



2022
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 MARCH 11-13, 2022 | *In-Person*
 HYATT REGENCY COCONUT POINT • NAPLES, FLORIDA

COURSE DIRECTORS:
 Tolga Erim, DO and Joel E. Richter, MD, MACG



 EARN UP TO **13** CME CREDITS | EARN UP TO **13** MOC POINTS

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2022
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ACG 2022

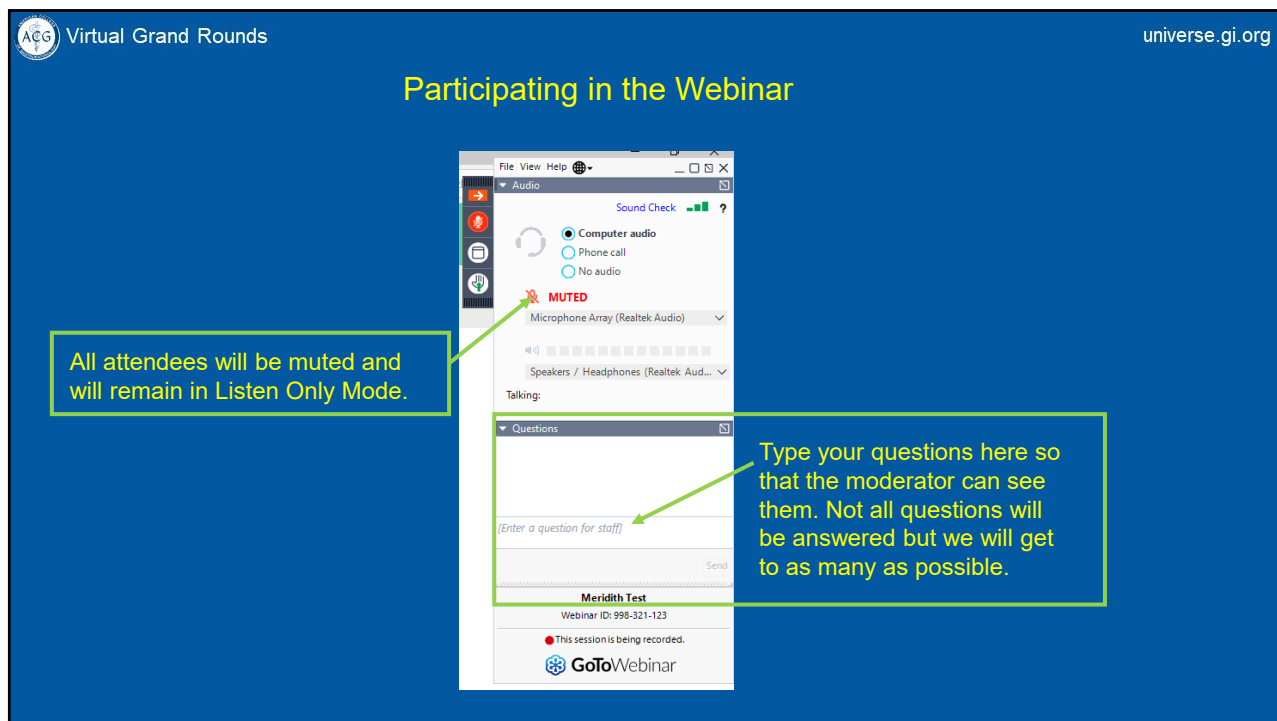
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All attendees will be muted and will remain in Listen Only Mode.

Type your questions here so that the moderator can see them. Not all questions will be answered but we will get to as many as possible.

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LIVE VIRTUAL GRAND ROUNDS WEBINAR
ACG will send a link to a CME & MOC evaluation to all attendees on the live webinar.

ABIM Board Certified physicians need to complete their MOC activities by December 31, 2022 in order for the MOC points to count toward any MOC requirements that are due by the end of the year. No MOC credit may be awarded after March 1, 2023 for this activity.

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If you plan to claim MOC Points for this activity, you will be asked to: Please list specific changes you will make in your practice as a result of the information you received from this activity.

**Include specific strategies or changes that you plan to implement.
THESE ANSWERS WILL BE REVIEWED.**

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ACG Virtual Grand Rounds

Join us for upcoming Virtual Grand Rounds!



Week 9
Update: Mitigating Burnout in Gastroenterologists
 Joseph C. Anderson, MD, MHCDS, FACP
 March 3, 2022 at Noon Eastern and **NEW! 8pm Eastern!**




Week 10
Update: Diagnosis and Management of HBV Reactivation
 Joseph K. Lim, MD, FACP
 March 10, 2022 at Noon Eastern and **NEW! 8pm Eastern!**

Visit gi.org/ACGVGR to Register

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Disclosures:



Speaker:
 Kishore R. Iyer, MBBS
 VectivBio, Switzerland: Grant support, scientific advisor
 Zealand, Denmark: Grant support
 Takeda, Massachusetts: Grant support; scientific advisor
 Hanmi, S Korea: Scientific advisor
 Ipsen, France: Scientific advisor



Moderator:
 Carol E. Semrad, MD, FACP
 Dr. Semrad, moderator for this activity, has no relevant financial relationship(s) with ineligible companies to disclose.

*All of the relevant financial relationships listed for these individuals have been mitigated

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Best Practices in Managing Short Bowel Syndrome



Kishore Iyer, MBBS, FRCS (Eng), FACS
 Professor of Surgery & Pediatrics
 Director Intestinal Rehab & Transplant Program
 Icahn School of Medicine/Mount Sinai Hospital
 New York



Based on: AGA Clinical Practice Update
 Kishore Iyer, John Dibaise, Alberto Rubio-Tapa
Currently under peer review

<https://liftecho.org/web/resources/didactics-archive/best-practices-managing-short-bowel-syndrome-sbs>
 Original slides prepared by Dr John DiBaise, MD, Mayo Clinic, Arizona & adapted

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Learning Objectives

1. Describe best practices in the evaluation and management of SBS
2. Understand the importance of GI anatomy in managing SBS
3. Describe principles of dietary and medical management of SBS

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What is short bowel syndrome?

- Malabsorptive syndrome generally related to reduced gut length
- Results in inability to maintain nutrition, hydration, electrolytes/micronutrients consuming a normal diet
- Wide range in normal SB length: 300-800 cm
 - Tremendous functional reserve

<200 cm small bowel remaining (Medicare states <150 cm)

- *Note that SBS is distinct from Intestinal Failure (IF)*
 - *Need for parenteral support*
 - *May be due to SBS but also functional causes*

O'Keefe S et al. Clin Gastroenterol Hepatol 2006

Pironi L et al. Clin Nutr 2015



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BPA1: Bowel anatomy

- *When evaluating patients with SBS, clinicians should define the anatomy of the residual gastro-intestinal tract with specific reference to the length of remnant small bowel, measured beyond the duodeno-jejunal flexure, and also define whether the colon is in continuity, whether the ileo-cecal valve is present, or whether the bowel ends in a stoma.*

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SBS bowel anatomy types

End-Jejunostomy

SHAWVO
2013

Type 1

- Rapid transit
- Acid hypersecretion
- Poor adaptation
- Large fluid losses
- Malabsorption
- Worst prognosis
- **< 100 cm**

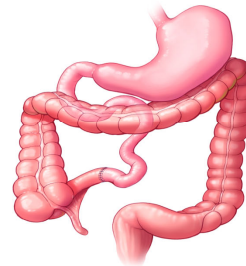
Jejuno-colonic



Type 2

- Rapid transit
- Poor adaptation
- B12 and bile salt malabsorption
- Variable calorie and fluid absorption
- **< 65 cm**

Jejunioileo-colonic



Type 3

- Adequate absorption until about 75% resected
- Good adaptation
- Slower transit
- Uncommon; best prognosis
- **< 30 cm**

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BPA 2: Nutrition assessment

- *A comprehensive nutrition assessment and nutrition support history should be performed at baseline and periodically on all SBS patients.*

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BPA 2: Nutrition assessment/monitoring

- Weight change, medication usage (including supplements), presence of GI and other symptoms that affect oral intake or fluid loss, symptoms of micronutrient deficiencies, and physical assessment for signs of dehydration, malnutrition, and micronutrient deficiency
- Pertinent past medical, psychiatric, and surgical history including the presence of bowel complications (anastomotic strictures, chronic obstruction, enterocutaneous fistulae) and drains
- Nutrition support history including information regarding any enteral and/or central venous access device, formula used, route and method of administration, and prior complications

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BPA 2: Nutrition assessment/monitoring

- Regular monitoring of renal function and fluid balance; adequate hydration generally based on urine output of >1 L/day and urinary sodium concentration >20 mEq/L
- Serial weight measurements as a warning of compromise in nutrition/hydration status
- Serum vitamin/trace element concentrations should be measured at least annually depending upon the presence of existing/prior deficiencies
- Bone density testing and repeated every 2–3 years; annually in the osteoporotic

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BPA 3: Diet

- *The major emphasis of dietary therapy for SBS should be on maintaining compensatory hyperphagia rather than on excessive dietary restrictions.*

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BPA 3: Diet

General	<ul style="list-style-type: none"> • ≥6 small meals/snacks per day • Chew foods well • Tailor diet to individual
Fluids	<ul style="list-style-type: none"> • ORS and/or hypotonic • In some, all fluids may need to be limited & IV given
Carbohydrates	<ul style="list-style-type: none"> • Complex CHO; limit simple sugars & sugar alcohol in both foods/fluids
Fat	<ul style="list-style-type: none"> • Limit fat to <30% in those w/ a colon; may need to limit in those without; ensure oils w/ essential fatty acids
Protein	<ul style="list-style-type: none"> • High-quality protein at each meal
Fiber	<ul style="list-style-type: none"> • Some fiber is good in those with a colon segment
Oxalate	<ul style="list-style-type: none"> • Limit in those w/ a colon; ENSURE adequate urine output first
Salt	<ul style="list-style-type: none"> • Usual intake in those w/ colon; increased salt intake

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BPA 4: Enteral (tube) feeding

- *Use of enteral nutrition (EN), i.e., tube feeding, in combination with oral feeding should be considered in patients with SBS-IF in whom the expected gain with tube feeding may allow weaning from PN.*

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BPA 4: Enteral (tube) feeding

- Enhance intestinal adaptation
- Facilitate weaning from PN when oral intake insufficient
 - Gastric, continuous administration
 - ? Optimal EN formula (elemental vs. polymeric)
 - More frequent use in pediatric population
 - Prokinetic use may improve enteral tolerance in SBS patients with dysmotility
- Promote reversal of PNALD

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BPA 5: Parenteral nutrition (PN)

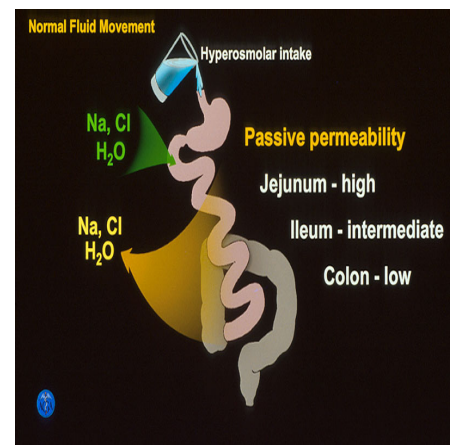
- PN should be considered the primary treatment for patients with SBS-IF.

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BPA 6: Oral rehydration solution

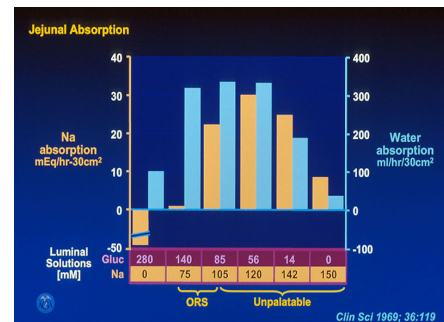
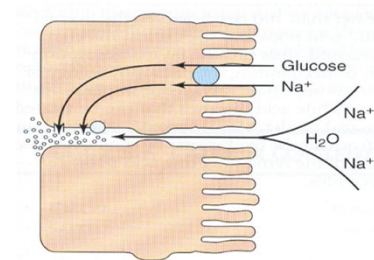
- *SBS-IF and SBS patients with chronic borderline dehydration or sodium depletion, especially patients with a high output end-jejunostomy, should use an isotonic high sodium oral rehydration solution to replace sodium losses via the ostomy.*



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BPA 6: ORS

- End-jejunostomy require glucose-electrolyte solution (ORS)
 - 90 mEq/L sodium
- Fluid composition less important to those with a colon
- All should avoid hyperosmolar fluids
- Commercial and ORT-like recipes



Parrish CR, DiBaise J. Part III: Hydrating the Adult Patient with Short Bowel Syndrome.

Practical Gastroenterology. 2015;XXXVIII(2):10.

*Parrish CR. A Patient's Guide to Managing a Short Bowel, 3rd Ed. 2015.

*Available at no cost at: www.shortbowelsupport.com.

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BPA 7: Pharmacologic therapy

- *Conventional pharmacologic approaches, typically anti-motility and anti-secretory medications, should be used aggressively as first-line agents in the management of SBS-related diarrhea/excessive stoma losses*

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BPA7: Conventional SBS Treatment Options

Diet	Fluids	Drugs			
		Antisecretory	Antimotility	Antimicrobial	Other
<ul style="list-style-type: none"> • Limit simple sugars • Lactose okay if tolerated • Complex CHO preferred • Limit fat with colon • Ensure EFA oils • High quality protein • +/- soluble fiber with colon • Increase salt without colon 	<ul style="list-style-type: none"> • Avoid hyperosmolar • ORS in end-jejunostomy mainly • 90 mEq Na/L optimum • Commercially available and homemade ORS • Sports drinks (high glucose/low Na) 	<ul style="list-style-type: none"> • PPI/H2RA – available PO/IV • Octreotide – subcutaneous (? IV) • Clonidine – PO/transdermal 	<ul style="list-style-type: none"> • Best if taken 30 min ac/hs • Loperamide and diphenoxylate – 1 to 4 tablets up to 4 times/d • Loperamide preferred • Use of codeine and tincture of opium limited • Role of combination of agents unclear 	<ul style="list-style-type: none"> • Mainly to treat SIBO • No quality studies demonstrating role of probiotic, prebiotic or synbiotic 	<ul style="list-style-type: none"> • Bile acids – limited availability • Bile acid binders – may worsen fat malabsorption; not indicated if no colon • Pancreatic enzymes – no evidence of reduced enzyme secretion in SBS but potential for mismatch

ORS, oral rehydration solution

PN support in those with SBS-associated intestinal failure

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BPA 8: Drug dosing

- *Drugs should be prescribed to SBS patients recognizing the absorptive capacity of the remaining bowel and the pharmacologic properties of the drug. Whenever possible, drug dosing should be titrated according to measurable clinical effects or measurement of plasma concentrations.*

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BPA 8: Drug dosing

- Medications in solid dosage forms need to undergo disintegration and dissolution before being absorbed
 - Alternative drug delivery methods (e.g., liquids, topical) should be considered as should the monitoring of medication levels
- Most oral medications are absorbed within the first 50 cm of jejunum
 - Sustained- and delayed-release medications should be avoided
- The solution in response to a lack of clinical response of a drug
 - Escalating the dose
 - Changing to a different dosing schedule or frequency
 - Changing to a different drug formulation (e.g., crushed tablet, capsule, liquid) or route of administration (e.g., intravenous, subcutaneous, transdermal)

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BPA 9: Surgery



Martyrdom of Saint Erasmus
Nicholas Poussin 1628

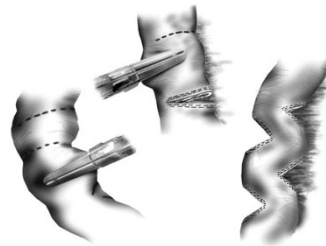
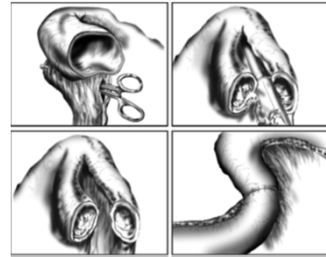
- *The role for surgery in SBS patients should be considered judiciously, periodically and within the context of multidisciplinary care. Surgical intervention may be of value to recruit unused distal bowel or to augment the function of residual bowel through specific lengthening and tapering operations or procedures designed to slow intestinal transit.*

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BPA 9: Surgery

- Preserve as much bowel as possible
 - Restore continuity/take-down stomas
 - Relieve obstruction
 - Repair fistulae
 - Recruit bypassed/unused bowel
- Autologous GI reconstruction
 - Optimize function
 - Increase length (Bianchi, STEP)
 - Taper dilated segment
 - Slow transit
 - Reversed intestinal segment



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BPA 10: Glucagon-like-peptide-2 (GLP-2)

- Use of glucagon-like-peptide 2 (GLP-2) analog should be considered for patients with SBS-related intestinal failure (SBS-IF) who require PN support **after optimization of routine medical and surgical therapy** and if there are no contraindications to GLP-2.

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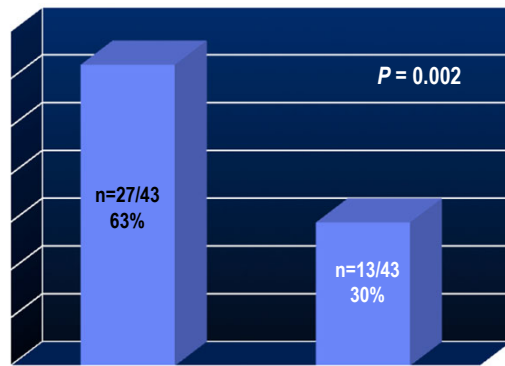


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BPA10: RDBPCT of teduglutide in SBS-IF

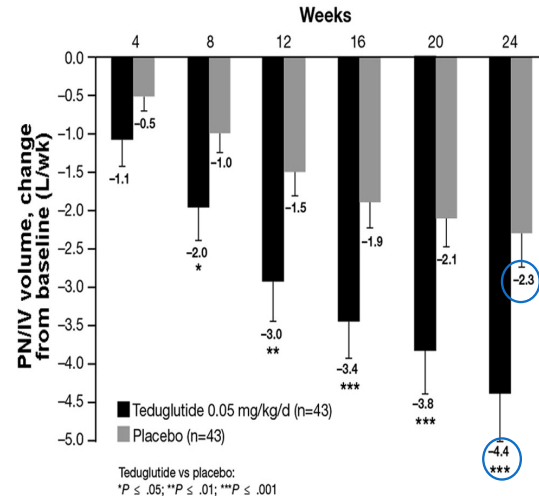
Responder Rate

Reduction in PN/IV Volume



Primary and Secondary Endpoints

- 1) % patients responding with >20% PN reduction/week at weeks 20-24
- 2) Reduction in PN volume



Jeppesen PB et al. Gastroenterology 2012

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BPA10: Teduglutide: Reduction in days on PN/IVF

Baseline Characteristics of 18 Patients

	N	Median (Range)
Gender	7M; 11F	
CIC	15	
End stoma	3	
Age (yrs)		47 (20–81)
Time between last bowel resection and initiation of teduglutide (yrs)		4 (1–13)
Time on PN/IV prior to teduglutide (months)		36 (4–96)
Weekly PN/IV volume prior to teduglutide (L)		9.9 (2.7–30)
PN/IV calories prior to teduglutide (kcal/day)		682 (0–1823)
Small bowel length (cm)		55 (6–180)

- ▶ 18 patients on teduglutide from 2009 – 2015
- ▶ 16/18 decreased PS ('responders')
- ▶ 11 (61%) patients discontinued PS
- ▶ 10/11 patients with CIC
- ▶ Median time to discontinuation: 10 months (3-36)
- ▶ Conditional autonomy in some

CIC, colon in continuity; PS, parenteral support (parenteral nutrition and/or intravenous fluids); PN, parenteral nutrition; IV, intravenous

Lam K et al. JPEN J Parenter Enteral Nutr. 2018 Jan;42(1):225-230

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BPA10: Precautions with teduglutide use

- Risk for acceleration of GI neoplastic growth
 - Colonoscopy before treatment and 1 year later
- Intestinal obstruction
- Fluid overload
- Pancreaticobiliary disease
 - Labs before and every 6 months
- Potential to increase concomitant drug absorption
- Reduce dose in mod-severe chronic kidney disease
- **Active malignancy (< 5 years) is a contraindication to GLP-2**

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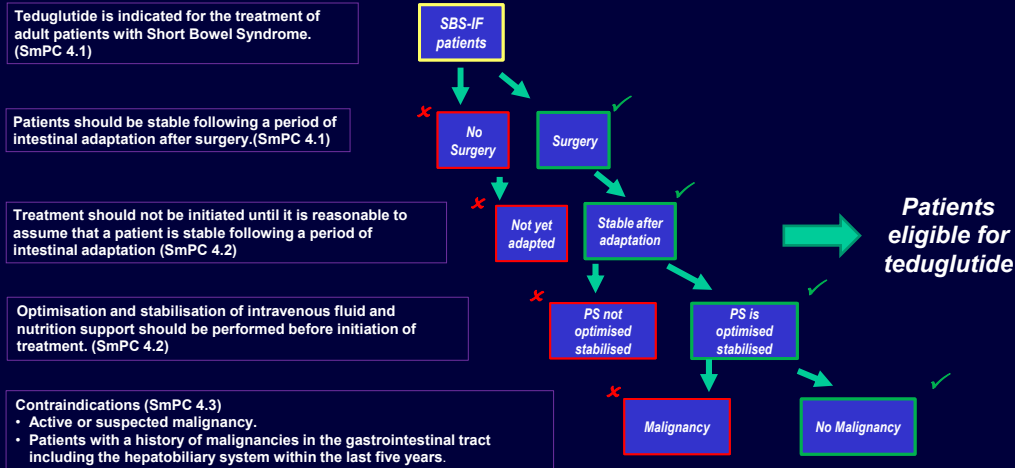
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BPA10: Considerations before using GLP-2

- Patient meets criteria for SBS
- PN/IV fluids required >3 times/week for ≥1 year
- Patient has been optimized on:
 - *Diet therapy*
 - *Anti-secretory drugs*
 - *Anti-diarrheal drugs*
- Is compliant/reliable with therapies
- Partnership exists between treating team and patient

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SmPC guidance for selecting teduglutide-eligible patients



Slide courtesy Prof Francisca Joly, Paris.

Teduglutide EMA SmPC, 2017

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BPA 11: Prevention of complications

- *An important priority of care in SBS is the prevention of complications related to SBS and those related to the need for parenteral nutrition, which are often inter-related.*

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BPA11: Complications/challenges in SBS

- Diarrhea/Malabsorption
 - Multifactorial
 - Weight loss/Malnutrition,
 - Micronutrient/EFA deficiencies
 - metabolic bone disease
- Fluid and electrolyte disturbances
 - 'Net secretor', hypomagnesemia
- Renal dysfunction
 - Stones (oxalate) , CKD
- Small intestinal bacterial overgrowth
- D-lactic acidosis

Other SBS management challenges:

PN/IF-related – liver disease
CVC – sepsis; loss of access

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BPA 12: Referral for intestinal transplantation

- *For patients with SBS-IF and any evidence of PN-failure in the form of onset of life-threatening complications associated with PN, clinicians should consider timely referral for intestinal transplantation (ITX).*

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Intestinal Transplant: Indications

- Irreversible intestinal failure with TPN dependence

PLUS

- TPN failure*

Impending or overt liver failure

Thrombosis of ≥ 2 central veins

Blood stream infections

Liver dysfunction

Loss of vascular access

Recurrent dehydration despite TPN/IVF

≥ 2 line sepsis w/ hospitalization in a year
1 fungemia

1 line sepsis with shock or ARDS

Metastatic infection

- Other indications
 - Massive enterectomy/Desmoids
 - Very poor QOL

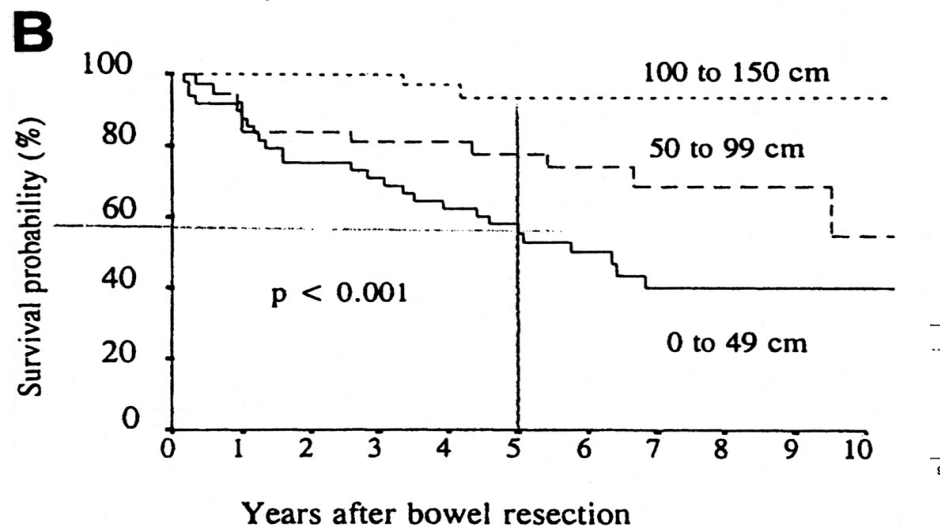
* As defined by Center for Medicare and Medicaid Services

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Can we predict TPN failure?



Messing et al. Gastroenterology. 1999;117: 1043 - 1050

Cavicchi et al. Annals of Internal Medicine. 2000;132: 525 - 532

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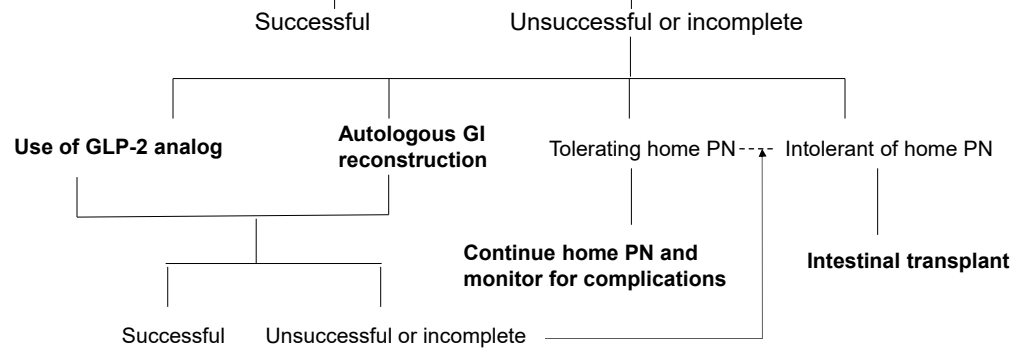
Managing SBS - associated intestinal failure

PN still frequently necessary

- Does not enhance bowel function
- Costly (>\$100K/yr)
- Reduced quality of life
- 1–2 hospitalizations annually/patient

Attempt to wean PN

- Optimize oral diet and fluids
- Aggressive use of antisecretory and antimotility agents
- Maximize function of remnant bowel surgically if possible
- Careful monitoring of status
- Micronutrient supplementation



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BPA 13: Education & support for pts/caregiver

- *Due to the physical, psycho-social and financial burdens confronting those with SBS and/or SBS-IF, and the frequent dependence on intrusive chronic therapy in the form of PN, clinicians should encourage ongoing education for patients and caregivers and their participation in sources of psycho-social support.*


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BPA 13: Ongoing education and support


→ ↻ https://oley.org

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- ▶ Case-based learning in intestinal failure & Home PN (IF 101)
- ▶ Eight one-hour virtual clinics over 4 months
 - ▶ 1st & 3rd Tuesdays, 1-2 pm Eastern US
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 - ▶ Free CME/CE credits
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Questions?



Speaker:
Kishore R. Iyer, MBBS



Moderator:
Carol E. Semrad, MD, FACG

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