Case Study #2: Burns
Understanding the Diagnosis and Pathophysiology

1. Describe how burn wounds are classified. Identify and describe Mr. Angelo's burn injuries.
    a. Burn wounds are classified by the depth of the burns on a numerical scale ranging from 1 being a topical burn on the epidermis and 4 reaching the muscle.
        i. First degree burns; reach roughly 0.010 inches deep and are located on the epidermis of the skill accessing nerve endings.
        ii. Second degree burns; reach double the depth at 0.020 inches and go into the dermis where hair follicles reside.
        iii. Third degree burns; go into subcutaneous fat tissue and access the blood supply at approximately 0.035 inches.
        iv. Fourth degree burns; go all the way to the muscle at about 0.040 inches deep.
    b. Mr. Angelo's burn covered approximately 40% of his body including his face, bilateral upper extremity, bilateral lower extremity circumference, scrotum, buttocks, and back. His assessment declared the burns across the spectrum. There were first degree burns on his stomach, second degree on his upper extremities and back, with full thickness burns on his lower extremities and blistering on his penis and scrotum. His skin was described as showing weeping, sloughing, blistering, and necrosis and a Braden score of 10 classifying him as high risk. [1]

2. Explain the "rule of nines" used in assessment of burn injury.
    a. The "rule of nines" is a standardized method to assess and quantify the percent of a person's body that has been burned. All body parts are worth a percent that are all multiples of 9 allowing for quick math. For an adult a leg, back, and chest are all considered 18%, while arms and head are 9%, and the groin is 1% however for children their back, chest, and head are 18%, arms 9%, legs each 14%, and groin again just 1%. This system allows a fast assessment a healthcare professional can quickly identify how much of a person is covered in burns. [2]

3. Mr. Angelo's fluid resuscitation order was: LR @ 610 mL/hr x first 8 hours and decrease to 305 mL/hr x 16 hours. What is the primary goal of fluid resuscitation? Briefly explain the Parkland formula. What common intravenous fluid is used in burn patients for fluid resuscitation? What are the components of this solution?
    a. Traditionally 2-4mL/kg body weight per percent of burn of resuscitation fluid is given immediately to burn patients; the Parkland formula calculates how much fluid to give patients for the first 24 hours of treatment. Typically half the calculated amount if delivered within the first 8 hours and the rest dispersed throughout the next 16 hours to finish the first day of treatment. The volume of fluid also depends on the patient's age, weight, and TBSA. The main purpose of fluid resuscitation is to replace fluid and electrolytes to allow for proper wound

healing. A common intravenous fluid if a pure crystalloid parkland formula the translates well with the parkland calculations and contains normal saline and 0.9% sodium chloride; similar to that of blood. [1]

4. Burns are often described as one of the most metabolically stressful injuries. Discuss the effects of a burn on metabolism and how this will affect nutritional requirements.
    a. Energy requirements can double a person's normal REE varying by extent of the burns. They also create a protein catabolism and increase urinary nitrogen with the hyperactive metabolism. Their accelerated metabolism leads to drastic increase in calories, protein, carbohydrates, fats, vitamins, minerals, antioxidants, and electrolytes. Burn size is the largest indicator of the increase of caloric needs followed by age. Smaller increases in calories may be necessary to support complementary issues such as infection or fever that follows the burn. Protein needs are increased because there is so much lost with the initial wound and urine output but also an increase in gluconeogenesis for wound healing. It is recommended that 20-25% of the caloric input is in the macronutrient protein. Vitamins A, C, and D are all imperative but exact amounts have not been recommended. Vitamin C supports collagen synthesis so is imperative with wound healing and promotes a strong immune system and can battle infections. If a burn victim in vitamin A deficient than it can indirectly affect Vitamin C. Lastly burn survivors have an increased risk for vitamin D deficiency so it is often supplemented throughout their treatment to try to offset the risk. [1]

5. List all medications that Mr. Angelos is receiving. Identify the action of each medication and any drug-nutrient interaction that you should monitor.
    a. Ascorbic Acid 500 mg every 12 hours
        i. Action: Vitamin C, anti-scurvy, water soluble antioxidant.
        ii. Interaction: helps promote iron absorption is taken together; no drug nutrient interaction to watch.
    b. Chlorhexidine 0.12% oral solution 15 mL every 12 hours
        i. Action: antihistamine, antiseptic used to clean skin after injury, before surgery, or before injection.
        ii. Interaction: take with food to lower GI stress, sometimes liked to anorexia; no key interaction to watch for.
    c. Famotidine tablet 20 mg every 12 hours
        i. Action: Antacid, antisecretory, antihistamine, treat ulcers, gastroesophageal reflux disease (GERD), and conditions that cause excess stomach acid, treat heartburn caused by acid indigestion.
        ii. Interactions: take with water let tablet dissolve before swallowing, bland diets are recommended drug must be taken at least 2 hours before or after Fe supplementation or it will decrease Fe and Vitamin B12 absorption; oppositely Mg or Al/Mh antacids decreased drug absorption.
    d. Heparin injection 5000 units every 8 hours

    i. Action: anticoagulant.
    ii. Interactions: No nutrient interaction some side effects may be decreased platelets, Chol, T4TG and increased AST, ALT, PT/INR, K, FFA
e. Insulin regular injection every 6 hours
    i. Action: anti diabetics, hypoglycemic
    ii. Interactions: Best utilized if patient is on a diabetic meal plan to help with HCO digestion; some alterations include decreased HbA1c, K, Mg, P, glucose and increase T4; water serum glucose, urine ketones, and HbA1c
f. Multivitamin Tablet 1 tablet daily
    i. Action: support/provide nutrient absorption with medications and treatments
    ii. Interactions: Calcium sometimes makes multivitamins harder to absorb
g. Zinc Sulfate 220 mg daily
    i. Action: mineral supplement
    ii. Interaction: take 2 hours before or after meals; specifically Cu, Fe, Ca or foods high in bran; will need to be careful to take separately from the multivitamin
h. Methadone 5 mg every 8 hours
    i. Action: analgesic, narcotic, opioid
    ii. Interactions: must be careful with grapefruits and citrus for maximal absorption
i. Oxandrolone 10 mg every 12 hours
    i. Action: anti-wasting, anabolic steroid
    ii. Interaction: requires increased calcium and protein for anabolic effect and possibly lower Na, may result in increased protein synthesis; will want to monitor for increased protein and appetite as evidence for improvement
j. Senna tablet 8.6 mg daily
    i. Action: Laxative, stimulant
    ii. Interaction: requires high fiber diet, causes electrolyte imbalance, increased glucose and decreased K and Ca, be careful to monitor the patient electrolyte balance to stay within goal rate
k. Docusate oral liquid 100mg every 12 hours
    i. Action: stool softener, laxative
    ii. Interaction: requires high fiber diet, and may alter intestinal absorption of water and electrolytes; be careful to monitor electrolytes
l. Silver sulfadiazine 1% cream topical application daily
    i. Action: antibiotics; prevent infection
    ii. Interaction: no nutrient concerns
m. Acetaminophen 650 mg oral every 4 hours as needed
    i. Action: analgesic, antipyretic
    ii. Interaction: increased risk of vitamin C toxicity and increased caffeine rate of absorption; watch effects in conjunction with ascorbic acid that Vitamin C levels stay adequate

n. Midazolam CHl (Versed) 100 mg in sodium chloride 0.9% 100 mL IV infusion, initiate infusion at 1 mg/hr
    i. Action: antianxiety, skeletal muscle relaxant, anti epileptic, anti panic, sleep aid, acute alcohol withdrawal, anesthesia adjunct
    ii. Interaction: limit caffeine consumption and be careful with grapefruits and citrus
o. Hydromorphone (Dilaudid) injection 0.5-1 mg, intravenous every 3 hours as needed
    i. Action: analgesic, antitussive, narcotic, Opioid
    ii. Interaction: phenothiazine medicine, MAO inhibitor within the past 14 days
p. Fentanyl (Submlimaze) injection 50-100 mcg intravenously every 15 minutes as needed
    i. Action: analgesic, narcotic, opioid
    ii. Interaction: caution with grapefruit and citrus fruits
q. Propofol (Diprivan)10 mg/mL premix infusion, start at 25 mcg/kg/min as needed
    i. Action: anesthesia, sedative
    ii. Interaction: high fat EN, infusion rate 30mL/hr provides 790cal fat/day

R. Thiamine 100mg x 3 days
    I. Action: B complex vitamin, anti-beriberi, Vit B1
    Ii. Interaction: increased thiamine and CHO intake

S. Folate 1 mg x 3 days
    I. B complex vitamin, antianemic
    Ii. Interaction: 400ug/day RDA[3]

Understanding the Nutrition Therapy

7. Using evidence-based guidelines, describe the potential benefits of early enteral nutrition in burn patients.

- According to the Nutrition Care Manual, enteral nutrition has been initiated to burn patients as early as 6 hours after the burn occurred[4]
- EN is safe for both children and adult burn victims[4]
- Benefits of early EN initiation for burn victims include:
    - Effective nutrient delivery
    - Trophic effects on gastrointestinal function
    - Lower chance of infection
    - Reduced length of stay in ICU
    - Possibility to protect against negative effects of the hypermetabolic state of patients[3]
- Some of these benefits (ex: maintenance of the gastrointestinal tract and its function) cannot be achieved if parenteral nutrition is used[4]
- Evidence-based guidelines recommend early EN for burn patients, to reach nutritional needs safely and effectively[4]

8. What are the common criteria used to assess readiness for the initiation of enteral nutrition in burn patients?

- Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient by ASPEN and SCCM recommend:
    - Enteral nutrition initiation within 24-48 hours of admission[5]
- Criteria to assess before it can be assumed that the patient is ready for the initiation of EN include:
    - Weight loss
    - History of nutrient intake before admission
    - Severity of disease (if applicable)
    - Comorbid conditions
    - Functional status of GI tract[5]
- EN should not be administered until the burn patient is hemodynamically stable[5]
- Burn patients in ICU: the presence (or absence) of bowel sounds, as well as the presence (or absence) of bowel movements do not need to be assessed before EN is initiated[5]

9. What are the specialized nutrient recommendation for the enteral nutrition formula administered to burn and trauma patients per ASPEN/SCCM guidelines?

- The ASPEN/SCCM guidelines recommend that enteral nutrition formulas should be supplemented with immune-modulating additions, including:
    - Glutamine
    - Arginine
    - Antioxidants
    - Nucleic acids
    - Omega-3 fatty acids[5]
- The addition of these antioxidants can provide extra defense to the burn patient:
    - Selenium
    - Vitamin C
    - Vitamin E[5]
- The ASPEN/SCCM guidelines recommend that burn and trauma patients receive a mixture of antioxidant vitamins (mentioned before) and trace minerals (selenium, zinc and copper)[4]
- Glutamine should be included in the EN formula[5]
- Soluble fiber can be added to the formula if patient experiences diarrhea after EN is initiated, but patient must be hemodynamically stable[5]
- The ASPEN/SCCM guidelines state that serum glucose should be closely monitored, 80-110 mg/dL is an appropriate range for burn patients[5]
- The ASPEN/SCCM guidelines also suggest the addition of probiotics, to reduce chance of infection[5]
- Evidence from research supports that the addition of these components to the EN formula will lead to increased benefits (that standard formulas cannot achieve):
    - Reduced length of stay
    - Decreased chance of infection[5]

- These benefits are possible only if an appropriate volume of EN is administered[5]
    - ASPEN/SCCM guidelines recommend that 50-65% of estimated caloric needs are met from EN feeding[5]

10. What additional micronutrients will need supplementation in burn therapy? What dosages are recommended?

- According to the Nutrition Care Manual, burn patients generally have higher micronutrient needs because:
    - Hypermetabolic state
    - Losing micronutrients through wounds
    - Using micronutrients to heal wounds and burns
    - Increased immune function needs[4]
- There is not one definitive guideline for micronutrient needs of burn patients[4]
    - According to the Nutrition Care Manual, Shriners Burn Hospital has a protocol for micronutrient supplementation that is used for patients over 3 years old
        - 1 multivitamin once per day[4]
        - 500 mg of ascorbic acid (Vitamin C) twice per day[4]
            - Vitamin C levels decrease after burn[6]
            - Decreases oxidative stress of burn patients, antioxidant[6]
            - Wound healing, role in collagen synthesis and cross-linking[6]
        - 10,000 IU Vitamin A once per day[4]
            - Decreases oxidative stress, antioxidant[6]
            - Role in epithelial growth, wound healing[6]
        - 220 mg zinc sulfate once per day[4]
            - Important for burn recovery[6]
            - Antioxidant role, decreased chance of infection[6]
            - Oxygen co-factor, helps oxygenate tissues (faster recovery)[6]
            - Role in DNA replication and protein synthesis (wound healing)[6]
- Magnesium
    - Nutrition Care Manual does not have a defined dosage of Magnesium for burn patients
    - Greater cellular energy needs, intracellular energy metabolism[4]
- Copper
    - Nutrition Care Manual does not have a defined dosage of Copper for burn patients
    - Supplement early x 8-14 days[6]
    - Decreased levels after a burn[6]
    - Needed for burn recovery[6]
    - Wound healing via role in collagen synthesis[6]
    - Needed to increase immunity and decrease chance of infection[6]
- Manganese
    - Nutrition Care Manual does not have a defined dosage of Manganese for burn patients

    - One of many micronutrients that can become deficient after burn, supplement to reach normal levels[7]
    - Needed for wound healing, in combination with other micronutrients[7]
- Arginine
    - Controversial, 0.5 g/kg bw infused via IV (30 g max)[8]
    - Could have immunity benefits[4]
    - Could help with trauma recovery[4]
    - Could be harmful to septic patients[4]
- Glutamine
    - Patients with >20-30% TBSA burned: 0.3-0.5 g/kg x 14-21 days post burn[6]
    - Reduces oxidative stress[6]
    - Increases immune function because it is a glutathione precursor[6]

Nutrition Assessment

11. Using Mr. Angelo's height and admit weight, calculate IBW%, BMI, and BSA.

Height: 72" (182.88 cm)
Weight: 156.97 lbs (71.2 kg)

BMI: 21.3 & normal
IBW: 106 lb + 6(12) = 178 lbs
%IBW: 156.97/178 lbs x 100 = 88.2% & mild malnutrition
BSA[9]: 1.92 m^2

12. Energy requirements can be estimated using a variety of equations. The Xie and Zawacki equations are frequently used. Estimate Mr. Angelo's energy needs using these equations. How many kcal/kg does he require based on these equations?

Xie[10] = (1000 x BSA) + (25 x TBSA)
(1000 x 1.92) + (25 x 40) = 1920 + 1000 = 2920 kcal/day
Kcal/kg = 2920 kcal / 71.2 kg = 41 kcal/kg

Zawacki[10] = 1440 x BSA
1440 x 1.92 = 2765 kcal/day
Kcal/kg = 2765 kcal / 71.2 kg = 38.8 kcal/kg

13. Determine Mr. Angelo's protein requirements. Provide the rationale for your estimate.

Protein Requirements: Burns 2.0-2.2 g/kg
71.2 kg x 2.0 g/kg = 142.4 g
71.2 kg x 2.2 g/kg = 156.64 g
= 142-157 g/day

Mr. Angelo has experienced a level 2 trauma and has burns covering 40% of his body. In order to heal properly from his injuries, he has increased protein needs. Burn pt.'s should consume 20-25% of their daily kcals from protein[1]. Based upon the calorie needs calculated using the Xie & Zawacki equations, and the protein requirements calculated above, the pt. will be receiving ~20-22% of kcals from protein.

15. This patient is receiving the medication propofol. Using the information that you listed in #6, what changes will you make to your nutritional regimen and how will you assess tolerance to this medication?

Propofol[3]
Anesthesia/Sedative
Parenteral (IV) **Only** (ICU sedation for intubated and/or mechanically ventilated adults)
Diet: Use >72 hr. Low fat diet/enteral feeding/TPN
Nutr: IV infusion rate of 30 mL/hr (300 mg/hr) provides 790 cal fat/day.
Monitor: TG, lipid panel, serum turbidity, vital signs

Glutamine is initially at 20 mL/hr due to Propofol administration, which provides an additional 790 kcal fat/day. Therefore, the pt. needs to be on a lower energy/fat EN prescription. After >72 hours, pt. Glutamine prescription can be increased to 60 mL/hr, as Propofol will be discontinued.

Nutrition Diagnosis

16. Identify at least 2 of the most pertinent nutrition problems and the corresponding nutrition diagnosis.

- **NI-3.1 Inadequate fluid intake**
- **NI-5.1 Increased energy needs** (protein & calories)

17. Write your PES statement for each nutrition problem.

- **NI-5.1 Increased energy needs** (protein & calories) R/T wound healing & NPO AEB burns on 40% of TBSA, malnutrition noted as an active problem in MD notes, and protein-calorie malnutrition noted in assessment/plan.
- **NI-3.1 Inadequate fluid intake** R/T burns on 40% of TBSA and initial resuscitation fluid needs of 610 mL/hr x first 8 hours, then 305 mL/hr x 16 hrs for burn recovery AEB ↑ chloride (113 mEq/L), ↑ hemoglobin (18.7 g/dL), ↑ hematocrit (54.4%), ↑ creatinine serum (1.26 mg/dL) oliguria, poor skin turgor, tachycardia, MD note of hypotension overnight, yellow color of urine, and dry mucous membranes.

Nutrition Intervention

18. The patient is receiving enteral feeding using Impact with Glutamine @ 60 mL/hr. Determine the energy and protein provided by this prescription. Provide guidelines to meet the patient's calculated needs using the Xie equation.

Energy needs: Xie equation: Caloric value (kcal/day) = (1000 x BSA (m^2)) + (25 x % TBSA)
(1,000 x 1.922 m^2) + (25 x 40) = 1,920 + 1,000 = **2,920 kcal/day**
Protein needs: Burns 2.0-2.2 g/kg x 71.2 kg = **142-157 g**

Impact Glutamine: Calories: 1.3 kcal/mL; Free water: 810 mL; Protein: 78 g; CHO 148 g; Fat: 43.25 g

Continuous Feeding
Total Volume: 22 hr x 60 mL/hr = 1,320 mL
Total Calories: 1.3 kcal/mL x 1,320 mL = 1,716 kcal
Calories per kg: 1716 kcal / 71.2 kg = 24 kcal/kg
Protein g: 78 g x 1.716 L = 134 g
Protein per kg: 134 g / 71.2 kg = 1.9 g/kg
Free Water: 810 g x 1.716 L = 1390 g
Additional Water: 1,716 g - 1390 g = 326 g
Water Flush: 6 flushes (every 4 hours) = 326 g / 6 = 54 g per flush

19. By using the information on the intake/output record, determine the energy and protein provided during this time period. Compare the energy and protein provided by the enteral feeding to your estimation of Mr. Angelo's needs.

- Daily total enteral feeding was 565 kcals
- 136 kcal of that from protein, and 34 g of protein
- Estimated energy needs are 2,920 kcal/day
- Estimated protein needs 134 g/day
- The total enteral feeding that Mr. Angelo received is significantly lower than what his actual needs are.

20. One of the residents on the medical team asks you if he should stop the enteral feeding because the patient's blood pressure has been unstable. What recommendations can you make to the patient's critical care team regarding tube feeding and hemodynamic status?

- A recommendation is made to not start the patient on tube feed until he is hemodynamically stable[1]
- In hemodynamic instability, the patient is unable to tolerate enteral feeding[1]
- Until complete resuscitation and hemodynamic stability has been achieved the patient should not receive nutrition support because they are fighting for their life and nutrition is not of high priority, saving their life is[1]
- When the patient becomes hemodynamically stable, a recommendation is given to initiate enteral nutrition as tolerated by the patient[1]

Nutrition Monitoring and Evaluation

22. What is the best method to assess caloric needs in critically ill patients? What are the factors that need to be considered before the test is ordered?

- The best method to use when assessing caloric needs in critically ill patients is based on the patient's EE (energy expenditure).[11]
- An indirect calorimetry test used to measure the inspired and expired gas flow is the best determinate when finding energy needs in a critically ill patient.[11]
- This test allows one to determine energy requirements and response to nutrition over time.[11]
- The calculation of energy expenditure allows determination of nutritional requirements.[11]
- This method for obtaining energy needs is important for difficult patients groups including burn patients because it allows one to find the precise energy requirements the patient is exerting as he/she heals.[11]

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Nutrition Care Progress Note		*DATE & TIME*	**11/17/16 at 8:00am**
Assessment	**Diagnosis**	**Intervention**	**Monitoring & Evaluation**
Narrative Mr. Angelo is a 65 y/o Caucasian, English speaking male admitted to level 2 trauma with burns on 40% TBSA after a trailer fire.The patient is unclear about the details of the accident. Active problems include respiratory failure, acute pain, oliguria, acute kidney injury & malnutrition. Ruptured blisters, devitalized skin, decreased ROM in affected areas. Past Hx of diabetes, GERD, & HTN. Pt. arrived alert and cooperative with mild distress, now intubated and sedated. Recent job loss, unemployed, lives alone. Alcohol use: 2-3 beers daily, and a case on Sat and Sun. Tobacco use: Smokes 1 PPD for >30 years **Anthropometric** Height: 72" (182.88 cm) Weight: 156.97 lbs (71.2 kg) BMI: 21.3 & normal IBW: 106 lb + 6(12) = 178 lbs %IBW: 156.97/178 lbs x 100 = 88.2% & mild malnutrition BSA: 1.92 m^2 Stable weight over 6 months	**NI-5.1 Increased energy needs** (protein & calories) R/T wound healing & NPO AEB burns on 40% of TBSA, malnutrition noted as an active problem in MD notes, and protein-calorie malnutrition noted in assessment/plan. **NI-3.1 Inadequate fluid intake** R/T burns on 40% of TBSA and initial resuscitation fluid needs of 610 mL/hr x first 8 hours, then 305 mL/hr x 16 hrs for burn recovery AEB ↑ chloride (113 mEq/L), ↑ hemoglobin (18.7 g/dL), ↑ hematocrit (54.4%), oliguria, poor skin turgor, tachycardia, MD note of hypotension overnight, yellow color of urine, and dry mucous membranes.	**ND-2.2.2 Enteral Nutrition Concentration** Goal: To increase nutrition from EN (using NG tube) from Impact Glutamine @ 20 mL/hr → 60 mL/hr to reach goal calorie & protein needs. Continuous Feeding Goal Rate: 60 mL/hr Total Volume: 22 hr x 60 mL/hr = 1,320 mL Total Calories: 1.3 kcal/mL x 1,320 mL = 1,716 kcal Calories per kg: 1716 kcal / 71.2 kg = 24 kcal/kg Protein g: 78 g x 1.716 L = 134 g Protein per kg: 134 g / 71.2 kg = 1.9 g/kg Free Water: 810 g x 1.716 L = 1390 g Additional Water: 1,716 g - 1390 g = 326 g Water Flush: 6 flushes (every 4 hours) = 326 g / 6 = 54 g per flush **ND-2.2.7 IV fluids;** after initial 24 hour resuscitation of fluids decrease and level the hourly rate to promote	**Monitor** EN tolerance **Evaluate:** For refeeding syndrome, checking for pt. tolerance (diarrhea, N/V) & lab decreased values of K, P, and Mg. **Monitor** protein-calorie malnutrition status. **Evaluate:** Lab values indicative of protein malnutrition: PAB, Alb, transferrin, and RBP (best indicator) & wound healing. **Monitor** Hydration Status **Evaluate:** Balanced I/Os, electrolytes WNL, increase fluids PRN, improved wound healing/medical support, improved skin turgor, lessening edema, urine color. **Monitor** Any food medication interactions **Evaluate:** no s/s GI dysfunction (diarrhea, taste change, nausea)

Biochemical **High values include:** Potassium(5.9 Meq/L), Chloride(113 mEq/L), Creatinine Serum(1.26 mg/dL), Glucose(211 mg/dL), AST(44), C-reactive protein(12 mg/dL), WBC(18.1x $10^3/mm^3$), Hgb(18.7 g/dL), Hct(54.4%) **Low values include:** Carbon Dioxide(20 mEq/L), Magnesium(1.5 mg/dL), Calcium(6.9 mg/dL), Protein(4.7 g/dL), Albumin(2.1 g/dL), Prealbumin(12 mg/dL), pH(7.31), HCO_3^-(19.6 mEq/L) **Clinical** **Current dx:** 40% total body surface area burned, admitted to surgical intensive care unit, nasopharyngolaryngoscopy and evaluation by ENT found laryngeal edema, soot in vocal cords bilaterally, planned: bronchoscopy by burn team **Medical and surgical hx:** Diabetes, HTN, GERD, cholecystectomy 30 years ago **Family hx:** Father: HTN, mother: anxiety disorder, HTN, brother: healthy **Medications:** none at home, scheduled and PRN meds: Ascorbic acid 500 mg q 12 hrs Chlorhexidine 0.12% oral solution 15 mL q 12 hrs Famotidine tablet 20 mg q 12 hrs Heparin injection 5,000 units q 8 hrs Insulin regular injection q 6 hrs Multivitamin tablet 1 Tab daily		stability of hydration, wound healing, include water flushed, . **Goal:** Alter initial fluid resuscitation t**o** 2-3.1mL/kg/hr; 168mL/hr 2(71.2)=142.4mL(24)=3417.6 3.1(71.2)=220.72mL(24)=5297.28 (3417.6+5297.28)/2=4357.44mL Average water needed=4357.44mL 4357.44-326(water flushes) =4031.44 4031.44/24hrs=167.97=168mL/hr	**Monitor** pertinent labs and urine concentration **Evaluate** labs WNL **Monitor** Watch for weight stability/maintenance with biweekly ins **Evaluate** loss/gain of no more than +/- 2 lb/wk from initial weight upon admittance

Zinc sulfate 220 mg daily Methadone 5 mg every 8 hrs Oxandrolone 10 mg q 12 hrs Senna tablet 8.6 mg daily Docusate oral liquid 100 mg q 12 hrs Silver sulfadiazine 1% cream topical application daily Acetaminophen 650 mg oral q 4 hrs PRN Midazolam HCl (Versed) 100 mg in sodium chloride 0.9% 100 mL IV infusion, initiate infusion at 1 mg/hr Hydromorphone (Dilaudid) injection 0.5-1 mg, intravenous q 3 hrs PRN Fentanyl (Sublimaze) injection 50-100 mcg intravenous q 15 min PRN Propofol (Diprivan) 10 mg/mL premix infusion, start at 25 mcg/kg/min intravenous continuous <72 hrs Thiamin 100 mg x 3 days Folate 1 mg x 3 days NKDA **Dietary** No hx of specific diet NPO with EN Impact with Glutamine @ 20 mL/hr, advance to 60 mL/hr after D/C of Propofol (requires a low fat diet/EN). No specific diet, monitors blood glucose levels Stable wt. past 6 months NKA **Energy Needs** Xie: 2920 kcal/day			

Kcal/kg = 41 kcal/kg *Used to estimate TF needs Zawacki: 2765 kcal/day Kcal/kg = 38.8 kcal/kg NPO with EN: Impact Glutamine @ 20 mL/hr → 60 mL/hr (through NG tube) **Protein Needs** Burns: 2.0-2.2 g/kg = 142-157 g/day **Fluid Needs** Fluid resuscitation via Parkland formula: LR @ 610 mL/hr x first 8 hrs → 305 mL/hr x 16 hrs **NFPA** **General appearance:** intubated, sedated **Skin:** beefy red to pale color, poor turgor, skin condition: weeping, sloughing, blisters, necrosis **Vital Signs (vital signs every hour, I/O every hour):** Temp: 100 → 100.2 F BP: 140/93 → 87/59 mmHg RR: 22 → 18 Pulse: 120 → 104 bpm O_2 Sat = 98% → 100% NG tube to intermittent suction **HEENT** PERRLA Dry, blistering mucous membranes Non-rebreather mask in place (oral care provided) **Lungs** Clear to auscultation bilaterally **Heart** Tachycardia Regular rhythm			

S1, S2 normal No murmur **Abdomen:** Soft non-tender Partial thickness and 1st degree burns **Male genitalia:** Abnormal findings, blistered scrotum and head of penis **G.I.** Abdominal distension NG tube to low intermittent suction Normal bowel-sounds **Burns** 40% TBSA Entire face 1st degree burns: near umbilicus 2nd degree burns: covering most of upper extremities & back Full thickness burns: bilateral lower extremities Blistering of penis/scrotum *Receiving daily burn care and dressing changes			
	Signature & Credential	Anna Schlauch, Kara Meyer, Erica Hess, Paige Macauley	