

## **Non-Complex Medical Case**

### **Severely Malnourished Cerebral Palsy Pediatric Case**

#### **Summary:**

15 yo M with cerebral palsy seen in ED with chronic lower extremity weakness, FTT, abdominal pain and constipation with large stool burden on exam and abdominal x-ray, admitted for disimpaction. Patient is nonverbal and has a past history of being able to ambulate with walker but currently wheelchair bound. When the patient was visited multiple times by nutrition during admission no caretaker was present at bedside. Social work spoke with mother and found out that she cannot meet the needs of taking care of her son due to lack of support. Mother will be moving to Broward but would like her son to continue his medical treatment at facility. Department of Children and Family investigated this case and the child was placed in foster care.

When performing the nutrition focused physical exam the patient displayed prominent temporal wasting, knee bone prominent, depression on inner thighs, calf with no muscle definition and MUAC of 18 cm which indicates severe malnutrition. Since last seen by RD on 11/2018 patient has lost 1.8 kg or 6% UBW and reported that patient was able to feed self at admission. A calorie count was initiated and patient started on nasogastric enteral feedings of Pediasure 1.0. PO intake was not initiated at start of care due to lack of energy to feed self efficiently. Labs were drawn to check for refeeding syndrome. Lactulose and Golytely was provided to the patient to loosen stools. Patient tolerated the feeds well and goal rate was able

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to be reached. The patient began eating orally and provided with double portions and enteral feeds to optimize nutrition while admitted to the hospital.

While in the hospital, patient was able to gain weight (4 kg during LOS) and energy daily. NG tube was discontinued on 3/15 as patient had adequate PO intake. Patient became progressively more interactive with staff, spoke in few sentences, was able to eat and drink by himself, and able to walk a few feet with assistance. Foster home placement was found on 3/20/19 and patient was discharged with foster mom.

## **Nutrition Care Process:**

### **Pediatric Nutrition Assessment**

**Current Weight:** 30 kg, MUAC: 19 cm L ARM

**Admitting Diagnosis:** Weakness/diarrhea

**Nutrition Referral Source/Reason:** Consult

### **Significant History:**

(Per EMR) 15 yo boy with PMH ex- 24 week, history of IVH that developed into hydrocephalus s/p VP shunt as a neonate that has been nonfunctional since 2011, cerebral palsy, chronic lung disease, G tube dependent s/p Nissen as a neonate as well but off G tube since 8 months, with FTT who presented to the ER with worsening chronic lower extremity weakness, failure to thrive, abdominal pain and constipation with large stool burden on exam and abdominal x-ray, admitted for disimpaction.

### **Nutrition:**

**(3/20/19):** Pt seen this morning for follow up to ensure adequate PO intake. During breakfast RN reported that she did see pt drink sips of juice, Pediasure, and water however, she was unsure if had eaten breakfast. At lunch time pt observed eating chicken noodle soup and meat loaf with very good appetite. Calorie count started and left at bedside. Pt pending placement in foster care/DCF involved. Continue to encourage PO intake. Ultimate goal is achieve a minimum goal weight gain (140 g/d). Discontinue zinc after 2 weeks of administration. Encourage movement/ ambulation with help from PT if feasible.

**(3/18/19):** pt seen this morning for follow up to ensure adequate PO intake. During breakfast RN reported that she did see pt drink sips of juice, Pediasure, and water however, she was

unsure if he had eaten breakfast. At lunch time pt observed eating chicken noodle soup and meat loaf with very good appetite. Calorie count started and left at bedside. Pt pending placement in foster care / DCF involved. Continue to encourage PO intake. Ultimate goal is to achieve a minimum goal weight of 32.5 kg which is ideal as per CP growth chart for BMI of 16 kg/m<sup>2</sup>. Aim for 1 kg/week of weight gain (140 g/d). If unable to meet goal by PO alone may require nocturnal feeds of Pediasure.

**(3/14/19):** Pt seen this morning with no family at bedside. Pt currently receiving goal rate of Pediasure @ 60 mL/hr. Pt was more responsive. MUAC taken and remains at 18 cm. Per RN report pt is eating unassisted. Pt consumed entire tray. Will continue tube feeds to optimize nutritional intake. Tube feed will be discontinued at discharge and recommended regular diet with Pediasure Supplementation TID via PO.

**(3/12/19):** Pt seen this afternoon with no family at bedside. Length of pt taken today and he is 142 cm. Per CP estimated needs based on height pt should receive 50-70 kcal/kg (10-13.9 kcal/cm) vs 62 kcal/kg (BMR x 1.5SF). Pt currently receiving Pediasure @35 mL/hr; providing 30 kcal/kg. Pt with loose stools was recently on Golytely. Advance to 45 mL/hr by tonight (6pm). Tomorrow advance as tolerated to provide @final goal of 60 mL/hr (51 kcal/kg). If bolus feeds preferred pt will need Pediasure 1.0 can (240 mL) q 4 hours or Pediasure 1.5 (240 mL) q 6 hours. Nutrition plan discussed with team.

**(3/11/19):** Pt seen this morning for follow up with no family at bedside. Pediasure feeds were running @35 mL/hr up until early morning but currently on hold 2/2 pending NGT xray. Pt with a 1.3 kg wt gain since last seen, when medically feasible resume feeds @ 35 mL/hr. Goal is to provide feeds @ 60 mL/hr to provide 52 kcal/kg and 1.6 g Pro/kg. Please provide PO diet if medically feasible/consider SLP consult.

**(3/08/19):** Pt seen s/p consult received for weight and inadequate weight gain, visited twice, was laying in bed, no family at bedside. On physical assessment pt with signs of severe malnutrition including and not limited to prominent temporal wasting, knee bone prominent, depression on inner thighs, and calf with no muscle definition. MUAC of 18 cm which indicates severe malnutrition. Since last seen by RD in 11/2018 pt has lost 1.8 kg or 6% UBW. As per previous RD note in November pt was able to take PO with little to no assistance and was not receiving tube feedings. As per conversation with RN pt appears to be wheelchair bound at this time. Recommendation at this time is to continue resume regular diet, initiate calorie count, and initiate tube feeds of Pediasure 1.0 @ 25 mL/hr. Tube feeds will provide 23 kcal/kg to initiate and should provide a total of 55 kcal/kg at goal. Check for signs of refeeding. Please weigh pt daily and retake height when medically feasible.

### **Calorie Count:**

#### **Calorie count 3/15/19 Breakfast:**

2 pancakes , oatmeal, ½ yogurt ( about 11kcal/kg)

#### **Calorie count 3/18/19 Breakfast:**

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2 pancakes, oatmeal, 1/2 pediasure 1.5, 2 fl oz juice, 7 bacon strips ( ~24 kcal/kg )

**Calorie count 3/19/19 Breakfast:**

2 pancakes, 1 syrup, ¼ Pediasure 1.5, 1 oatmeal, 2 juices ( 19 kcal/kg)

**Current Nutrition Regimen:** High protein, high calorie, double portions with Pediasure 1.5 at meals

**Pertinent Labs:** Reviewed

**Pertinent Meds:** Zinc sulfate, vitamin D, Calcium carbonate MVI

**Skin Issues:** no pressure ulcers

**Nutrition Acuity Level:** High

**Current Oral Intake Status:** good-pt observed at lunch time

**Food Allergies/Intolerances:** NKA

**Meal Time Behavior:** can eat without assistance

**Bowel Function:** 4 stools w/in 24hr

**NUTRITIONAL ANTHROPOMETRICS**

**15y 1m (181 months), male** –normal developed children

	Value	Imperial	%ile	Z-score	50%ile
Weight (kg)	30	66.1 lb	0%	-4.38	56.7
Stature (cm)	142	55.9 in	0%	-3.27	170
BMI-for-age	14.9		0%	-2.95	19.9

**180.7 months, male**

	Value	%ile	Z-score	50%ile
Arm circumference (cm)	19	0%	-3.27	28.57

**Estimated Nutrition Needs (3/08):**

**Energy:** based on needs for cerebral palsy: 10-13.9 kcal/cm: kcal= 47-66 kcal/kg (56kcal/kg average)

**Protein:** 1.5-2g/kg weight

**Fluid Maintenance Needs:** 1700 ml or as per MD notes

**NUTRITION DIAGNOSIS:**

1. Severe chronic malnutrition and suboptimal growth related to developmental delay associated with CP with suspected inadequate PO intake as evidence by pt with MUAC of 19 cm and history of weight loss of 6% within 4 months.

**RECOMMENDATIONS / INTERVENTIONS:**

1. Encourage PO intake. Mix Pediasure with oatmeal in the morning.
2. Monitor tolerance of formula and PO intake.
3. Daily wt checks/ MUAC 1 x per week
4. Plans discussed with medical team.
5. Encourage mobility with help from PT.

**NUTRITIONAL GOALS/MONITORING:**

1. Meet nutrient requirements.
2. Monitor PO intake.
3. Promote gradual weight and linear growth.
4. Monitor labs.
5. Monitor weight and height.
6. Monitor I/O and stool output.

**Nutrition Follow Up:** F/U 2 x week

## **Culturally Relevant Case**

### **Newly Diagnosed Diabetic African-American Female**

#### **Summary:**

A 36 yo F was seen in the ED complaining of weakness, fatigue and muscle aches which she attributed to the flu. While at the ED the patient was found to have a blood glucose level of 790 and not in diabetic ketoacidosis. The patient is a newly diagnosed diabetic with a BMI of 35.1. She has a PMH of legal blindness, pseudotumor cerebri w/ VP shunt, legg calve parth disease s/p hip replacements, MVA (s/p liver and mesenteric lac repair, external iliac ligation, right leg fasciotomy, rib fractures) and preeclampsia who presents with a 4-day history of chills, myalgias, throat pain and weakness. On April 4, patient began noticing she was having body aches, sore throat, chills and subjective fever. While admitted to the facility her blood glucose ranged from 316-522.

Nutrition was consulted for an education on a new diabetes diagnosis. The patient was alert, oriented and alone at bedside. The patient reports that consuming an energy drink is the reason for her blood glucose being high. The patient described that she goes through periods of low energy and will consume ginger ale, juices and energy drinks during times of low blood glucose. The patient was provided with an education on "Managing Your Diabetes Using the Plate Method." The patient was very eager to understand more. The patient was educated on avoidance of sugar sweetened beverages, juices, and energy drinks. She displayed understanding and stated that she will no longer consume those items. We discussed the food items that she has preferences for, who cooks at home and diabetic friendly preparation

methods. The nurse reported prior to our education the patient had a significant other go and deliver McDonalds. The patient was discharged the next morning with blood glucose of 365.

## Nutrition Assessment

**Admitting Diagnosis:** Weakness

**Current Diet Order / Nutrition Support:** Diabetic/ Consistent Carb 1800 Diet, Regular Consistency

**Food Allergies/Intolerances:** NKA

**Nutrition Referral Source/Reason:** Trigger-Newly diagnosed diabetic

**Significant Medical History: (Per EMR)** 36 yo F with PMH of legal blindness, pseudotumor cerebri w/ VP shunt, legg calve parth disease s/p 2 hip replacements, MVA (s/p liver and mesenteric lac repair, external iliac ligation, r leg fasciotomy, rib fractures) and preeclampsia who presents with a 4-day history of chills, myalgias, throat pain and weakness. On April 4, pt began noticing she was having body aches, sore throat, chills and subjective fever. The next morning she woke up with excessive thirst, but was urinating normally without pain, blood or frothy appearance. She continued to have weakness, fatigue and muscle aches that she attributed to the flu, and presented to the ED. In ED pt found to have blood glucose level of 790, not in DKA.

**Nutrition:** Pt appeared alert and oriented in bed with no family at bedside. Pt reported fair appetite and had an episode of loose watery stools on Thursday (4/4/19) which she attributes to the flu and consuming energy drinks due to lack of energy. Pt reports consuming ginger ale, juices, and energy drinks frequently and attributes her admission as a result of beverage choices. Provided pt with education: "Manage Your Diabetes Using the Plate Method". Pt displayed to be understanding, and interested in the material and asked many questions, future education will be needed. Pt stated that they will no longer consume energy drinks or sweetened beverages. Per nurse report pt significant other brought McDonalds for breakfast.

**Height:** 158 cm                      **Current Weight:** 87.73 kg Per EMR Actual 4/8/19                      **BMI:** 35.1  
– obese

**IBW:** 52.3 kg                              **%IBW:** 167.7 % Obesity                              **Adj. BW:** 66.47 kg

**Usual Body Weight:** 86.36 kg

**Weight Changes:** NA

**Current Oral Intake Status:** Fair per pt, good per EMR

**Pertinent Labs:** Glucose (H): 365, BUN (H): 23, Creat (H): 1.20, Phos (L): 247, Fe (L): 21, POC Gluc (H): 316-522

**Pertinent Meds/Supplements (vitamins, minerals, herbal, and nutritional):** Heparin, Lantus, Lispro, HumaLOG, Glucagon (PRN), sodium chloride

**Skin Issues:** Dry, intact

**Nutrition Acuity Level:** High

**Estimated Nutrition Needs:**

**Calories (Kcal):** 22-25 kcal/kg IBW = 1496 - 1700 kcal/day

**Protein (gm):** 1.5- 2.0 gm protein/kg IBW= 79 – 105 g pro/day

**Fluid (mL):** 30-35 mL/kcal = 2632- 3070 mL/day or as per MD

**NUTRITION DIAGNOSIS (problem, etiology, signs/symptoms):**

1. **Altered nutrition related laboratory values related to excessive intake of sugar-sweetened beverages, energy drinks, poor food choices as evidence by pt report or intake of carbohydrate containing foods and Gluc: 790 upon admittance and currently Gluc: 365 with 24 h POC Glucose ranging from 316-522 - RESOLVING**
2. **Knowledge deficit related to undesirable food choices as evidenced by described eating habits - RESOLVING**

**RECOMMENDATION(S)/INTERVENTION(S):**

**Nutrition prescription/recommendation:** Maintain Diabetic Consistent Carb 1800 diet

**Additional Recommendation/Intervention/Goal:**

- Educated pt on diabetic diet, providing “Managing Your Diabetes Using the Plate Method”
- Provide further education on diabetic diet and management

**MONITORING AND EVALUATION:**

1. Monitor blood glucose levels
2. Monitor calorie and protein intake
3. Skin condition

**Nutrition Reassessment Comment:** FU 2x/week

# **Complex Case-Study**

## **Traumatic Brain Injury**

## Literature Review

### Introduction:

The central nervous system (CNS) is the controller of nutrient uptake, through internal signaling mechanisms maintaining homeostasis of blood glucose and electrolytes as well as triggering the consciousness of hunger and thirst. If the CNS is injured, these normal physiologic functions become disordered. Acute brain injury through trauma relays immediate metabolic effects for nutritional intake. Traumatic brain injury (TBI) is a major cause of death and disability in the United States. From 2006 to 2014, TBI-related hospital visits, admissions and deaths increased by 53%.<sup>1</sup>

The management of TBI in the intensive care unit (ICU) setting includes a combination of both invasive and noninvasive interventions. Noninvasive non-operative therapies include hyperosmolar therapies, use of anesthetics to reduce cerebral metabolic rate. Nutritional interventions in TBI must be implemented within 48 hours post injury and due to the physiological demands of TBI, hyper metabolism, catabolism and nitrogen losses accompany this disease state. The Brain Trauma Foundation guidelines aims for estimated calorie needs between 120% to 160% of estimated basal needs (determined by the Harris-Benedict Equation) and 1.5 to 2 gm Protein/kg/day. Careful attention must be made to monitor for signs of overfeeding such as elevated respiratory quotient and hyperglycemia.

Chiang et al., examines the effects of early enteral nutrition (EN) support on survival rate, Glasgow Coma Scale (GCS) score, and clinical outcomes of sTBI patients. In this multi-center cohort study data was collected from 2002-2010 on 145 EN patients receiving appropriate calories and nutrients within 48 hours post-trauma and compared with 152 non EN

controls matched for gender, age, body weight, initial GCS score, and operative status. The EN patients had a greater survival rate and GCS score on the 7<sup>th</sup> day in the ICU, and better outcomes 1 month post-injury.<sup>2</sup> The GCS score in the first 7 ICU days was significantly improved among EN patients with GCS scores of 6-8 compared with EN patients with scores of 4-5 and non EN patients with GCS scores of 6-8 ( $p < 0.001$ ).<sup>2</sup> These findings demonstrate that EN initiation within 48 hours post-injury is associated with better survival, GCS recovery, and outcomes among sTBI patients.

Early initiation is crucial for outcomes of the severe TBI (sTBI) patients. Härtl et al, examined the effect of timing and quantity of nutritional support on early mortality in sTBI patients in a prospective cohort study. 797 patients were analyzed in this study which recruited its sample from several trauma centers in New York State in part of a TBI quality improvement program. Two-week mortality based on nutrition status was significantly higher among patients never fed within 5 ( $p = 0.0008$ ) or 7 ( $p < 0.0001$ ) days.<sup>3</sup> The results of this analysis showed that any nutrition within the first 5 days after TBI is associated with a reduced mortality rate. The patients who were not fed within 5 and 7 days after TBI had a 2- and 4- fold increase likelihood of death, respectively. Every 10 kcal/kg decrease in caloric intake was associated with a 30-40% increase in mortality rates ( $p < 0.0001$ ).<sup>3</sup> The amount of nutrition is related to mortality in sTBI.

Haltmeir et al., assessed the caloric and protein intake and the factors that affect the intake over time in critically ill trauma patients. 100 trauma patients were sampled in a prospective observational study. The caloric and protein intake significantly increase over time in TBI patients, but the median intake did not meet the median calculated requirements at any time ( $p < 0.001$ ).<sup>4</sup>

There has been an increased interest in using immunonutrition as a mode of modulating the inflammatory response to injury or infection with the aim of improving clinical outcomes. Rai et al., evaluated the effect of an immunonutrition EN formula and the effects on biomarkers (cytokines, acute phase serum proteins and antioxidants) in TBI patients. Through performing a prospective randomized controlled trial patients were followed for one week receiving an immunomodulating formula versus a high energy and protein formula. The patients in the immunomodulating formula group showed a significant reduction of IL-6 at day 5 ( $p < 0.001$ ) with a concurrent rise in glutathione levels ( $p = 0.049$ ).<sup>5</sup> This study indicates that there is a potential for immunonutrition reducing cytokines and increasing antioxidant levels in TBI patients.

**Conclusion:**

Numerous considerations are important when evaluating nutrition support in a neurologically injured patient. Early initiation post traumatic incident is crucial for morbidity and mortality of the TBI patient. Most TBI patients have an increased need in comparison to other patients but the median calculated requirements are rarely met at any time in the patient's care. Specialty formulas are typically used for TBI patients due to ingredients containing anti-inflammatory properties. Use of these immunonutrition formulas demonstrated to reduce inflammatory biomarkers and increase antioxidant levels.

Strengths of the studies were that they were able to analyze large sample sizes. Limitations of the studies were that they were mostly prospective, although a randomized control trial could be unethical if performed with this population. Majority of the participants were male, due to the nature of males having a higher incidence of these injuries, so further

research is needed with the female population. Rai et al, was able to examine the effect on biomarkers, but further research should investigate the role that these formulas have, if any, on the patient outcomes and length of stay.

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## Final Paper

### Introduction:

A 32 year old Hispanic male was involved in a motorcycle accident on South Beach. The patient presents with major trauma and Slingshot vehicle, hit, flown 20-30 ft, loss of cognition, with a drunk driver who previously hit and killed two others. The patient was combative and required sedation with 400 mg of ketamine on board. The patient was un-helmeted, and brought to Ryder Trauma Center where a CT scan of the brain demonstrated diffuse subarachnoid hemorrhage of traumatic nature. The patient initially arrived with a Glasgow Coma Score of 9, combative and saturating 98% on restlessness and agitation. Patient was intubated for airway protection in resus bay. CT brain 4 hours following initial imaging revealed worsening epidural hemorrhage and patient was taken to OR for emergent craniotomy. Post OP patient Glasgow Coma Score decreased to 3T. The medical team placed a nutrition consult for the patient to assess nutritional needs and establish enteral nutrition goal rate.

### Pathophysiology:

A moderate or severe brain injury may cause the brain to hit against the intracranial portion of the skull, with or without penetration (from either skull fragments or foreign objects). The location and severity of impact, as well as the depth and amount of brain penetration, likely have a significant impact on the patient's outcome. Any penetration of the brain's delicate structure can tear apart neurons and shear their axons to disrupt neuronal circuitry as well as damage the vasculature, allowing movement of blood and leukocytes into the normally immune privileged brain.<sup>1</sup> This results in an immediate impact on the brain by producing necrotic cell loss as well as apoptosis of the surrounding cells.<sup>1</sup> Almost

instantaneously, a local inflammatory response occurs whereby astrocytes and microglia secrete proinflammatory cytokines, such as tumor necrosis factor (TNF), interleukin-6 (IL-6), and interleukin-1 $\beta$ , into the perilesional region.<sup>2-4</sup> These proinflammatory cytokines mobilize immune and glial cells to the injury site, causing edema and further inflammation.<sup>4</sup> This phase is associated with gliosis, demyelination, and continued apoptosis.<sup>5</sup> Hypoperfusion may occur acutely after injury, likely caused by reduced blood pressure, impaired vasodilation, and elevated intracranial pressure.<sup>6-7</sup> This may later result in hyperemia, after which hypoperfusion may return and be accompanied by vasospasms.<sup>8</sup>

**NCP: Assessment(4/15)/Reassessment (4/17)**

**Significant Medical & Nutrition Related History:** (Per EMR) 32 yo M, rear ended a parked car while un-helmeted in a motorcycle, brought to Ryder Trauma Center where a CT scan of the brain demonstrated diffuse subarachnoid hemorrhage of traumatic nature. Per reports, patient initially arrived with a GCS 9, combative and saturating 98% on RA. Subsequently, decision was made to intubate patient for airway protection in resus bay. Repeat CT brain 4 hours following initial imaging revealed worsening epidural hemorrhage and patient was taken to the OR for emergent craniotomy. **(4/16)** Extubated in stable condition. Per SLP: **(4/16)** Reduced mouth opening to accept spoon. No signs of aspiration. Pt refused trial of solids and agreed to puree diet. REC: Puree diet, Upgrade as tolerated.

**Nutrition: (4/15)** Pt seen in the room sleeping with family at bedside. OGT placed for nutrition support. Pt currently intubated. No reported BM. Abrasion present on the left knee.

**(4/17):** Pt seen in room sleeping with family and friend at bedside. Per family no reported BM since 4/14. Pt reported to family that he does not want solid foods due to pain in esophagus and neck brace and does have an appetite. The patient was requesting mango and mamey from family. Pt could benefit from nutritional supplement; Ensure due to increased needs for healing. Abrasion on left knee. OGT removed 4/15. GCS 14. Pt

**Anthropometric Measurements:**

**Height:** 185.0 cm

**Current Weight:** 87.0 kg

**BMI:** 25.4

**IBW:** 80.9 kg

**%IBW:** 107.5%

**Adj. BW:** NA

**Usual Body Weight:** NA

**Weight Changes:** NA

**Current Oral Intake Status:** Regular Diet, puree

**Biochemical Data:**

**Pertinent Labs:** Cl (H): 109, Creat (L): 0.55, Ca (L): 7.7, POC Gluc (H): 107-117

**Pertinent Meds/Supplements (vitamins, minerals, herbal, and nutritional):** HumaLOG

**Skin Issues:** Abrasion (deep muscle wound per EMR), no pressure injuries

**Nutrition Acuity Level:** High

**Intake/Output:** 1421/1250

**Balance:** +377 mL

**Oral Intake:** 0 mL

**Urine Output:** 1250 mL

**Stool:** 0

**Emesis:** 0

**Nutrition-Focused Physical Findings:**

N/A pt unconscious, ventilated, and in critical condition with family present

**Estimated Nutrition Needs:**

**Calories (Kcal):** 30-35 kcal/kg CBW= 2610-3045 kcal/day; Penn State: **(4/15)** 2154 kcal/day

**Protein (gm):** 1.2-1.7 gm pro/kg CBW= 104-148 g protein/day **(4/15):** 1.4-1.7 gm pro/kg CBW= 121-148 g protein/day

**Fluid (mL):** 1 mL/kcal or as per MD

**NCP: NUTRITION DIAGNOSIS (problem, etiology, signs/symptoms):**

1. Increased nutrient needs related to increased metabolic demands as evidence by hypercatabolic disease state.
2. Swallowing difficulty related to intubation as evidence by need for alternate need for nutrition.
2. **(4/17)** Swallowing difficulty related to inflammation due to prior mechanical ventilation as evidence by pt refusal to consume trial of solids.

**NCP: RECOMMENDATION(S)/INTERVENTION(S):**

**Nutrition prescription/recommendation:**

- Pivot 1.5 Cal at 60 mL/hr ( 2160 kcal/d, 135 g Pro/d, 1093 ml free fl)
- Initiate at 30 mL/hr and advance by 20 mL/hr every 8-12 hours as tolerated until goal rate reached
- **(4/17)** When feasible recommend regular diet, mechanical soft consistency
- When feasible supplement with Ensure BID (350 kcal; 20 g Pro)

**Additional Recommendation/Intervention/:**

- Meet 80-100% of estimate kcal/protein needs

**NCP: MONITORING AND EVALUATION:**

1. Monitor tolerance to enteral feeds
2. Monitor nutrition related labs
3. Monitor skin integrity
4. Monitor weight
5. Monitor I/O's

**Conclusion:**

When managing the nutrition support for a patient post an acute traumatic brain injury, an aggressive approach should be taken to ensure that the patient's energy and protein needs are being met. These patients are going under a hyper metabolic and catabolic physiologic response and needs are elevated. Use of inflammatory-modulating nutrition support can prove to be efficacious in neurological trauma to decrease inflammation in the patient.

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