ICU FLAGLER NUTRITION PROTOCOL

As with any protocol, this protocol serves to provide evidence-based, comprehensive recommendations to guide our multidisciplinary team in patient care, with the expectation that expert practitioners will modify and customize as necessary the present protocol to meet individual patient needs. This Protocol is not intended to replace the physician's judgment; it is intended to provide guidance to the physician for the group of patients described in this Protocol.

Nutrition of critically ill patients is part of the standard of care in intensive care units (ICUs). Early initiation of nutrition is recommended in international guidelines and is a fundamental tenet of the **Enhanced Recovery After Surgery (ERAS) Protocol** (1-5).

Delivering early nutrition support therapy, primarily using the enteral route, is seen as a proactive therapeutic strategy that may reduce disease severity, diminish complications, decrease length of stay in the ICU, and favorably impact patient outcome.

Initiation of enteral nutrition (EN), however, is often difficult in ICU patients for a variety of reasons, including development of gastroparesis associated with intolerance of gastric feeding as well as multiple contraindications for starting EN.

The implementation of structured nutrition support protocols improves nutrition provision in ICU patients. **Nurse-driven protocols which define goal infusion rate, designate more rapid startups, and provide specific orders for handling gastric residual volumes, frequency of flushes, and conditions or problems under which feeding may be adjusted or stopped, have been shown to be successful in increasing the overall percentage of goal calories provided (1-5)**. The use of a feeding protocol that incorporates use of prokinetics, higher gastric residual volumes tolerance and use of the small bowel for feeding when indicated, should be considered as a strategy to optimize nutritional intake (1-5).

OBJECTIVE:

To optimize the nutritional status of patients in the Intensive Care Units (ICU) at Flagler Hospital.

SCREENING:

All patients admitted to the ICU will be screened by the registered nurse (RN), if not done previously following Flagler Hospital Policy PC-003-11, for nutrition risk using Flagler's established risk screening criteria documented in the admission assessment form within 24 hours of admission (see appendix 1-Allscritps).

If the patient is nutritionally at risk, including but not limited to ICU stay longer than 48 hours,

presence of weight loss, poor intake, nausea, vomiting or swallowing - chewing difficulties; the RN will request a nutrition consult. Nursing may also identify other nutritional areas of concern thereby triggering a nutrition consult.

The nutrition consult will be communicated to the Registered Dietitian (RD) via Allscripts and will be completed and documented by the RD in the Allscripts structured format within 24-48 hours of receipt. In addition, every patient with an ICU stay >3 days will have a documented RD screen if they have not already been assessed and charted on by the RD.

ASSESSMENT:

Before initiation of feedings, the RD assessment will include evaluation of weight loss and anthropometric measurement, nutrient intake prior to admission, nutrition related drugs, nutrition focused physical exam, current diet order or lack thereof, level of disease severity by SOFA score, comorbid conditions, and function of the gastrointestinal tract.

Estimated energy and protein needs will be based on validated predictive equations (6). Energy goals will be set given the patient's overall presentation.

DIAGNOSIS AND INTERVENTIONS:

The RD will provide a nutrition diagnosis and assign a level of care, I through IV, according to Flagler Hospital Policy PC-003-11. In collaboration with the multidisciplinary team, the RD will establish a nutrition intervention and set the energy and nutrients goals. This includes providing the patient with a diet or nutrition support when appropriate, recommend supplements, vitamins or other nutrition related drugs and provides diet education.

In the critically ill patient able to eat with no risk for aspiration, no expected procedures and no contraindications, oral nutritional intake will be initiated.

Enteral Nutrition (EN):

In the critically ill patient unable to eat, EN will be started within the first 24-48 hours following ICU admission unless contraindicated (see list of typical contraindications, appendix 2) and no expected procedures.

- In patients with malnutrition and those at nutritional risk including every critically ill patient staying for more than 48 h in the ICU.
- If it is anticipated that the patient will be unable to eat for more than five days perioperatively.
- If it is expected to have low oral intake and who cannot maintain above 50% of recommended intake for more than seven days.

Target infusion rate will be 1 mL/kg ideal body weight/h.

Either gastric or small bowel feeding will be acceptable. However, if patient is at high risk for aspiration or after showing intolerance to gastric feeding including need to withhold enteral feeding for repeated high gastric residual volumes, small bowel feeding will be indicated.

The head of the patient's bed should be elevated 30-45° while the patient is receiving enteral nutrition. The minimum amount of head elevation to receive EN is 10°.

Patients in the prone position may receive enteral nutrition provided they are placed in the reverse Trendelenburg position with at least 10° elevation at the head of the bed:

1. Temporarily disconnect tube and stop feeding prior to proning if the patient has been receiving EN
2. Once proned, elevate the head of the bed to 10-25 degree
3. Infusion of feeding to be at a trophic rate of 20mL/hr while in the prone position
4. Once supine, tube rates can return to previous rate prior to proning or to goal volumes

Resolution of non-mechanical ileus is not required in order to initiate EN in the ICU. Neither the presence nor absence of bowel sounds nor evidence of passage of flatus and stool is required for the initiation of enteral feeding (1-5).

In the case of an unrepaired anastomotic leak, internal or external fistula, a feeding access distal to the defect should be aimed for to administer EN (3-5).

Goals for nutrition support are to be set on the basis of daily volumes by the RD.

- EN will be started at 10 ml/h continuous infusion and titrated up by nursing until feeding goal is reached (see appendix 3). Efforts to provide >50% of goal proteins and calories will be made in order to achieve the clinical benefit of EN over the first week of hospitalization.
- Permissive underfeeding with restriction of non-protein calories (caloric goal of 40 to 60% of caloric requirements) will be acceptable under the discretion of the multidisciplinary team.
- In obese patients, permissive underfeeding will be recommended for all classes of obesity where BMI is >30. The goal of the EN regimen should not exceed 60%-70% of target energy requirements.
- Patients receiving PO phenytoin, tetracyclines or fluoroquinolones will be placed on an intermittent feeding schedule beginning with 50 ml every 3 hours and increase by 50 ml every 3 hours daily until feeding goal is reached.

For procedures or suspected aspiration, the EN will be place on hold by nursing.

Tube feeding tolerance will be assessed through physical examination completed by nursing at each initial shift assessment and as needed along with abdominal XR when applicable. Gastric residual volumes (GRV) will not be used routinely, only when intolerance of enteral feeding is suspected.

GI intolerance of enteral feeding should be based on the following: Nausea and/or vomiting, abdominal distension, complaints of abdominal discomfort, high NG/OG output if to suction, reduced passage of flatus and stool, diarrhea, or abnormal abdominal radiographs.

- Tube feeds will be held if intolerance is suspected based on the presence of one or more symptoms described above and or evidence of obstruction on any abdominal XR. The intensivist or critical care NP-PA will be contacted within an hour for further instructions.
- In patients with gastrostomy tube, nasogastric tube, or oral gastric tube, will heck GRV at recognition of suspected intolerance, then at each initial shift assessment unless otherwise specified. Gastric residual volumes are not to be checked in patients with Jejunostomy (J-tube) tubes or Dobhoff tubes.
  If GRV > 500 ml, follow protocol below.
  - Metoclopramide may be ordered unless contraindicated at starting dose of 5 mg IV push over 1-2 min every 6 hours and tube feeding resumed in 2 hours.
  - If there is no beneficial response in 24 hours, Metoclopramide will be increased to 10 mg IV every 6 hours' x 48 hours.
  - If at 72 hours there is no beneficial response, the patient will be re-evaluated for considering either switching to or adding Erythromycin 125 mg q 12 hours providing there is no concern for QT prolongation or drug interaction.

Holding tube feeding for high gastric residual volumes should not exceed two hours unless directly ordered by the intensivist, surgeon, or gastroenterologist.

If there is need for withholding enteral feeding for repeated high gastric residual volumes or patient develops vomit or is at high risk for aspiration, a post pyloric feeding tube will be placed by the infusion service team or under fluoroscopy by interventional radiology or endoscopically by gastroenterologist. The gastric tube will be left in place for decompression. In certain circumstances placement of jejunal feeding tube will be required.

Enteral tubes are to be flushed with 30 ml free H2O every 4 hours. Medication administration will be considered a free H2O flush and must be administered as follows:

- The tube is pre flushed with 3o ml free H2O.
- Medications approved for use with tube feeding will be crushed, mixed in 30 ml free H2O, and administered via feeding tube.
- The tube will be flushed again with 30 ml free H2O.
- The tube will be capped or connected to enteral nutrition if it is ordered.

Development of diarrhea associated with enteral tube feedings warrants further evaluation for etiology attempting to distinguish infectious diarrhea from osmotic diarrhea. If there is evidence of diarrhea, soluble fiber containing or small peptide formulations will be utilized. If patient develops systemic inflammatory response (SIR), the following work up will be initiated:

> Abdominal exam, fecal leukocytes, quantification of stool, stool GI film array including *C.* difficile test, serum electrolyte panel and review of medications.

If unable to meet energy requirements after 7-10 days by the EN alone, supplemental PN will be utilized.

All patients receiving enteral nutrition will receive Docusate/Senna 50 mg/8.6 two tablets q12h. If the patient does not have a quality bowel movement in last 24 hours:

- Add Bisacodyl suppository 10 mg daily. If the patient is able to swallow Bisacodyl EC 5mg tabs daily with a maximum of 3 tablets (15mg daily).
- If the patient does not have a quality bowel movement in the next 24 hours, or is receiving narcotics, Lactulose 15-30 ml q12h or Polyethylene Glycol (MiraLAX) 17 g in 8 oz of water will be used. Lactulose preferred when Dobhoff in place because MiraLAX may clog the Dobhoff.
- If still no bowel movement, notify MD, NP or PA, and if no clinical evidence of bowel obstruction, proceed with rectal disimpaction and use Magnesium Citrate 150 ml to a maximum of two doses (caution in renal failure i.e., sCr ≥2)).
- If still no bowel movement and the patient is receiving narcotics, notify MD, NP or PA to consider Naloxegol 25 mg once daily. The dose can be reduced to 12.5 mg daily if intolerance or drug interaction.

Parenteral Nutrition (PN):

PN should be reserved for patients in whom EN is not feasible in the following conditions:

1. In critically ill patients with no previous evidence of malnutrition:

   - PN should be initiated only after the first 7 days of hospitalization if EN continue not to be feasible.
   - PN should be initiated only if the duration of therapy is anticipated to be > 7 days. PN therapy provided for a duration less than 5-7 days would be expected to have no outcome effect and may result in increased risk to the patient (1-5).

2. In critically ill patients with evidence of malnutrition on admission PN should be initiated as soon as possible following admission and adequate resuscitation.

3. In critically ill patients post GI surgery:

- The surgeon is required to anticipate and consider appropriate enteral access at the time of initial or damage control surgery.
- In case of contraindications to oral and EN or when the energy and nutrient requirements cannot be met by oral and enteral intake alone (<50 to 60% of caloric requirement) for more than seven days, PN alone or in combination with enteral nutrition will be recommended.
- In the case of an unrepaired anastomotic leak, internal or external fistula, and if distal feeding access is not achieved, EN should be withheld and PN may be commenced.
- Unless the patient is at high nutrition risk/malnourished, PN should not be started in the immediate postoperative period but should be delayed for 5–7 days.
- PN should be initiated only if the duration of therapy is anticipated to be ≥7 days.

New gastrointestinal anastomosis at risk for dehiscence is not necessarily a contraindication for EN. More recent evidence suggests that early feeding strengthens anastomosis (UpToDate reviewed December 2021 and references 1-5).

Patients receiving parenteral nutrition are to be reevaluated every 48 hours for possible initiation of enteral nutrition. Patients admitted on chronic PN are an exception.

MONITORING AND EVALUATION:
The RD sets the monitoring parameters by establishing level of care (LOC) as per Nutrition Protocol (PC-003-11).

CONSENTS:

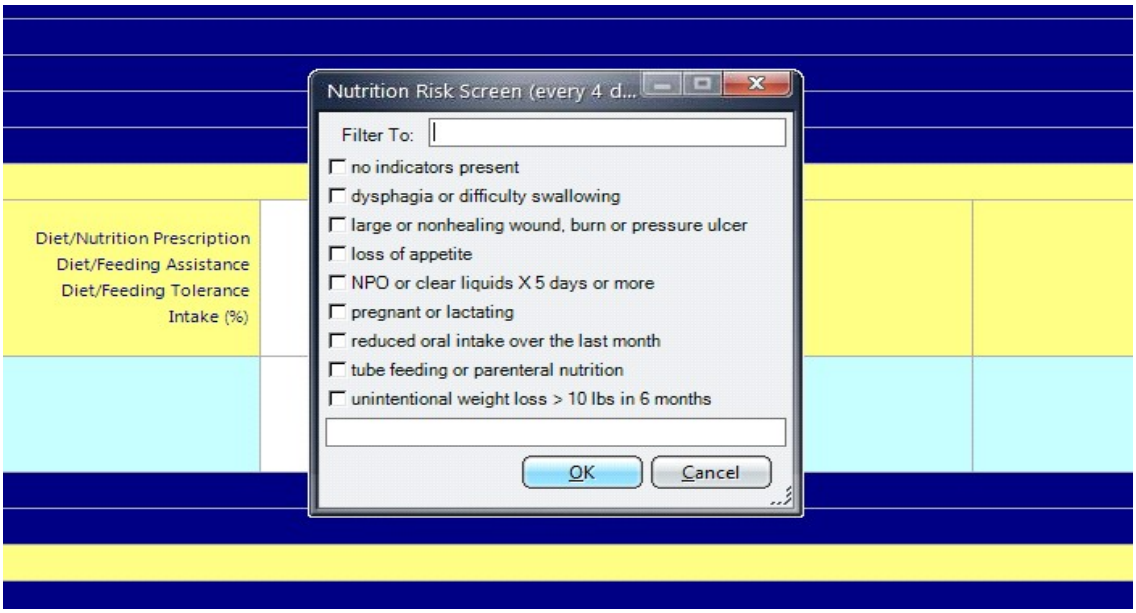
In those patients with a DNR/DNI status, the clarification of the family's intention for enteral feeding will be obtained prior to starting the feeding.

References

1. Ljungqvist O, Scott M, Fearon KC. Enhanced recovery after surgery: a review. *JAMA Surg* 2017; 152:292e8.
2. Lobo DP et al. Perioperative nutrition: Recommendations from the ESPEN expert group: *Clinical Nutrition* 2020; 39: 3211-3227.
3. McClave SA et al: Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). *JPEN* 2016; 40: 159-211.
4. Singer P et al: ESPEN guideline on clinical nutrition in the intensive care unit 2019: *Clinical Nutrition* 38: 48e79.
5. Weimann A et al. ESPEN practical guideline: *Clinical Nutrition* 2021; 40: 4745e4761.
6. Mueller C, et al and the American Society for Parenteral and Enteral Nutrition A.S.P.E.N. Clinical Guidelines Nutrition Screening, Assessment, and Intervention in Adults. Board of Directors. Journal of Parenteral and Enteral Nutrition Volume 35 Number 1 January 2011; 16-24.

APPENDIX 1

ESTABLISHED RISK SCREENING CRITERIA **RN DRIVEN** FOR ALL PATIENTS ADMITTED TO THE ICU



Patients with a Braden Score ≤13 whose intake is documented by RN as 'probably inadequate' or worse will also trigger a nutrition consult

APPENDIX 2

CONTRAINDICATIONS FOR ENTERAL FEEDING

GI discontinuity or obstruction
Abdominal compartment syndrome
GI ischemia
High output enteric fistulas
Severe ileus
Intractable vomiting
Major upper GI bleed
Severe diarrhea
Planned surgery or endoscopy
Severe hemodynamic instability
Patients that are intubated and extubated in less than 48 hours
Patients in which terminal weaning is anticipated within 48 hours
Patients on noninvasive mechanical ventilatory support
Patients with reported milk allergy or soy allergy

APPENDIX 3

RN driven tube feeding titration. For periods of holding >1 hour, the RN will refer to the following chart to adjust TF rate to appropriately meet the EN daily volume goals set by the RD

CONTINUOUS FEEDING GUIDE

Goal ml/hr	Hours TF held for test or procedure																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	≥ 21
100	105	110	115	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
95	100	105	110	115	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
90	95	100	105	110	115	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
85	90	95	100	105	110	115	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
80	85	90	90	95	100	105	110	120	120	120	120	120	120	120	120	120	120	120	120	120	120
75	80	80	85	90	95	100	105	115	120	120	120	120	120	120	120	120	120	120	120	120	120
70	75	75	80	85	80	80	100	105	115	120	120	120	120	120	120	120	120	120	120	120	120
65	70	70	75	80	80	90	95	100	105	110	120	120	120	120	120	120	120	120	120	120	120
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55	60	60	65	65	70	75	80	85	90	95	100	110	120	120	120	120	120	120	120	120	120
50	50	55	60	60	65	70	70	75	80	85	90	100	110	120	120	120	120	120	120	120	120
45	50	50	50	55	60	60	65	70	70	80	85	90	100	110	120	120	120	120	120	120	120
40	45	45	50	50	50	55	55	60	65	70	75	80	90	95	105	120	120	120	120	120	120
35	40	40	40	45	45	50	50	55	55	60	65	70	75	85	90	105	120	120	120	120	120
30	30	35	35	35	40	40	45	45	50	50	55	60	65	70	80	90	105	120	120	120	120
25	25	30	30	30	35	35	35	40	40	45	45	50	55	60	65	75	85	100	120	120	120
20	20	20	25	25	25	30	30	30	30	35	35	40	45	50	55	60	70	80	95	120	120
15	15	15	20	20	20	20	20	25	25	25	30	30	35	35	40	45	50	60	70	90	120

Start FEED ME when patients reach goal rate - obtain order for protocol (Nursing communication)
FEED ME Guidelines uses a 24 hr period and resets at 7 AM daily - discuss at BSSR.

BOLUS FEEDING GUIDE

Goal ml Q 4 HR	# Feeds Missed Out of 6				
	1	2	3	4	5
360	400	400	400	400	400
320	375	400	400	400	400
300	360	400	400	400	400
280	340	400	400	400	400
240	290	360	400	400	400
220	270	330	400	400	400
200	240	300	400	400	400
180	215	270	360	400	400
170	205	240	340	400	400
160	190	240	320	400	400
150	180	225	300	400	400
140	170	210	280	400	400
130	160	195	240	390	400
120	145	180	240	360	400

****REMEMBER TO START D5W WHEN TFs are HELD**

Example for continuous feeds:
Order: Pivot 1.5 @ 50 ml/hr with 30 ml water flush q 4 hrs
TF held since midnight for trach; OK to restart feeds post trach at 2
TF has been off from 7 am to 2pm = 7 hrs held
Look at FEED ME chart - Find goal 50 ml/hr follow line over to 7 hours off.
TFs to run at 70 ml/hr until 7 am, then revert back to 50 ml/hr. Flush 30 ml q 4 hrs.

Example for Bolus/Intermittent feeds:
Order: Osmolite 1 cal 280 ml q 4hrs with 60 ml water flush
TF held for procedure
1 feed given since 7 am = 3 feeds missed out of 6.
Look at FEED ME chart - find amount to give with 3 feeds missed.
Give 400 ml q 4hrs with 60 ml water flush for next 3 feeds
At 7 am go back to original order of 280 ml.

***As soon as order to be "NPO at Midnight" is received increase TF accordingly to account for "12 hours held" or 3 feeds left.

***Obtain resume TF order in Compass to restart feeds when patient returns from OR.

*** Continue to follow current residual policy: Hold TF for residual >350.

*** If signs of intolerance, (increase in amount of stool, abd distention, emesis, NG output) document in Compass and revert back to original goal rate or D/C TF if necessary.