

Management of Short Bowel Syndrome (SBS) in Adult. Systematic Literature Review

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Received: January 13, 2020; **Published:** January 21, 2020

Abstract

Background/Aims: This review is aiming to discuss the management of short bowel syndrome in adult.

Methods: The presented review was conducted by searching in Medline, Embase, Web of Science, Science Direct, BMJ journal and Google Scholar for, researches, review articles and reports, published over the past years. were searched up to November 2018 for published and unpublished studies and without language restrictions, if several studies had similar findings, we randomly selected one or two to avoid repetitive results.

Results: Through our review we found many ways for the management of short bowel syndrome in adult depends on the age, inflammatory status, small bowel transit, and the biochemical status of the patients. Conclusion: On the basis of findings and results this review found colon interposition, intravenous fat emulsion with one containing primarily omega-3 fatty acids, parenteral nutrition (PN), are used to manage short bowel syndrome in adult.

Keywords: Management; Short Bowel Syndrome; Adult

Introduction

There are some patients who cannot absorb secondary intestinal nutrients to the length or function of the intestinal intestine. The life-saving treatment is intravenous nutrition (PN). Before PN development, as a result of malnutrition and hunger, patients die. 30,000 US patients permanently dependent on PN for survival. Long-term use of PN is associated with many complications including bloodstream infections, metabolic abnormalities, and others [1-3]. Liver diseases associated with PN (PNALD) are the most serious complications, the causes of which are still not clear. The most effective treatment for PNALD is increasing enteral energy intake while reducing PN, but this process can be challenging when intestinal function is poor [4]. Liver/small intestine transplantation remains the only option for treat-

ment of some cases of liver dysfunction in case of intestinal failure. As for infants with PNALD have a mortality rate close to 100% within one year of diagnosis if they were unable to get rid of PN or failed to obtain a liver/small intestine transplant [5]. Recent evidence suggests that PNALD may be in part due to the soy oils in the fat emulsions, leading us to explore alternative products available elsewhere [6,7].

The short-gut syndrome in the neonate is a dreaded consequence of extensive intestinal loss for various antenatal and neonatal abdominal catastrophes. These infants are "nutritional cripples" and may die from starvation if adequate intestinal adaptation does not occur. The use of total parenteral nutrition (TPN) allows prolonged survival and provides the time and nutrients for adaptation to occur. Enteral nutrition should be started early in the postoperative course to provide trophic factors of intestinal adaptation [8]. In favorable cases, TPN can be tapered slowly as intestinal adaptation progresses and enteral nutrition is better tolerated. This method of medical management can take from weeks to months [9].

Short bowel syndrome is a malabsorptive state resulting from congenital malformation of the gut or occurring after extensive resection of the small intestine for acquired lesions [10]. Common etiologies in infancy include acquired or congenital defects of the small intestine, such as necrotizing enterocolitis, gastroschisis, volvulus, or multiple intestinal atresias. Patients undergoing intestinal surgery for these conditions often must meet some or all of their nutrient requirements through parenteral nutrition [11]. After resection, the residual small bowel undergoes intestinal adaptation, a process characterized by mucosal hyperplasia, villus lengthening, increased crypt depth, and bowel dilatation [12,13].

Methods

The present review article was done through web based search from November 2018 till September 2019 in accordance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA) declaration standards for systematic reviews. We reviewed all the topics on management short bowel syndrome in adult. such as colon interposition, intravenous fat emulsion with one containing primarily omega-3 fatty acids, parenteral nutrition (PN). To achieve this goal, we searched Medline, Embase, Web of Science, Science Direct, and Google Scholar for, researches, review articles and reports, published over the past 15 years.

Our search was completed without language restrictions. Then we extracted data on study year, study design, and key outcome on diabetes. The selected studies were summarized and unreproducible studies were excluded. Selected data is shown in the table 1.

Author and year	Sample	Management	Key point
Philip L 1984 [14]	Six infants	Colon interposition	Our experience with the colon interposition in the patient with short gut syndrome has led us to conclude that when a reasonable trial of medical management has failed, a colon interposition is a safe and effective adjuvant to treatment.
Judah F 2005 [15]	2 infants	Intravenous fat emulsion with one containing primarily omega-3 fatty acids	This suggests that fat emulsions made from fish oils may be an effective means of treating and preventing this often-fatal condition
David J 2001 [16]	30 patients	Parenteral nutrition (PN)	Although residual small bowel length remains an important predictor of duration of PN use in infants with SBS, other factors, such as use of breast milk or amino acid-based formula, may also play a role in intestinal adaptation.

Table 1: Results from sequencing studies.

Inclusion criteria

Inclusion criteria were management short bowel syndrome: adult, neonate.

Exclusion criteria

Irrelevant articles not related to the aim of this review and articles that did not meet the inclusion criteria in this review.

Data extraction and analysis

Information relating to each of the systematic review question elements was extracted from the studies and collated in qualitative tables. Direct analysis of the studies of management short bowel syndrome in adult.

Results and Discussion

Through our search in the we found many ways for the management of short bowel syndrome in adult depends on the age, inflammatory status, small bowel transit, and the biochemical status of the patients.

Three infants were weaned completely off parenteral feedings between 2 and 4 months after colon interposition. Three infants never became independent of parenteral alimentation, and all died secondary to complications of TPN (two from sepsis and one from hepatic failure). No patient developed evidence of bacterial overgrowth or lactic acidemia, usually associated with intestinal stasis. One infant developed bleeding gastritis several months postoperative due to duodenal reflux. The comparative increase in length of small bowel measured in infants No. 1, 4 and 6 at the time of initial bowel resection and later when the colon interposition was performed is shown in Two patients, who had preoperative small bowel transit times measured, had increased transit times after colon interposition [14].

Both patients tolerated the infusion of Omegaven without incident. Direct bilirubin levels at the initiation of therapy with Omegaven, Cholestasis, defined as a direct bilirubin level 2 mg/dL, resolved in both infants within 60 days despite their continuing PN requirement. In both cases, the AST and ALT values also normalized. Weekly CRP levels were obtained to monitor systemic inflammation. When the Omegaven was started, the CRP levels for both infants were elevated but decreased immediately before normalization of their hepatic enzymes [15].

Thirteen (43%) of the patients had necrotizing enterocolitis, and 17 (57%) had congenital gastrointestinal malformations. Median residual small bowel length was 61 cm. The ileocecal valve was preserved in 57% of the patients. The shortest duration of PN use was 101 days, the longest was 3287 days, and the median was 245 days. Of the 30 patients in the study, 20 (67%) were weaned from PN; 9 of the 10 PN-dependent patients died while receiving PN. The causes of death were progressive liver failure in 6 subjects, sepsis in 2, and cardiac arrest in one. One patient received a combined small bowel–liver transplant that enabled her to discontinue PN, so she was considered, for the purposes of the study, to not have been weaned from PN. The duration of PN among those patients who were weaned from PN was not statistically different from those whose death or transplantation led to the discontinuation of PN (mean [SD] days of PN: 553 [376] vs 629 [831], $P = .73$) [16].

The use of duodena-jejunal isoperistaltic colon interposition for short-bowel syndrome was first described by Hutcher, *et al.* using beagle puppies and later by Lloyd employing adult rats. These studies showed that colon interposition prolonged intestinal transit time, increased weight gain, diminished quantity of stool per day, decreased mortality, and did not interfere with intestinal adaptation. Lloyd demonstrated that an antiperistaltic colon interposition in rats can produce a partial bowel obstruction. Theoretically, the colon interposition delays duodenal emptying because of the slower rate of peristalsis of the colon. This allows for more complete intraluminal digestion of nutrients prior to their entry into the small intestine. In addition, the colon absorbs water, and to a limited degree electrolytes, carbohydrates, proteins and fats, although these functions have not been verified in interposed colon. Colon interposition has been described previously by Garcia, *et al.* they interposed a 24-cm segment of colon 6.5 cm from the ligamentum Treitz in a 14.5-month-old infant; his weight or size were not described [14].

PNALD is typically seen with prolonged PN use and is characterized by elevations of serum aminotransferases, bilirubin, and alkaline phosphatase. Histologic alterations include steatosis, steatohepatitis, and cholestasis and, in some cases, progresses to fibrosis and cirrho-

sis [10,11]. Risk factors for PNALD include young age, premature birth, low birth weight, long-term use of PN, absence of enteral nutrition, prolonged diverting enterostomies, gastrointestinal mucosal disease, bacterial sepsis, and multiple operative procedures [15].

Our study indicates that longer residual small bowel, higher percentage of calories received entirely at 6 weeks, and enteral feeding with breast milk or an amino acid-based formula is associated with shorter duration of PN. Longer residual small bowel, shorter time with a diverting ostomy, fewer Gram-positive infections, and feeding with a protein hydrolysate formula are associated with a lower peak direct bilirubin concentration [16].

Conclusion

The results of this studies show the management short bowel syndrome in adult. On the basis of findings and results this review found colon interposition, intravenous fat emulsion with one containing primarily omega-3 fatty acids, parenteral nutrition (PN).

Conflict of Interest

The authors of this article hasn't receive and support for this work and it was completely self-funded.

Bibliography

1. Wilmore DW and Dudrick SJ. "Growth and development of an infant receiving all nutrients exclusively by vein". *Journal of the American Medical Association* 203 (1968): 860-864.
2. Howard L., et al. "Current use and clinical outcome of home parenteral and enteral nutrition therapies in the United States". *Gastroenterology* 109 (1995): 355-365.
3. Buchman AL. "Complications of long-term home total parenteral nutrition: their identification, prevention and treatment". *Digestive Diseases and Sciences* 46 (2001): 1-18.
4. Teitelbaum DH and Tracy T. "Parenteral nutrition-associated cholestasis". *Seminars in Pediatric Surgery* 10 (2001): 72-80.
5. Wales PW., et al. "Neonatal short bowel syndrome: a cohort study". *Journal of Pediatric Surgery* 40 (2005): 755-762.
6. Clayton PF., et al. "The role of phytosterols in the pathogenesis of liver complications of pediatric parenteral nutrition". *Nutrition* 14 (1998): 158-164.
7. Alwayn IP., et al. "Omega-3 fatty acid supplementation prevents hepatic steatosis in a murine model of nonalcoholic fatty liver disease". *Pediatric Research* 57 (2005): 445-452.
8. Weser E. "The management of patients after small bowel resection". *Gastroenterology* 71 (1976): 46-150.
9. Bohane TD., et al. "A clinical study of young infants after small intestinal resection". *The Journal of Pediatrics* 94 (1979): 552-558.
10. Vanderhoof J and Langnas A. "Short bowel syndrome in children and adults". *Gastroenterology* 113 (1997): 1767-1778.
11. Wilmore D and Dudrick S. "Growth and development of an infant receiving all nutrients exclusively by vein". *Journal of the American Medical Association* 203 (1968): 860-863.
12. Porus R. "Epithelial hyperplasia following massive bowel resection in man". *Gastroenterology* 48 (1965): 753-757.
13. Williamson RC. "Intestinal adaptation (second of two parts). Mechanisms of control". *The New England Journal of Medicine* 298 (1978): 1444-50.

14. Philip L., *et al.* "Colon Interposition: An Adjuvant Operation for Short-Gut Syndrome". *Journal of Pediatric Surgery* (1984): 0022-3468.
15. Judah F., *et al.* "Reversal of Parenteral Nutrition - Associated Liver Disease in Two Infants with Short Bowel Syndrome Using Parenteral Fish Oil: Implications for Future Management". *Pediatrics* (2005): 2662.
16. David J BA., *et al.* "Nutritional and other postoperative management of neonates with short bowel syndrome correlates with clinical outcomes". *Journal of Pediatric Surgery* 139 (2001): 27-33.

Volume 7 Issue 2 February 2020

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