The Conundrum of Constipation:

Managing the Burden of Bowel Dysfunction for People Living with ALS

Presented by :
Brittany M. Hitson MS, RD, CSG, LDN
Dominique M. Kosk MPH, RD, LDN, CNSC

Disclosures

- No disclosures

Objectives

1. Discuss the effect of constipation and gastrointestinal dysmotility in people living with ALS (PALS)

2. Discuss dietary fiber in relation to ALS

3. Discuss practical implications to addressing constipation in PALS including diet, enteral nutrition support, hydration, and pharmacological management

Introduction

- People living with Amyotrophic Lateral Sclerosis (PALS) progress differently in the disease with some losing ability to move, swallow, and breathe

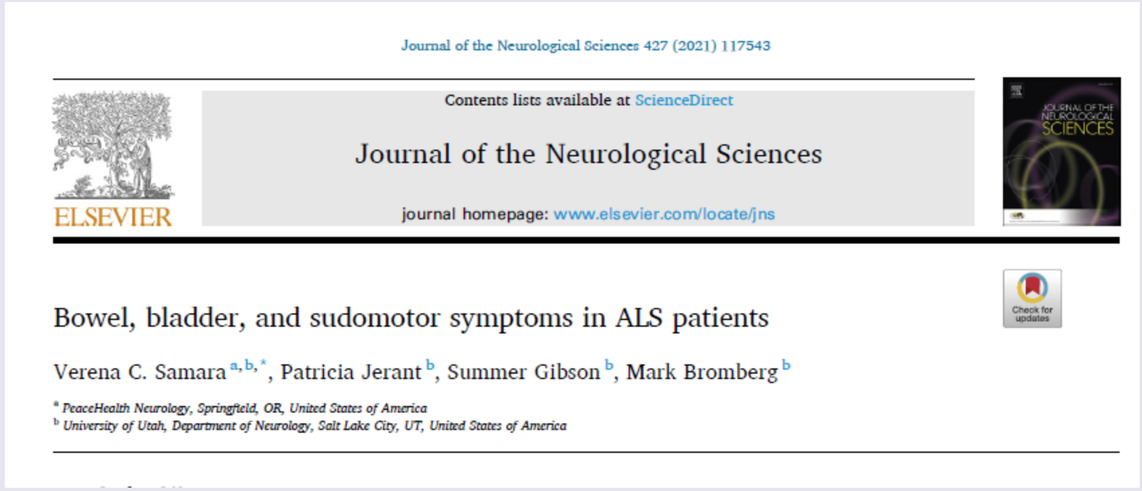
- Secondary symptoms include constipation, leading to discomfort which can reduce oral intakes and subsequently impact quality of life

- The disease progression in ALS includes bowel dysmotility and therefore the registered dietitian nutritionist (RDN) is challenged with finding applicable interventions in this progressive disease

Constipation

Definition: Less than one bowel movements in a period of three days

- General Population: 20% prevalence rate
- PALS population
  - Samara et al described the prevalence rate of bowel, bladder, and sudomotor symptoms in PALS
  - In a cohort of 66 PALS, 33% reported constipation prior to diagnosis vs. 65% reported constipation after diagnosis
- Contributing Factors:
  - Diet composition
  - Dysphagia
  - Dehydration
  - Mobility



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Bowel, bladder, and sudomotor symptoms in ALS patients

Verena C. Samara [a,b,*], Patricia Jerant [b], Summer Gibson [b], Mark Bromberg [b]

[a] PeaceHealth Neurology, Springfield, OR, United States of America
[b] University of Utah, Department of Neurology, Salt Lake City, UT, United States of America

Gastrointestinal Dysmotility

ALS and Gastrointestinal Transit Time?

- Literature Review:
  - Toepfer et al
    - Delay in gastric emptying in 14 of18 PALS compared to healthy controls
    - Delay in colonic transit time in 11 of 14 PALS when compared to healthy controls
  - Russo et al
    - Mean mouth to colon transit time/Gastric to colon transit time (MCTT/GCTT) in PALS was significantly prolonged compared to healthy controls (121 vs 74 minutes, p=0.002)
    - MCTT/GCTT increased as ALSFRS-R scores decreased
  - Schaff et al
    - MCTT in PALS was significantly longer compared to healthy controls
    - MCTT increased as the ALSFRS-R score decreased
- Impact:
  - General discomfort associated with eating
  - Alterations in perception of hunger and satiety

Gastrointestinal dysfunction in amyotrophic lateral sclerosis

M Toepfer,[1] C Folwaczny,[2] A Klauser,[2] RL Riepl,[2] W Müller-Felber[1] and D Pongratz[1]

P170 NON-INVASIVE MEASUREMENT OF MOUTH TO COLON TRANSIT TIME IN PATIENTS WITH AMYOTROPHIC LATERAL SCLEROSIS (ALS)

RUSSO G, CHEN J, SAADIQ R, BARR C, DEBOO A, HEIMAN-PATTERSON T

57 | **Gastrointestinal Dysmotility in Patients with Amyotrophic Lateral Sclerosis (ALS)**

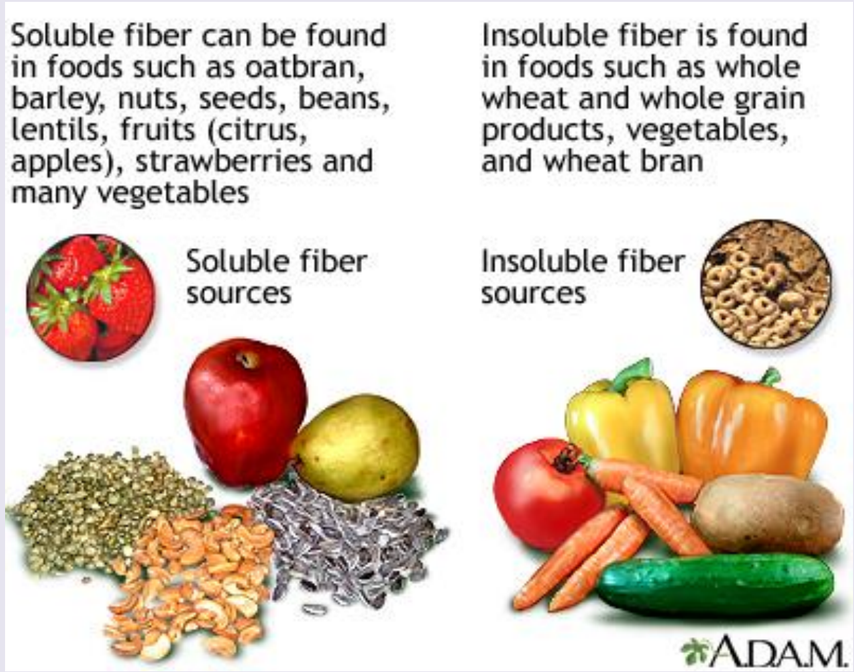
Christina Martin Schaff[1,2], Terry Heiman-Patterson[1], Anahita Deboo[1], Christine Barr[1]

Diet Considerations

Dietary Fiber

Fiber works to promote increased bowel movements by bulking stools

- Soluble and insoluble fiber are both suggested to improve and normalize bowel function
- Most plants contain both soluble and insoluble fiber in varying amounts and ratios
  - Soluble fiber: attracts water and turns to gel during digestion
    - *Can slow gastric emptying*
    - *Inhibit absorption of glucose*
    - *Shown to decrease levels of triglycerides and cholesterol*
    - *Plays a role in SCFA production in the large intestine*
  - Insoluble fiber: adds bulk to the stool
    - *Can help food pass more quickly through the stomach and intestines*
  - The 2005 Dietary Reference Intake for healthy individuals recommends 25-38 grams of dietary fiber/day (depending on age and sex of individual)



Increasing fiber is a common recommendation for individuals suffering from constipation

Fiber Consumption

Literature Review

- Limited studies currently available that focus on the relationship between dietary fiber and ALS
- Current literature has focused on the relationship between dietary fiber intake and disease (rate of progression and survival times)

Dietary Fiber in ALS Care

Literature Review

Studies of Note

Yu et al

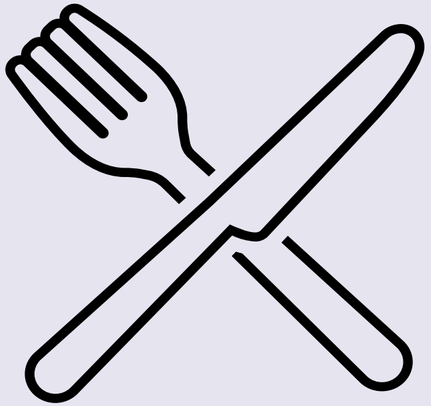
- Investigated the relationship between disease progression rate and survival time with intake of different types of dietary fiber
- Found that PALS who consumed >19.8 g of vegetable fiber vs. those who consumed <13.45 g of vegetable fiber had a longer survival time
- No difference in survival time in relation to **total** fiber intake

- Suggested PALS consume a minimum of 20 grams of dietary fiber/day
  - Based on the Korean DRI recommendations of 20-25 grams of dietary fiber/day

Nutrients. 2020 Nov; 12(11): 3420. PMCID: PMC7695159
Published online 2020 Nov 7. doi: 10.3390/nu12113420 PMID: 33171846

Relationship between Dietary Fiber Intake and the Prognosis of Amytrophic Lateral Sclerosis in Korea

Haelim Yu,[1,†] Seung Hyun Kim,[2,†] Min-Young Noh,[2] Sanggon Lee,[2] and Yongsoon Park[1,*]



Literature Review

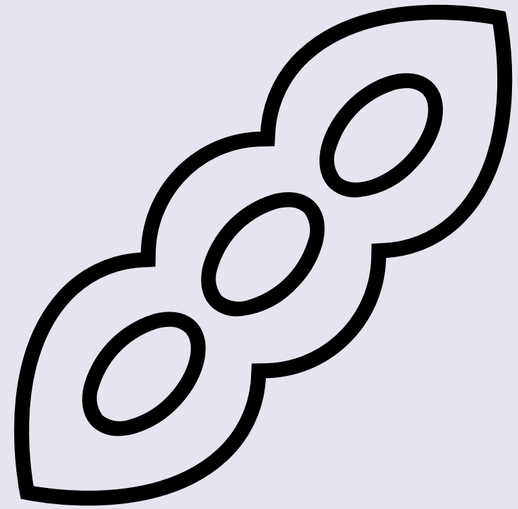
Fondell et al

- Analysis of 5 large prospective cohort studies
- 1.05 million participants with occurrence of 1,133 cases of ALS during a mean follow up of 15 years
- Found that neither insoluble, soluble, nor total fiber intake was associated with ALS risk development

Am J Epidemiol. 2014 Jun 15; 179(12): 1442–1449.
Published online 2014 May 9. doi: 10.1093/aje/kwu089
PMCID: PMC4051879
PMID: 24816788

Dietary Fiber and Amyotrophic Lateral Sclerosis: Results From 5 Large Cohort Studies

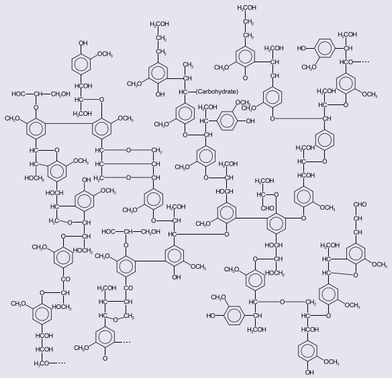
Elinor Fondell,* Éilis J. O'Reilly, Kathryn C. Fitzgerald, Guido J. Falcone, Laurence N. Kolonel, Yikyung Park, Marjorie L. McCullough, and Alberto Ascherio



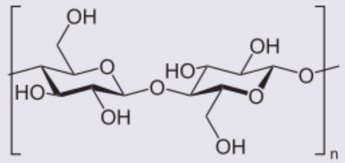
Dietary Fiber Consumption in PALS

- The natural progression/restriction of fiber over the course of disease may be related to:
  - Dysphagia
  - GI upset/constipation leading to discomfort and early satiety
  - Poor appetite and decreased portion sizes

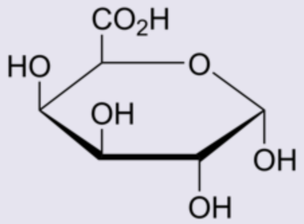
Fiber Consumption and Alteration



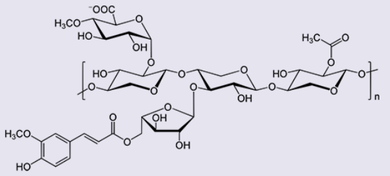
Lignin



Cellulose



Pectin (galacturonic acid)



Hemicellulose

Texture Modifications

Implications to Practice

GI symptoms should be managed by an interdisciplinary team through diet and medication changes as applicable

Excessive or inappropriate fiber intakes/supplementation may cause

bloating	abdominal pain	gas	worsening constipation	cramping	dehydration	bowel obstruction

Excessive bulking of stools through dietary fiber *may have the opposite effect* of worsening constipation or increasing obstruction potential in PALS with poor colonic transit

Specific consideration of PALS confined to wheelchairs and those in later stages of illness

Fiber should be slowly introduced into the diet and modified with caution based on gastrointestinal symptoms/tolerance

Implications to Practice

- Monitor gastrointestinal symptoms as fiber is cautiously increased in the diet
- Consider stage or progression of disease and modify recommendations based on assessment
- May need to provide ongoing nutrition education on fiber-containing foods and how to make adjustments on a texture modified diet
- Oral nutrition supplementation containing fiber may need to be considered

Enteral Nutrition Considerations

Enteral Nutrition Overview

- Enteral nutrition (EN) is the preferred route of nutrition support in individuals with a functional gastrointestinal tract

- Indication for Gastrostomy:
  - Weight loss
  - Dysphagia
  - Prolonged meal times
  - Changes in pulmonary function

EN and Constipation

Prevalence of Constipation in EN
- Ranging from 15.75 to 29.7% in the general population
- Most common intestinal motility disorder found in EN fed patients

Current EN Recommendations
- No current guidelines in recommending specific EN formulas in PALS
- Zhang et al surveyed 148 health care individuals associated with an ALS clinic:
  - Major themes highlighted "there is no set formula or procedure that works for everyone" and "hydration is not recommended adequately"

e-SPEN Journal 8 (2013) e25–e28

Contents lists available at SciVerse ScienceDirect

e-SPEN Journal

journal homepage: http://www.elsevier.com/locate/clnu

Original article

Survey of current enteral nutrition practices in treatment of amyotrophic lateral sclerosis

May Zhang[a], Jane Hubbard[b], Stacy A. Rudnicki[c], Carolyn S. Johansen[d], Kate Dalton[e], Terry Heiman-Patterson[f], Dalles A. Forshew[g], Anne-Marie Wills[h,*]

EN and Fiber

Formulas

- Vast majority of EN formulas available
- EN formulas enriched with fiber
  - Designed to normalize intestinal transit and reduce laxative use
  - May contain a single source or blend of fibers of varying proportions
  - There are limited guidelines on EN recommendations for home care patients with gastrointestinal dysmotility


Clinical Nutrition 41 (2022) 468–488

Contents lists available at ScienceDirect

Clinical Nutrition

journal homepage: http://www.elsevier.com/locate/clnu

ESPEN Guideline

ESPEN practical guideline: Home enteral nutrition

Stephan C. Bischoff [a, *], Peter Austin [b], Kurt Boeykens [c], Michael Chourdakis [d], Cristina Cuerda [e], Cora Jonkers-Schuitema [f], Marek Lichota [g], Ibolya Nyulasi [h], Stéphane M. Schneider [i], Zeno Stanga [j], Loris Pironi [k, l]

Guidelines for Home EN	
The European Society for Clinical Nutrition and Metabolism (ESPEN)	A standard commercial formula can be used unless there is a specific justification for a blended tube feed
Guidelines for Fiber Use	
The European Society for Clinical Nutrition and Metabolism (ESPEN)	Use a fiber-containing formula for the management of both diarrhea and constipation
ASPEN/SCCM Guidelines for Adult Critically Ill Patients (2016)	Recommend avoiding both soluble and insoluble fiber if there is a risk for bowel ischemia or severe dysmotility

Implications to Practice

- Routine use of fiber-containing formulas in PALS are inconclusive and should be based on clinical judgement
- Bowel regularity and gastrointestinal symptoms must be continually reassessed in PALS receiving EN
- Further research in warranted

Hydration

- Important component to managing constipation
- PALS are at an increased risk for dehydration
  - Advanced age
  - Dysphagia with liquids
  - Increased caloric demand from respiratory and motor function
  - Increased sialorrhea
  - Decreased mobility
  - Fear of incontinence
  - Cognitive impairment
- Additional fluid needs for some individuals
  - Severe diarrhea or emesis
  - Large draining wounds
  - Constant drooling
  - Persistent fever

General Guidelines for Hydration	
30 to 40 ml/kg	1 ml/kcals consumed or required
Holliday-Segar - 1500 ml for the first 20 kg + 20 ml/kg for the remaining kg of body weight Adjusted Holliday-Segar - 1500 ml for the first 20 kg + 15 ml/kg of the remaining body weight	Based on bodyweight and age - Ages 18-55 years: 35 ml x body weight (kg) - Ages 56-75 years: 30 ml x body weight (kg) - Ages >75 year: 25 ml x body weight (kg) - Fluid restricted adults (eg kidney disease, cardiac disease, fluid overload): ≤25 ml x body weight in kilograms

Literature Review

Scagnelli et al explored hydration in PALS and its effects on survival

- Water Turnover
  - PALS have a decreased mean daily rate of water turnover compared to healthy controls
  - Risk factors for reduced water turnover were females, bulbar-onset disease, and lower values of ALSFRS-R, FVC, and BMI
- Survival
  - Survival was progressively shortened with decreasing water intake
  - Lower water intake had a greater negative impact on survival than BMI
- Predicative Fluid Equations
  - Fluid calculations of 1 ml/kcal/day and the Holliday-Segar formula both underestimated fluid needs
  - Best choice: Kasarskis Equation with a correction factor
    - Intake (L/d) = 0.087 + 0.001151*TDEE from ALSFRS-6 modification of Harris-Benedict Equation

Amyotrophic Lateral Sclerosis and Frontotemporal Degeneration, 2018; 19: 220–231

Taylor & Francis
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Check for updates

ORIGINAL ARTICLE

Hydration measured by doubly labeled water in ALS and its effects on survival

CONNOR N. SCAGNELLI[1], DIANTHA B. HOWARD[2], MARK B. BROMBERG[3], EDWARD J. KASARSKIS[4], DWIGHT E. MATTHEWS[5], HIROSHI M. MITSUMOTO[6], ZACHARY SIMMONS[7]& RUP TANDAN[1]; FOR THE ALS NUTRITION-NIPPV STUDY GROUP

Equation (9). Overall, Equation (9) slightly overestimates water intake in ALS compared to DLW-measured water turnover; however, since water turnover in ALS patients is low, this estimation likely corrects for the shortfall. Therefore, in ALS we recommend the use of Equation (9) to estimate water requirements.

Signs of Dehydration

- Dehydration can lead to physical deterioration, constipation and urinary tract infections

Monitoring for Signs of Dehydration		
Dark colored urine	Decreased urine output	Dry mouth
Dry itchy skin	Confusion	Constipation
Dizziness or Lightheadedness	Headaches	Increased fatigue
Skin turgor	Thirst	Weight changes

Implications to Practice

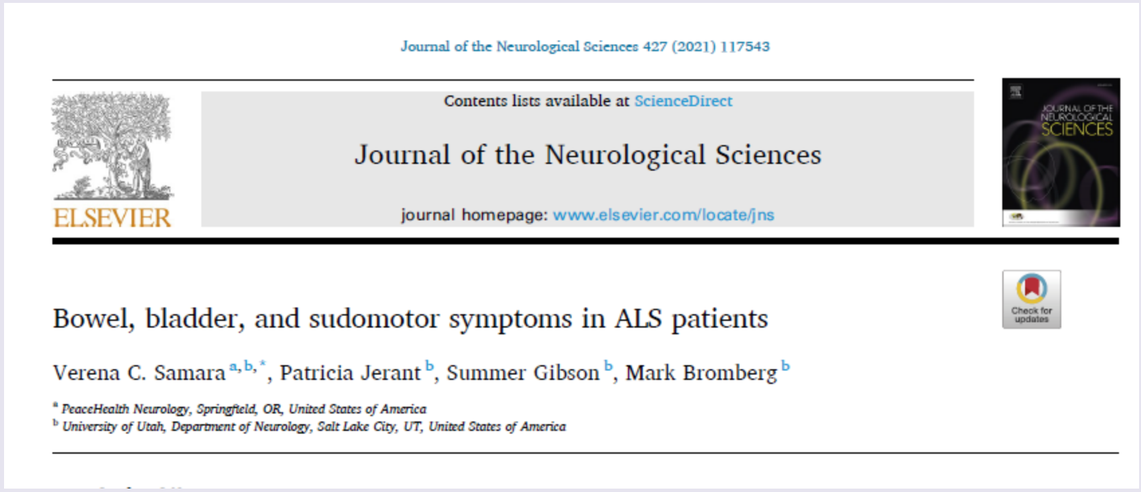
- Routine monitoring of hydration status and using clinical judgement based on signs and symptoms
- Working with a Speech-Language Pathologist to determine if thicken liquids are needed
- If thin liquids like water are not recommended, consider drinking naturally thicker liquids such as milkshakes, smoothies, nectars, tomato juice, and pureed soups
- Consider spacing out free water flushes for enterally fed patients

Pharmacological Management of Constipation

Constipation management of PALS often means the addition of a scheduled bowel regimen
- Over the counter and/or prescription medications may be indicated

PALS surveyed self-reported most effective treatment for symptoms:
- laxative use
- dietary fiber supplementation
- polyethylene glycol
- diet/exercise

Additional medication considerations:
- scopolamine
- glycopyrrolate



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Bowel, bladder, and sudomotor symptoms in ALS patients

Verena C. Samara [a,b,*], Patricia Jerant [b], Summer Gibson [b], Mark Bromberg [b]

[a] PeaceHealth Neurology, Springfield, OR, United States of America
[b] University of Utah, Department of Neurology, Salt Lake City, UT, United States of America

Common Bowel Regimen Medications

Medications of Note

- Fiber supplementation
  - Stool softeners
  - Suppositories
- Prokinetic agents

- *Dietitians should confer with and advise patients to discuss medications with medical providers*

Table 2. Common bowel regimen medications and their mechanisms of action

Medications/ supplements	Mechanism of action	Types
Fiber	Add bulk to the stool, making it easier and softer to pass	*Psyllium-based*: psyllium husk, Psyllium hydrophilic mucilloid *Polycarbophil-based*: Calcium polycarbophil, Polycarbophil *Methylcellulose-based*: Methylcellulose
Stimulants	Stimulate the myenteric plexus and cause increased secretions and intestines to contract	*Bisacodyl-based*: bisacodyl *Sennosides*: senna, psyllium senna
Stool softeners	Moisten the stool by drawing water from the intestines	Docusate sodium Docusate calcium
Lubricants	Enable stool to move through the colon more easily/gently	Mineral oil
Osmotics	Increase secretion of fluid from the intestines and draw water into the lumen of the bowel	Oral magnesium hydroxide Magnesium citrate Lactulose Polyethylene glycol
Enemas and suppositories	Soften stool and provide lubrication and stimulation	Tap water enemas Glycerin or bisacodyl suppositories
Prokinetic agents	Enhance motility by increasing frequency or amplitude of gastrointestinal organ contractions with varied effect on different areas of the GI tract	Few are available in the U.S.A. and have limited use due to their limited efficacy, high side effect profile and rapid development of tolerance[a]

GI=gastrointestinal

Data from Camilleri M, Bharucha AE. Behavioural and new pharmacological treatments for constipation: getting the balance right. *Gut*. 2010;59(9):1288–1296. doi:10.1136/gut.2009.199653; Kale H, Fass R. Prokinetic agents and antiemetics. John Wiley & Sons, Ltd; 2014:1–14

[a] Data from Tack J, Müller–Lissner S. Treatment of chronic constipation: current pharmacologic approaches and future directions. *Clin Gastroenterol Hepatol*. 2009;7(5):502–508. doi:10.1016/j.cgh.2008.12.006

Implications to Practice

Stepwise Approach to Constipation Management

01

Lifestyle modifications

- Dietary changes (including diet and enteral nutrition considerations)
- Physical activity as appropriate and indicated

02

Hydration

- Consider both oral and enteral route

03

Pharmacological Management

- OTC and/or prescription medications and supplements

Work with your medical team when identifying someone who would benefit from additional scheduled bowel regimen

Conclusion

- Gastrointestinal dysmotility can be a common and burdensome aspect of PALS care management
- Remains important to obtain a diet recall and/or reassess the EN formula prescription to monitor for changes in the amount of fiber and fluid received as it relates to symptoms of constipation and through disease progression
- Gastrointestinal symptoms should be managed in an interdisciplinary manner through nutrition-related adjustments, appropriate hydration, and medication changes as applicable

Questions?

Thank you very much!

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