Artificial Nutrition Support for Adults through the Continuum of Care Part I- Enteral Nutrition Webinar

Live Webinar: Thursday, November 7, 2024 (1:30-2:30pm EST) Convert to your own time zone

Join Advanced Clinical Specialist, ***Elizabeth Wall, MS, RDN-AP, CNSC****, and learn how RDNs can provide excellent nutrition care in all settings.*

Description and Speaker:
This webinar will focus on enteral nutrition (EN) support practice guidelines required for safe and sufficient EN support across the continuum of patient care settings. The presentation will include considerations for proper feeding tube selection, safe initiation and advancement of feedings in acute care and long term care settings, key principles to troubleshoot enteral feeding complications, and monitoring parameters. The session will conclude with a discussion of considerations of EN support for adults who require long term EN support.

Objectives:
After completing this continuing education course, the learner should be able to:

1. Know the indications for use of enteral nutrition (EN) support.
2. Understand how to safely initiate and advance EN to optimize fluid and nutrient absorption to maintain health.
3. Be acquainted with recommended parameters for monitoring patients receiving long-term EN support.

Disclosures: Beth is a consultant to Zealand Pharma, however, certifies that no conflict of interest exists for this program.

Funding has been provided through an independent medical educational grant from Baxter Healthcare Corporation.

Funding from non-CPE revenue for CPE planning, development, review, and/or presentation has been provided by Becky Dorner & Associates.

Professional Approvals:
Becky Dorner & Associates, Inc. has been providing continuing professional education (CPE) since 1993 (Commission on Dietetic Registration provider number NU004).

Intended Audience: RDNs and NDTRs	**CPE:** 1.25 Live 1.25 Recorded	**Expiration Date**: Live webinar:October 9, 2025 Enduring Activity: October 8, 2027
CDR: Activity Type: 172 Live webinar Activity number: **185599** Activity Type: 741 Enduring Activity Activity number: **185600**		
Suggested CDR Performance Indicators: 11.5.1, 11.5.2, 11.5.3, 11.5.4		

Note: Numerous Other Performance Indicators May Apply.

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Artificial Nutrition Support for Adults through the Continuum of Care Part I- Enteral Nutrition Webinar

Today's Webinar
- Please refer to your handout for an overview of the program

Handouts
- Live: Emailed to the person who registered for the program, and posted in the Go To Webinar System
- Recording: Available on our website with the recording

Questions
- Live: Use GoToWebinar to ask questions
- Recording: Email info@beckydorner.com

Credit Hours/Certificate
- Please refer to handouts for details

1

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2

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Elizabeth is a consultant to Zealand Pharma however, she certifies that she has no conflicts of interest for this program.

Elizabeth Wall, MS, RDN-AP, CNSC

- Senior member, Adult GI/Nutrition Support Service, University of Chicago Medicine
- Specialty areas: Management of short bowel syndrome and other malabsorptive disorders; management of home PN patients; troubleshooting mechanical tube problems or enteral feeding intolerance for patients on long-term home enteral feedings
- Active participant in several human research protocols
- Active member of the Short Bowel Syndrome subgroup of DMNT
- Author of multiple book chapters, journal publications, and has presented at FNCE, ASPEN, and ESPEN symposia

3

Artificial Nutrition Support for Adults through the Continuum of Care

Part I – Enteral Nutrition

Elizabeth Wall, MS, RDN-AP, CNSC
The University of Chicago Medicine
November 7, 2024

4

Learning Objectives

After completing this continuing education course, the learner should:

1. Know the indications for use of enteral nutrition (EN) support.
2. Understand how to safely initiate, advance, and monitor EN to ensure adults receive optimal nutrients and fluids to maintain health.
3. Be aware of important considerations for safe and sufficient long term EN support.

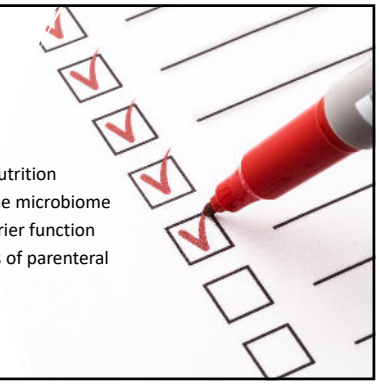
5

Outline

I. Indications for use of EN support
II. Safe initiation and advancement of feedings
III. Key principles to optimize fluid/nutrient absorption
IV. Monitoring parameters for EN
V. Considerations of EN for adults who require long term EN support
VI. Questions and answers

6

Advantages of Enteral Nutrition



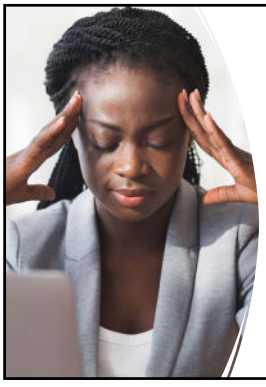
- Favors intestinal villi growth/nutrition
- Immunomodulatory – feeds the microbiome
- Promotes gut motility and barrier function
- Avoids potential complications of parenteral nutrition (PN)
- Cost advantage over PN

7

Indications for EN Support

- Swallowing impairment
- Mechanical ventilation
- Malnutrition (risk) and poor oral intake
- Support through hypermetabolic conditions – burns/COVID-19
- Partial small bowel obstruction
- Impairment of digestion or absorption of nutrients

8



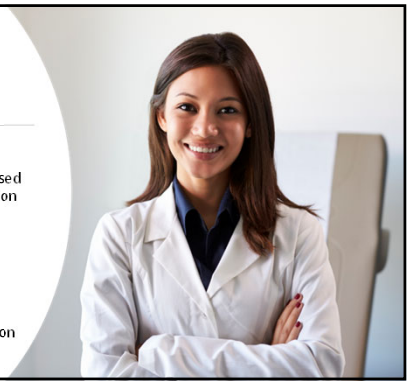
Contraindications to Enteral Nutrition

- Mechanical or pseudo-obstruction
- Paralytic ileus
- Intractable vomiting or diarrhea
- Severe GI bleeding, shock, or ischemia
- Severe malabsorption
- Distal high-output fistula
- End of life

9

Needs Assessment

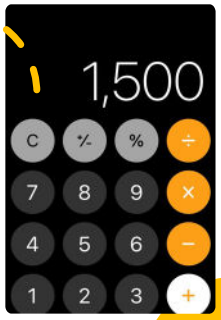
- Macronutrients
  - Energy and protein needs based on underlying patient condition
    - Carbohydrates 50-60%
    - Protein 10-25%
    - Fat > 5%
- Micronutrients
  - 100% RDI
    - Assess for supplementation requirement



10

Estimated Hydration Needs

- Calculations
  - 1 mL/kcal/d
  - 25-40 mL/kg base on age and renal/cardiac condition
  - 1500 mL for the first 20 kg + 15 mL/kg remaining weight
- Intake/output data
  - Intake - IV/tube/PO
  - Output - Urine/stool/drains
  - Measurement container
- Physical exam



11

Physical Exam - Hydration Status

Euvolemia	Dehydration	Over hydration
• Moist mucous membranes • Urine out >1L/24 hr, light yellow or clear in color • Normal vital signs • Stable weight	• Dry mucous membranes • Dark urine, output < 1L/24 hr • Hypotension, tachycardia • Thirst • Muscle cramps • Rapid weight loss	• Edema • Excess urination, >2L/24 hr • Hypertension • Shortness of breath • Weakness • Nausea/vomiting/ reflux • Rapid weight gain

12

Enteral Formula Composition

- Water: 70-85% of volume
- Carbohydrate: Polysaccharides - GOS, maltodextrin; lactose-free
  - Fiber
- Protein: Whey, casein, soy, pea, "flesh"; hydrolyzed proteins
- Fat: Usual need 15-25 g/d (5% linoleic); MCT; fish oil
- Micronutrients: Volume-based vitamins and minerals
  - Very low sodium
- Osmolality: 300-800 mOsm/kg
- Blenderized tube feedings?[1,2]

[1]Brown, *Nutr Clin Prac.* 2020
[2]Bischoff, *Clin Nutr.* 2020

13

Enteral Tubes

Temporary Tubes/Short Term

- Use < 60-90 days
- Used to document tolerance
- **Nasogastric** – via nose with tip in the stomach; often placed bedside
- **Nasoenteric** – via nose with tip beyond the pylorus; often placed bedside
- **Nasojejunal** – via nose with tip beyond the ligament of Treitz (LOT); often requires assistive device or GI procedure

Long Term Tubes

- Use > 30 days
- Require exchange q 6-12 months
- **Gastrostomy** – placed across the abdominal wall; terminates in the stomach
- **Gastrojejunostomy** – placed across the abdominal wall, into the stomach; one lumen terminates in the stomach, one lumen beyond the LOT
- **Jejunostomy** – placed across the abdominal wall into the jejunum

14

14

Safe Initiation and Advancement of EN - Acute Care

- Verification of tube position
- If malnourished or critically ill, then start continuous infusion
  - <20 kcal/kg/d infusion rate, 10-40 mL/hr
  - Monitor for refeeding syndrome
- Water flushes for tube patency and/or hydration
- HOB >30°; prone HOB 10-15°
- Daily BMP, mg^{++}, Phos, POC glucose q6hr - until at goal
  - Once at goal chemistries 1-2 times weekly; ?POC glucose
- Strict intake/output and daily weights
- Advancement when tolerating and metabolically stable
  - MAP >50 mmHg
  - 10-20 mL/hr q8-12 hr
  - Volume based

Mueller C. *The ASPEN Adult Nutrition Support Core Curriculum, 3rd ed, 2017*

15

Safe Initiation and Advancement of EN: LTAC or Home

- Verification of tube position
- Intermittent gravity infusion (pump if post-pyloric tip)
- Gradual initiation and advancement
  - Continuous – 50 mL/hr - increase 15 mL/hr q 4hr
  - Intermittent – 60-120 mL – increase q 8-12 hr
- Water flushes for hydration (medication administration)
- Head upright during and one hour after feedings
- Daily weights and 24 hr urine volume (initially)
- Periodic lab monitoring
- Medical follow-up

Mueller C. *The ASPEN Adult Nutrition Support Core Curriculum, 3rd ed, 2017*
Bischoff, *Clin Nutr.* 2020

16

What is EN "Tolerance"?

- Absence of GI symptoms
  - Nausea
  - Gastro-esophageal reflux
  - Bloating/distention
  - Diarrhea/high output ostomy
  - Constipation
  - Abdominal discomfort or pain

17

Case #1 - AG

- 83 y/o female admitted with dysphagia and vomiting
- 20 pound wt loss over 2 months
- 10Fr NJ tube was placed
- Estimated needs – 1650 kcal/d, 90 g pro/d (calculation wt 76 kg)
- Initial feeding 1.2 kcal/mL formula at 20 mL/hr + 25 mL H_2O/hr flush
- Day 3 – increase by 10 mL/hr q 12 hr to goal 60 mL/hr + 35 mL H_2O/hr flush for 1728 kcal/108 g pro/2L H_2O/d
- Day 8 – Achieved goal feeding regimen
- Day 10 – Escalating O_2 requirement, scheduled furosemide -> contraction alkalosis, hyponatremia, hypokalemia, no wt or urine volume
- Revised plan – Continue EN with 30 mL H_2O flush q 4 hr (-650 mL/d)

18

Poll #1

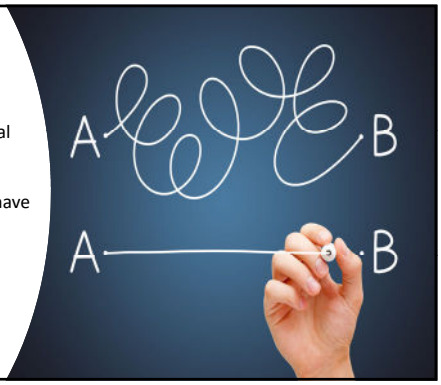
A small-bore nasoenteric tube (8-10 French) should be flushed

a. Every hour with water
b. Every four hours with water
c. Every day with Cola
d. Every 12 hours with Cola

19

AG Case Pearls

- Look at your patients
- No need to flush enteral tubes hourly
- If output cannot be measured, then must have accurate weights
- Watch medications



20

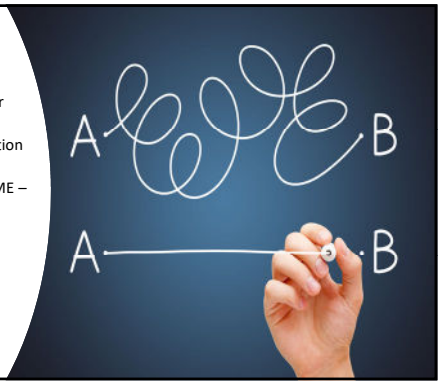
Case #2 - SC

- 58 yo woman with ALS, pulmonary function declining, still able to eat and drink. Elective PEG placed for future use.
- Instructed to flush once daily, rotate 360° daily, keep clean and dry
- Return to clinic 1 wk, 1 mo, 3 mos after PEG placement
- At 3 mos complaint of protracted meals & evening fatigue. Blood chemistries WNL
- Insurance authorization for home health DME only
- Initial feeding – One container of 1.5 kcal/mL oral nutrition supplement via PEG by syringe gravity Q pm
  - 60 mL H_2O flush before and after
- Return to clinic 1 month – wt stable, blood chemistries wnl, using 3 containers daily (~1080 kcal/d), medications via PEG.
- Swallow study with aspiration risk, insurance authorization for enteral formula – full feedings ordered; H_2O flushes for medications and feeds

21

SC Case Pearls

- Home starts are possible for stable, nourished patients
- Obtain insurance authorization
- Effective communication between pt – homecare/DME – provider
- Monitoring tools available
- Medical follow-up



22

Optimizing Fluid and Nutrient Absorption

- Understand your patient's GI tract and accessory organs
  - GI surgery, intestinal mucosal diseases, pancreas disease, fistula/leaks
- Know the location of the enteral tube tip
- Assess/measure
  - EN volume in
  - Stool and urine output
  - Tolerance – diarrhea/high output

- Compare EN input to assessed needs
- If EN/water input is less than needs or stool output is excessive, then adjust the feed/flush regimen
  - Consider enteral tube reposition
  - Slow the infusion rate
  - Change the EN formula
- Is malabsorption a problem or insufficient absorptive surface
  - Would the patient benefit from in-line lipase cartridge?

23

Poll #2

A patient on enteral nutrition develops diarrhea. What is the first thing the RD should recommend?

a. Hold the enteral nutrition
b. Order an abdominal x-ray
c. Review the medications
d. Order a stool culture for C. diff infection

24

Diarrhea

- Common in ICU (60%)
- Causes of diarrhea in patients on TFs
  - Hyperosmolar medication administration
  - Tube migration
  - High rate of feeding or rapid bolus
  - Infectious source (*C. difficile*)
  - Fiber content of enteral formula
  - Rapid gastric emptying or poor mixing of bile/pancreatic enzymes
  - Overflow or stool seepage

25

Medication Administration

- Stop EN infusion prior to medications
  - Do not add medications to EN formula
  - Assess for drug-nutrient interactions
- Flush tube with 30 mL H_2O before & after medication
- Give each medication separately
- Crushed tablets dispersed in H_2O
  - Tube size $\geq$ 12 Fr
- Do not crush enteric-coated, sustained release, or microspheres
- Liquid medications – note osmolality of medication
- Check with a pharmacist regarding drug absorption for post-pyloric tubes

26

Liquid Medication Concentrations

Medication	Osmolality (mOsm/kg)
Isotonic	300
1 kcal/mL enteral formula	300-350
Acetaminophen	4035
Calcium carbonate	2490
Ergocalciferol	16,100
Loperamide	6775
Diphenoxylate	8800
Multivitamin	3655
Ranitidine	637

Klang M. J Parent Enteral Nutr. 2013

27

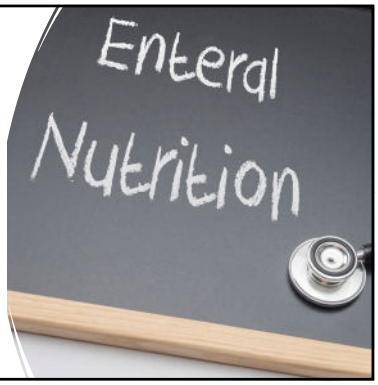
Monitoring Enteral Nutrition

- Is the patient "tolerating" the EN?
- Stool output
- Abdomen
- Extremities
- Enteral tube insertion site
- Weight, intake/output
- Physical strength
- Blood chemistry levels & glycemic control

28

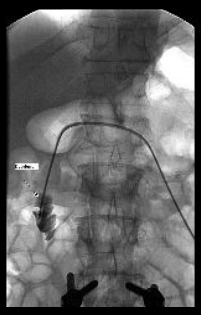
Tube Feeding Problems

- Constipation
- Diarrhea
- Nausea and/or vomiting
- Sinusitis
- Tube clogged or misplaced
- Leaking tube



29

Tube Migration



30

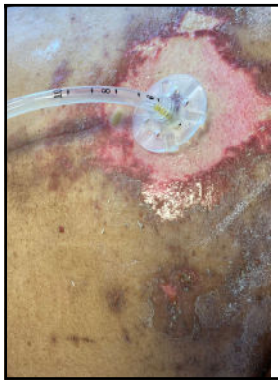
31

Poll #3

A patient presents to clinic with a leaking G-tube. What information is helpful to understand the underlying problem.

a. Does the patient use narcotics for pain?
b. When was the patient's last bowel movement?
c. At what number is the external bumper?
d. All of the above

32



The "Leaking G-tube"

- Most often due to impaired gastric emptying
  - Narcotics/gastroparesis/ileus/obstruction
  - Constipation
  - Bumper obstruction of pylorus
  - Deflated internal bumper
- Causes severe skin burn - painful
- Evaluation

RDN
- Review medications
- Evaluate enteral formula, feeding method, water flushes

Provider
- Check bumper
- Rectal exam
- Abdominal x-ray

33

Leaking Tube Solutions

- Stop/wean narcotics
- Bowel regimen
  - Start from below, then above
- Convert to post-pyloric feeding
- DO NOT UPSIZE tube

34

Monitoring EN

- Is your patient receiving their feedings?
- Are the "goal" feedings adequate?
  - Wound healing
  - Strength
  - Indirect calorimetry
  - Nitrogen balance study
    - Stable enteral feedings x 72 hr
    - 24 hr urine collection
    - $Nitrogen_{in} - (Nitrogen_{out} + 2\text{-}4) = goal + 2$

35

Metabolic Monitoring

	BMP[¥], mg++, Phos	POC* glucose	Liver tests, triglyceride	Vitamins and minerals	Weights
Initiation	Daily	Every 6 hr	Once	Baseline	Daily
Stable, acute care	1-2 times weekly	Only for Pts w/ DM	Weekly	N/A	Daily
Stable, post-acute care facility	Weekly	Only for Pts w/ DM	Monthly	N/A	1-2 x/week
Home	Monthly to every 3-6 months	Only for Pts w/ DM	Monthly to every 3-6 months	1-2 times a year	Weekly

[¥]Basic metabolic panel *Point of care glucose

36

Transition: Acute Care to LTAC/SNF

- Communication between facilities
  - Enteral formulary
  - Infusion schedule
  - Long term feeding/MNT plans
- Ensure LTAC/SNF has proper equipment – legacy tube adapters
- Communication EN feeding plan with the patient/family

37

Transition to Home

- Obtain insurance authorization
- Proper documentation in the medical record
- Communicate with the patient/caregiver
  - Agreement and ability to comply with HEN therapy
- Identification of home care vendor
  - Enteral formulary
  - Infusion equipment
- Provider order
- Education
- Medical follow-up

38

Home EN Education

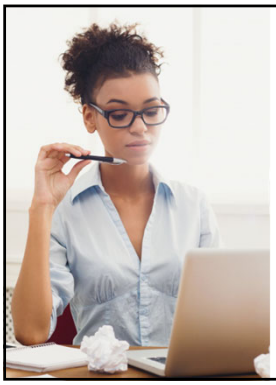
- Tube Care
  - Minimum once daily flush
  - Cleansing instructions
- Feeding infusion
  - Oral and written
  - Patient/caregiver return demonstration
- When and where to call with
  - Questions
  - Problems
- Medical follow-up appointments

39

Long Term Monitoring

- Medical appointments
  - Inspection of tube insertion site
  - Physical exam
  - Laboratory monitoring
  - Troubleshoot tube issues
  - Schedule tube replacements
- Nutrition assessment
  - Weight and strength
  - EN goals
  - Hydration
  - Micronutrient levels

40



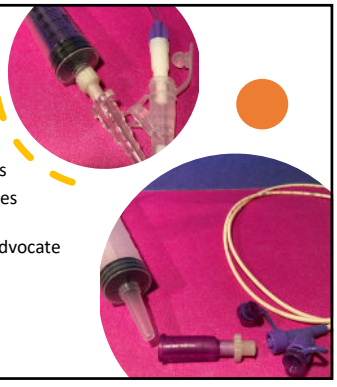
Home EN Support Benefits

- Medicare
  - Unable to sustain with oral intake – impairment of swallow, digestion or absorption of nutrients
  - EN is primary source of nutrition
  - Administration via enteral access device
  - Permanent impairment (90 days)
  - Physician's handwritten order with electronic documentation
- Private insurance companies
  - Variable coverage
  - Usually cover infusion supplies
  - Often will not cover the cost of the formula

41

Summary

- Know your patients and their tubes
- Assess and re-assess nutrition needs
- Think hydration in addition to calories and protein
- Communicate, communicate, and advocate



42

Questions

43

43

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45

References from *Artificial Nutrition Support for Adults Through the Continuum of Care: Part I- Enteral Nutrition* with Elizabeth Wall, MS, RDN-AP, CNSC
Thursday November 7, 2024

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