ileum
Dx Findings
WBC
Platelets
Lactate
Blood glucose
Pro calcitonin
Urine specific gravity
Urine Na+ positive blood cultures