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SHORT BOWEL SYNDROME

Essay

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Mohamed Ibrahim Abada


بسم الله الرحمن الرحيم
(قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا
إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ العَلِيمُ
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سورة البقرة - مدنية - الآية 32

List of Contents

List of Contents

List of Figures

AIM OF THE WORK

To study the pathophysiology and management of short bowel syndrome and to focus on the recent trends in management.

HISTORY OF THE SHORT BOWEL SYNDROME

The short bowel syndrome (SBS) is a significant problem in clinical medicine, and has emerged at the beginning of the last century, when the first resections of the gastro intestinal tract have started to be carried out. The loss of a significant small bowel length is a devastating clinical condition encountered in a wide spectrum of medical and surgical conditions ***(Wilmore and Robinson, 2000).***

The history of the first intestinal resection dates back to 1880, when Koeberle performed a resection of a 2 meter of the intestine in a patient who managed to survive. A few decades later (1935), Haymond reported a large series of patients having undergone bowel resection; he concluded that an almost normal bowel function could be expected after resection of one-third of the small bowel length, but loss of 50% of the small bowel was considered as the upper limit of safety; on the other hand, loss of a major part of the small bowel could lead to malnutrition and death ***(Thompson et al., 2012).***

Haymond reported that in 1935 his operative mortality was 33%, and only 20% of the patients survived 1 year. More recent estimates suggest that at least 70% of patients with the short bowel syndrome now leave the hospital, and almost all of this group are alive at the end of 1 year ***(Wilmore and Robinson, 2000).***

During the following decades major advances were made in the fields of anesthesia, the fluid and electrolyte management, and the perioperative care of the surgical patient. Nevertheless, after the 1960s the introduction of total parenteral nutrition (TPN) by Dudrick

and Wilmore has helped these patients to survive for the first period, giving time to the intestine to adapt and improve the absorptive capacity of the remaining part, so it could take over most or all of the missing bowel functions ***(Freund and Beglaibter, 2008)***

An important milestone was demonstrated by Wilmore and Dudrick in 1968 that parenteral nutrition (PN) would support nutrition a status in SBS patients. The development of home PN in 1970 revolutionized the long-term care of SBS patients and this modality rapidly became standard therpy ***(Wilmore and Robinson, 2000).***

More recently, the importance of optimal diet and potential pharmacologic therapy was introduced by Byrne and colleagues, leading to the concept of intestinal rehabilitation ***(Byrne et al., 2005).***

In the following years, the mechanisms able to enhance adaptation of the residual segment of the bowel were analyzed, and this helped in improving rehabilitation of these patients. Today a significant number of patients with small intestinal remnants (<50 cm) are independent of intravenous hyperalimentation on the basis of therapy facilitating intestinal absorption ***(Platell, 2012).***

In 1990 Grant and colleagues reported the first long-term survivor of a small bowel transplant who achieved enteral autonomy, ushering in a new avenue of treatment for SBS ***(Grand et al., 2005).***

Chapter (1):

What Is the Short Bowel Syndrome? (Definition)

Short bowel syndrome (sbs) is best characterized as astate of malabsorption that lead to inability to sustain survival ,growth, hydration and electrolyte homeostasis following massive resection of the bowel for acquired or congenital lesions, symptoms usually occur after resection of more than half of the small bowel ***(o'Keefe et al., 2006).***

The short bowel syndrome was defined as loss of 50% or more of the small bowel, especially when the distal ileum was removed along with loss of the ileocecal valve. More recently, it has been defined as the symptom complex that occurs in adults who have less than 200 cm of jejunum-ileum remaining ***(Wilmore and Robinson, 2000).***

SBS is the most common cause of *intestinal failure* and is defined as a significant reduction in functional small bowel mass, leading to inadequate digestion and absorption, with subsequent growth failure ***(Cole et al., 2008).***

Intestinal failure may be defined as a condition where faecal energy loss occurs and the patient is unable to increase oral intake or absorptive capacity sufficiently to maintain their nutritional status by the enteral route alone ***(O'Keefe et al., 2006).***

Intestinal failure from loss of intestine or short bowel syndrome (SBS), is associated with the inability to maintain protein, energy, fluid, electrolytes or micronutrient balances while on a conventionally accepted normal diet ***(O'Keefe et al., 2006).***

Incidence and Prevalence

The exact population prevalence of the syndrome is unknown. However, this may be estimated from numbers of patients on home total parenteral nutrition of whom approximately one quarter to one-third have short bowel syndrome. Thus the estimated population prevalence is approximately 1 per million. The incidence of severe SBS in the population is estimated to be approximately 2 per million per year ***(Buchman et al., 2003).***

The incidence and prevalence of SBS are estimated to be 3 per million and 4 per million, respectively. Thousands of patients are now surviving with SBS. This condition occurs in approximately 15% of adult patients undergoing intestinal resection, with three fourths of these cases resulting from massive intestinal resection and one fourth from multiple sequential resections. Massive intestinal resection continues to be associated with significant morbidity and mortality rates which are related primarily to the underlying diseases necessitating resection. Approximately 70% of patients who develop SBS are discharged from the hospital. The overall 5-year survival is 75% for those leaving the hospital ***(Thompson et al., 2012).***

ETIOLOGY

In adults the causes of the short bowel syndrome are numerous. The small bowel is mobile and suspended on a mesentery. It is also supplied, in large part, by a single vessel, the superior mesenteric artery and drained by its single companion vein. Thrombosis or occlusion of these vessels (due to torsion of the bowel on the mesentery) usually results in extensive necrosis of the small bowel and approximately one-half of the colon. Thus in a large percentage of patients with the short bowel syndrome the bowel infarcts following thrombosis or embolization of the superior mesenteric artery or thrombosis of the superior mesenteric or portal vein (the latter event being frequently associated with intraabdominal sepsis) ***(Wilmore and Robinson, 2000).***

Alternatively, these vessels may be occluded owing to a small bowel volvulus. Occasionally, such occlusion is also observed in adults who have congenital malrotation of the intestinal tract and present later in life with a strangulation obstruction of the bowel associated with massive intestinal infarction ***(Dabney et al., 2004).***

In addition, one or both of the superior mesenteric vessels may be injured following blunt or penetrating trauma or occasionally following excision of a retroperitoneal tumor ***(Wilmore and Robinson, 2000).***

A second large group of adult patients with the short bowel syndrome are those with Crohn's disease (or, to a lessor extent

radiation enteritis). These individuals have usually undergone repeated intestinal resections and eventually present with the signs and symptoms of the short bowel syndrome ***(Wilmore and Robinson, 2000).***

The need for resection of recurrent Crohn's disease depends on factors related to the site, and nature of disease (e.g., perforation) or complications of surgical treatment. Furthermore, inflammation of the intestinal remnant might impair the absorptive capacity of the intestine. Despite efforts for conservative resections in this disease ***(Thompson et al., 2006).***

There are also functional disorders characterized by severe malabsorption, which may lead to SBS, although the bowel length remains intact. Such condition may be: chronic intestinal pseudoobstruction syndrome, refractory sprue, or congenital villous atrophy ***(Buchman et al., 2003).***

It has been found that postoperative SBS, resection performed for complications of previous abdominal operation, has become the most common cause in adults. This occurs after both open and laparoscopic procedure ***(Thompson et al., 2012).***

The incidence of bariatric surgery, including the Rouxen- Y gastric bypass (GB), is increasing annually. Bariatric patients are at risk for a variety of complications, including the need for re-operation for bowel obstruction, internal hernias and mesenteric

thrombosis. Any of these conditions can result in massive small bowel resection with SBS as a consequence ***(McBride et al., 2006).***

Treatment of abdominal and pelvic malignancies by radiation therapy can result in intestinal injury these can manifest many years after the treatment, and most commonly present as small-bowel obstruction and fistula. Surgical treatment often includes resection or bypass of the affected bowel. Frequently, multiple sequential small bowel resections are required as the disease progresses, which eventually can lead to short bowel syndrome ***(Thompson et al., 2012).***