



Surgical Reflection Short Bowel Syndrome Truly Challenging

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INTRODUCTION

It is complex to tacitly define the so-called short intestine (SI), where the real length of it is the guideline to carry out its function, this will depend on many factors at the time of its counting or evaluation, since it is not exact or reliable and the calculation is very subjective in arithmetic or absolute terms, being impossible or practically fatuous. SI has been defined as those patients who have had an intestinal resection and who are left with a short length, approximately 200 cm or less of the remaining small intestine by counting from the ligament of Treitz. [1, 2] Minimizing bowel resection at initial surgery and restoring bowel continuity through ostomy reversal can effectively decrease the time to early enteral autonomy and avoid short bowel syndrome (SBS). [3]

There is the concept of SBS is divided into anatomical (A) by its length (with less than 100 cm) and/or physiological short bowel syndrome (P) than by its length (with less than 200 cm). SBS is a condition that results from a reduction in the length of the intestine or its functional capacity. Therefore, its definition must be clear, precise and forceful, which for different or varied reasons must be adapted to each patient. [4] SBS is a rare disorder with known physical, psychosocial, and economic burdens, with significant morbidity and mortality. Many people with SI require long-term home parenteral nutrition, decimating any health system, patients, and families, who report substantial financial distress that affects quality of life. [5]

ANATOMY AND PHYSIOLOGY

The small intestine is a crucial gastrointestinal segment involved in digestion and nutrient absorption, as well as various endocrine functions and immune protection; with a complex structure of blood vessels, nerves, muscles, and special cells, which work together to allow the small intestine to accomplish these tasks. [6] The small intestine has three portions: which is duodenum, jejunum, and ileum, 4 to 5 centimeters wide and 6 to 7 meters long (the duodenum is 25 to 30 cm). The colon or large intestine is on average 10 centimeters wide, with a total length of 120 x 160 cm in total. [7, 8]

The normal length of an adult's small intestine, starting from the duodenum-jejunal angle, measures between 275 and 850 centimeters. About 9 liters of fluid pass through the small

intestine daily in the form of oral fluids, saliva, gastric, biliary, and pancreatic secretions. On average, about 7 liters of those fluids are absorbed in the small intestine and 2 liters in the large intestine. The healthy large intestine absorbs approximately 150 kilocalories per day but can absorb up to 1000 kilocalories per day in those patients with malabsorption. The absorption of most nutrients occurs in the first 100 centimeters of the jejunum. Vitamin B12 and bile salts are absorbed in the last 100 centimeters of the ileum; magnesium is absorbed in the terminal ileum and proximal colon; the absorption of water and sodium takes place throughout the intestine. [9] The large intestine is the part of the digestive tract where water from indigestible contents is absorbed. The large intestine includes the cecum, appendix, entire colon, rectum, and anal canal. Key functions of the colon include the following: absorption of water, nutrients, and vitamins, compaction of stool, secretion of potassium, chloride, and moving waste material into the rectum. [10]

Diet quality affects gut homeostasis by influencing microbiota, intestinal permeability, and lipopolysaccharide clearance; therefore, dietary patterns could favor or protect against metabolic endotoxemia, bacterial translocation and intestinal permeability itself. [11]

HOW TO MEASURE THE LENGTH OF THE SMALL INTESTINE

Although there is a difference in measurement techniques and the size of study groups, most research that measures the length of the small intestine employs direct techniques using methods such as U-ribbon; ranging from the ligament of Treitz to the ileocecal valve, the mean length of the small intestine measured was 615.4 cm (623 cm for 494 men and 611.4 cm for 895 women, respectively), while the average diameter was 2.3 cm; whose measurement was carried out with artificial intelligence software in an abdominal computed tomography. [12] In addition, it should be considered that intestinal length can vary from one subject to another due to the same constitution, weight, height, or being male or female, or age, or genetic or hereditary pathologies and previous emergency or scheduled surgeries. [13]

The current gold standard for small bowel measurement in humans is intraoperative evaluation performed by an experienced surgeon. However, even measurements made in the operating room are notoriously unreliable. [14] Surgeons primarily use their visual estimation of distances to measure bowel length, or two-dimensional vision in laparoscopic surgery; where the lack of depth perception impairs the accuracy of the visual estimation of intestinal distances by surgeons, concluding an error factor of up to 30%. Although robotic surgery consoles offer three-dimensional vision, their impact on the accuracy of distance estimation is not yet fully understood. [15] Evaluation of the length of the remaining small intestine by three-dimensional computed tomography is the most accurate and acceptable method in the end, for clinical application; while intestinal transit with barium is less precise, however, it is more convenient and economical in a condescending manner in an institutional/public clinical reality. [16]

Therefore, non-invasive measurement of the length of the small intestine is challenging. Three-dimensional imaging modalities reduce the risk of length underestimation, which is common with two-dimensional techniques. However, they also require longer times to make length measurements. Automated segmentation has been tested for magnetic resonance enterography. [17] Where the length of the small intestine by computed tomography or magnetic resonance enterography allows with this method to reconstruct two- and three-

dimensional curves multiplanar and achieves the stretching of each intestinal loop, by means of a point-to-point identification of the intestinal lumen. Subsequently, the software allows the creation of a virtual image, on which the intestinal length is measured linearly with greater precision. [18]

ETIOLOGY OF SHORT BOWEL SYNDROME

In the first instance, congenital SBS (C) is a genetic mutation of Phylamine A (FLNA) with CSBS, which is a rare disease with a very poor prognosis. [19] Not to mention that the dimensions of the small intestine and the large intestine can be altered by the following causes, such as dilation or extension or a great elongation when there is an existing pathological condition or the combination of two or more of them such as: an intestinal occlusion, [20] paralytic ileus, severe systemic malnutrition, previous specific surgeries, [21] a restrictive and/or selective diet, mesenteric ischemia, metabolic or chronic-degenerative diseases or inflammatory bowel diseases, [22] cancer, [23, 24] necrotizing enterocolitis, volvulus malrotation, intussusception or idiopathic causes, [25] among many others.

We must not forget to mention the jejunal stomas, which are very high or close to the ligament of Treitz, which some surgeons do in an emergency surgery or even erroneously scheduled or because they have no other option in a damage control surgery in the practice of trauma surgery, and that results in SBS in the patient. [26] In mesenteric ischemia due to infarction or thrombosis, anticoagulant therapy is initiated in 68% of cases, but most surgical teams choose between 96% and 86% a major bowel resection when there are obvious signs of extensive necrosis. [27] See Figure 1.

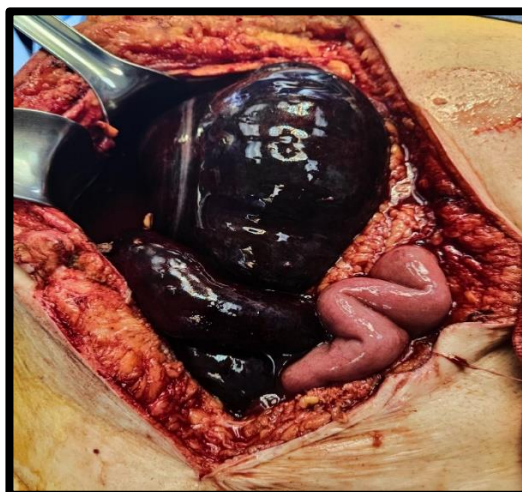


Figure 1: Massive intestinal ischemia with necrosis of the small intestine and colon.

Non-occlusive mesenteric ischemia is a fatal disease with a low survival rate in most cases, it occurs due to spasms or diffuse narrowing of the peripheral arteries, which ultimately leads to necrosis of the intestine; where being able to determine the exact extent of the intestinal resection is essential, with the utility of fluorescence, (sodium fluorescein and black light) [28] then projecting an additional intestinal resection in a second operation for a revision, at 48 or 72 hours; but it should be clarified that nothing is established at this time. [29]

PSBS has been documented in bariatric surgeries such as ileal shunt with a single anastomosis sleeve, which can lead to nutritional deficiencies, including iron metabolism disorders and consequently anemia. However, this study documented that a residual small bowel extension of 250 cm to 300 cm did not occur with these effects. [30]

Patients with high proximal stoma often depend on parenteral nutrition, which is expensive and risky, so it has been studied that when carrying out this research, a proposal that suggests that by preserving the first and second jejunal arteries has corroborated that they can sustain a length of small intestine beyond the feasible limit of 1.5 m, which implies the viability of resection, avoiding ASBS. [31] Jejunostomy for feeding is frequently employed as a nutritional support measure when oral or gastric feeding is contraindicated or is a Salvatore measure or practice in complicated upper digestive tract surgery. But as a programmed or elective derivative stoma or so-called protective stoma, its practice is not indicated or should be condemned. [32]

On the other hand, in pediatric patients with necrotizing enterocolitis, complete resection of the compromised intestine has shown a strong association in survival, which was evidenced in 88% of cases and who achieved enteral autonomy. There was no association between the operative approach and enteral autonomy or the time to achieve it. [33] Since an incomplete removal of the necrotic bowel can delay recovery due to bacterial translocation and inflammation. Resection margins to determine that the entire intestine affected by necrotizing enterocolitis had been completely removed were examined and verified to greatly reduce mortality and hospital stay and without data for a much-feared SBS. [34]

There are pathologies such as celiac disease, which is a sensitivity to gluten mediated by T cells that produces atrophy of the villi of the small intestine, which leads to chronic malabsorption and consequently severe chronic malnutrition, acute kidney injury, severe dehydration, hydro electrolyte imbalance, decreased immunity and secondary sepsis, since it would behave like a PSBS. [35] Although it has been commented that intestinal occlusion is a frequent cause of SBS, since it is one of the most frequent pathologies, being responsible for 350,000 hospitalizations in the U.S. and with a cost of approximately 2,300 million dollars per year, it should be noted that 55.6% had a successful nonsurgical treatment at discharge (mean length of stay 3 days) compared to 44.4% of surgical conversion. and small bowel resection 15.27% and only one SBS case was reported, [36] with a 6-month survival of 19% before transplantation. [37] It has been documented that there is an associated malabsorptive disorder regardless of the resected intestinal length, with surgeries for ileal ablations, which repeatedly (40.8%, 20/49) is the most frequent cause. A total of 228 patients were registered for follow-up for intestinal failure of any etiology, 89 patients (39.5%) were identified with Crohn's disease. [38]

DIAGNOSIS OF SHORT BOWEL SYNDROME

The physiology of SBS begins first, with stress-induced changes in intestinal mucosal permeability involving activation of specific cells in the gut (glial cells and mast cells), overproduction of interferon- γ , and morphological changes in the colonic epithelium. Environmental stress activates the hypothalamic-pituitary-adrenal axis, releasing corticotropin-releasing factor from the hypothalamus and stimulating the secretion of adrenocorticotrophic hormone from the pituitary gland, which leads to the release of cortisol, an important stress hormone, from the adrenal glands. Therefore, it can be concluded that both

neuronal and hormonal communication lines allow the brain to influence the activities of intestinal functional effector cells. [39]

From a functional point of view, intestinal failure is classified as:

- Type I. Acute: it is short-lived and self-limiting.
- Type II. Prolonged acute: in metabolically unstable patients who require complex multidisciplinary care and parenteral support for weeks or months.
- Type III. Chronic: in metabolically stable patients who require IV supplementation for months or years. It can be reversible or irreversible. [40]

On the other hand, it must be distinguished from other pathologies such as environmental enteric dysfunction, it is a subclinical pathology prevalent in environments with limited resources, which is raised as a consequence of chronic exposure to environmental enter pathogens, which results in malnutrition, growth retardation and neurocognitive diseases; by morphological changes including inflammation of the intestinal mucosa and villi atrophy, as well as functional damage, including impaired intestinal permeability and reduced intestinal absorption. [41]

Computed tomography is a very useful instrument in diagnosis, as it was used to evaluate intestinal emphysema, portal vein emphysema, thinning of the intestinal wall, deficient intestinal angiography, presence of ascites, intestinal dilation among many other non-specific characteristics that contribute to a high diagnostic/etiological suspicion in an indirect way. [28]

CLINICAL CONSEQUENCES

Postoperative SBS causes long-term impairment of bowel functions, such as nutrition, metabolism, and immune function, resulting in a significant decrease in quality of life. [28] Some of the clinical manifestations of short SBS are alopecia, considerable weight loss, lethargy, mucositis, visual impairment, considerable asthenia, progressive adynamia, depression, etc. [28]

Preoperative SOFA score (Sequential Organ Failure Assessment Score) and postoperative residual bowel length may be predictors of death in surgical patients, regardless of age and comorbidities. [29] Septic complications (bacterial overgrowth, catheter-related sepsis), vesicular complications, gastric-duodenal ulcers, gastrointestinal bleeding, severe dehydration, spontaneous abscesses, severe to fatal hydro electrolyte imbalance, consumption syndrome, or severe acute malnutrition, [42] acute renal failure, and hepatic failure related to total parenteral nutrition. [43]

TREATMENT

Clinical nutrition and especially artificial nutrition are important areas of clinical practice, with several gastrointestinal disorders interfering with digestive function, inducing systemic inflammation, and influencing physiological metabolic pathways, which can affect energy and protein balance, where refeeding syndrome is considered a life-threatening condition, defined as potentially fatal changes in fluids and electrolytes, resulting from metabolic and hormonal alterations that can occur in malnourished patients receiving nutritional therapy. [44] The main features of refeeding syndrome include abnormal glucose metabolism, hypophosphatemia,

hypomagnesemia, hypokalemia, and vitamin deficiency, leading to cardiorespiratory failure, malignant arrhythmias, neuromuscular symptoms, hematologic dysfunction, and death. [45, 46] Prolonged fasting induces histological and ultrastructural changes that are reflected in decreased absorption in the intestine (duodenum and jejunum). This includes villi shortening with or without mucosal atrophy resulting from degenerative changes in individual enterocytes. [47]

A high volume of ileostomy/jejunostomy effluent in patients with extensive bowel resection may be difficult to control. This leads to extensive loss of proteins, fluids, and electrolytes along with consequent malabsorption. The strategic use of drugs has traditionally been controlled by delaying intestinal transit, reducing intestinal and gastric secretion using opiates, loperamide, diphenoxylate, omeprazole, hyoscine butyl bromide, somatostatin and octreotide. [48, 49]

Intestinal adaptation becomes both a morphological and functional mechanism, in which there is an increase in the depth of the crypts and lengthening of the intestinal villi to provide a greater absorptive surface, with the conjugation of dietary changes and intestinal or colonic biota. The global process of intestinal adaptation occurs in 3 phases:

1. **Survival or phase I:** from 2 weeks postoperative to 2 months. Equalizing the hydro electrolyte imbalance.
2. **Intestinal retraining or phase II** lasts from 2 months to 2 years, with a mixed diet both enteral and parenteral.
3. **Intestinal stability or phase III:** nutritional and metabolic stability is achieved. More than 2 years until normalization with nutritional self-sufficiency or with minimal supplementation by oral intake. [50]

Patients with high proximal stoma often rely on total parenteral nutrition, which is expensive and risky. Distal enteral tube feeding is a method of delivering nutrition to the small intestine that aims to improve clinical outcomes and reduce complications, with a significantly shorter total hospital stay as in the intensive care unit, with less time for total parenteral nutrition (mixed nutrition) and a significantly faster time to closure or full recovery. [51]

On the other hand, bowel resection in an infant has a better prognosis, due to the potential for intestinal growth and adaptation. It is a determinant of intestinal functionality and prognosis, since in the neonatal period the probability of achieving independence from parenteral nutrition is 88% in >50cm of jejunum, 60% in >38cm and 7% in <15cm. In intestinal length <50cm, the probability of discontinuation of parenteral nutrition is 23% after 12 months, 38% at 24 months and 71% at 57 months. [52, 53] The 5-year mortality rate was estimated at 10.1% in patients with non-malignant intestinal failure, and by age the incidence was classified as 89.1% for those under 40 years of age, 74.8% for patients between 40 and 60 years of age, and 52.1% for those over 60 years of age; inflammatory bowel disease as a significant risk factor for increased mortality. In addition, gut anatomy was significantly associated with the weaning ability of parenteral nutrition, and no patient without a colon and with a remnant of less than 100 cm of the small intestine remained weaned continuously and alive for one year. [54] In another study, the relative survival that has been achieved was 76%. In patients with long-term intestinal failure, as a cause of death that occurred during home parenteral support, in adult patients for non-malignant reasons. [55]

As of 2012, the use of the semi-synthetic GLP-2 peptide, an enterohormone called Teduglutide, was introduced to the world, which changed the course and prognosis of this pathology, with the effects of increasing the time of gastric emptying, decreasing the intestinal transit time, maintaining entertrophism, increasing splanchnic blood flow, decreasing apoptosis in the intestinal mucosa and preserving the intestinal barrier. [40, 56, 57] Facilitating intestinal adaptation in SBS remains an important focus of research. Emerging data support the role of the gut microbiome in modulating disease progression. [58] The human microbiome is composed of bacteria, archaea, viruses, and microbes. Healthy adult humans typically have more than 1000 species of bacteria, among their known functions include digestion, vitamin production, regulation of the immune response through their metabolites. [59] Emerging data also support the use of fecal microbiota transplantation as a therapeutic strategy for SBS with varying success. [60, 61]

Autologous gastrointestinal reconstructive surgery has become a key component of bowel rehabilitation programs in the treatment of SBS, however, it is still unknown which is the best surgical option, combining lengthening, adaptation, and reduction of transit time procedures. [62, 63] Surgical techniques such as the one published in 1980 by Bianchi have been described, which doubles the length of a loop of small intestine, simultaneously reducing its luminal diameter and preserving the maximum amount of mucosa of the small intestine for intestinal adaptation. [64] Serial transverse enteroplasty, described in 2003 by Kim and colleagues, consists of a series of partial transverse sections over the intestine so that a zig-zag channel is created that reduces the intestinal lumen and increases its length. [65] See Figure 2.

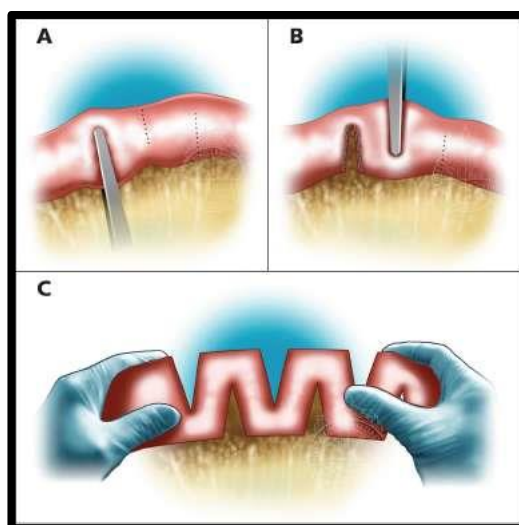


Figure 2: A and B: Transverse enteroplasties. C: Zig-zag-shaped channel. [66]

Image of the publication: Bellolio R. F., Klaassen L. J., Pulgar B. D., et al. Serial transverse enteroplasty as an alternative in the treatment of short bowel syndrome: Clinical case. Rev. méd. 2010; 138 (4): 478-482.

The cooperation of multidisciplinary care and improvements in parenteral nutrition in patients with SBS has led to better outcomes and increased survival. Autologous gastrointestinal reconstructive surgery may reduce the duration of total parenteral nutrition and lead to earlier enteral autonomy. [67]. In the tireless pursuit of treating short bowel syndrome surgically, a new surgical technique is exposed, the Saeki-Spiral-Shark (3S) method, using shark gut

biomimetics, which does not require an incision in the intestine, allowing for clean and less invasive surgery; and consists of forming many folds within the intestine using externally placed sutures. With the reduction of the dilated bowel and the placement of artificial intestinal valves are performed simultaneously. It hasn't been done in humans yet. [68] See Figure 3.

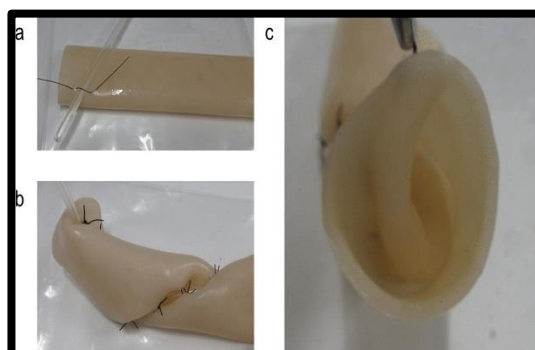


Figure 3: 3S method. (a) A soft catheter called Nelaton is placed in the intestine at about 45° as a guide. (b) Nodular sutures are placed in the intestine along the catheter to create a spiral bowel valve within the intestine. (c) With the 3S method, a spiral valve is formed within the intestine. [68] Post image: Saeki I., Kurihara S., Kojima M., et al. A new surgical technique for short bowel syndrome. *BMC Surg.* 2022; 22(1):375.

Surgical rehabilitation should be pursued when there is sufficient residual bowel to obtain a better bowel function. An antiperistaltic bowel loop should have the sole objective of slowing down transit and increase the absorption surface, with 10 cm of jejunum of the ligament of Treitz with jejunal anastomosis.

colonic (transverse) with inverted intestinal segment (antiperistaltic intestinal loop).

The aim is to increase the contact time between the intestinal epithelium and nutrients by creating peristalsis retrograde, oral autonomy has been achieved by up to 80% with a lower amount of parenteral calories, as well as dependence on total parenteral nutrition. [69] Figure 4.

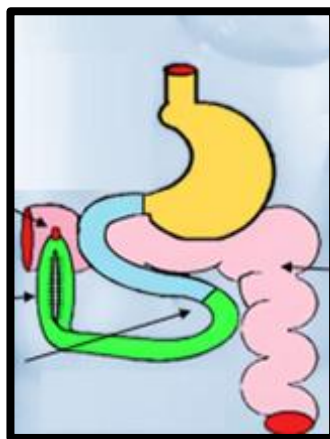


Figure 4: Diagram of the surgical technique using the antiperistaltic intestinal loop resource. [69] Image from the publication: Villacis R., Diaz D., Lemarie S. Inverted intestinal segment (antiperistaltic intestinal loop) in short bowel syndrome. *United for clinical nutrition.*

The preservation of the ileocecal valve has shown significant benefits with an extremely short distal ileum; since it allows to encourage intestinal transit, achieving more absorption of water and nutrients, as well as achieving an earlier intestinal adaptation after a low or upper stoma and/or with an SBS. [70] On the basis above, it is proposed how to create a new intestinal valve, an anti-reflux valve, by invaginating a segment of the small intestine 3.5 to 4.5 cm in the distal lumen, after removing the seromuscular layers at both ends of the intestinal segment. Antiperistaltic pressure resistance, measured at regular intervals for 6 months, showed valves with competition equal to or greater than the ileocecal valve. The problem to be solved with this technique is the blood supply to the invaginated segment that must be carefully preserved (it was only experimental). [71]. The creation of a new ileocecal valve in cases of short bowel syndrome (<45 cm) is effective in intestinal adaptation and improvement of nutritional parameters; with maximum survival with normal growth without parenteral nutrition is now possible with as little as 11 cm of jejunum-ileum with an intact ileocecal valve. [72]

In Mexico, the Surgeon Dr. Roberto Blanco Benavidez, in 1994 published the creation of a new valve, which was initially made in dogs and then in humans with very overwhelming/forceful positive results. [73, 74] See Figure 5.

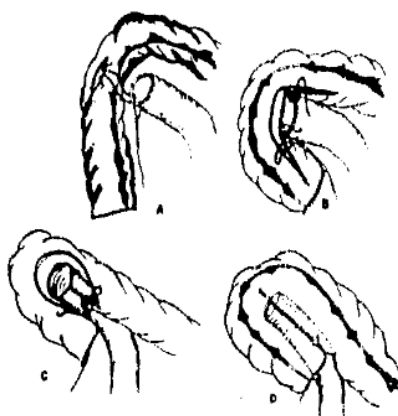


Figure 5: Blanco Valve.

The creation of a new jejunum-colon valve, performing a end-lateral anastomosis (a) and in the background performing seromuscular points, (b) performing mucosal eversion (c and d), without intestinal ischemia and with a competent and viable valve function. [74] Publication image: Blanco-Benavides R., Sánchez-Fernández P., Córdova-Amurrio C. Surgical management of short bowel syndrome. Specialty thesis in General Surgery. Mexico City. Mexico. National Autonomous University of Mexico. 1996.

Another surgical option explored is colon interposition, which can be isoperistaltic or antiperistaltic, the length of the colon that absorbs water, electrolytes, and nutrients. [75] This involves interposing a segment of the colon between two branches of the small intestine in patients with rapid intestinal transit. Although the exact mechanism is not well understood, colonic interposition has been studied experimentally and clinically applied in the treatment of SBS in anecdotal cases. The interposed colon segment is usually placed proximally, and its slow segmental peristaltic contractions probably reduce the rate at which nutrients are delivered to the distal intestine. This interposed colon can also absorb nutrients, water, and electrolytes. [76]

It can also be thought that the same colon may have an absorption function like that of the small intestine after massive resection of the small intestine. To improve the absorption function of the colon, a valve has been created in the colon (artificial colonic valve); but it has only been done in animal experiments. [77] See Figure 6.

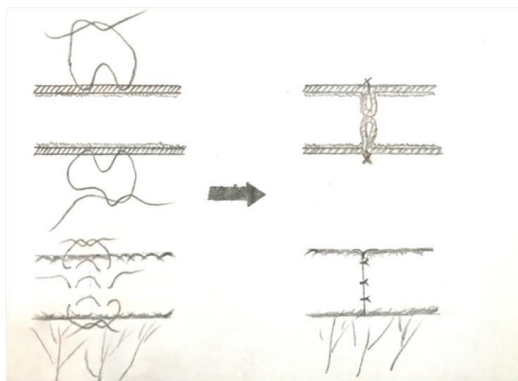


Figure 6: The manufacturing process of an artificial colonic valve. [77]

Imagen de la publicación: Deng G., Deng Z. Enhancement of Colonic Absorptive Function after the Massive Resection of the Small Intestine Based on the Creation of an Artificial Colonic Valve. *Sci Rep.* 2020; 10(1):818.

On the other hand, it has been investigated that the small intestine segments that were obtained from spring-induced stretched bowel (T2sp) and segments distal to the spring as a control and analyzed as prolonged adaptation, makes a viable and novel approach for SBS; but it is still in animal experimentation and will need to be explored further. [78]

Intestinal transplantation is the primary treatment option for eligible patients with severe gastrointestinal diseases, including inflammatory bowel diseases, acute mesenteric infarction, and refractory end-stage intestinal failure. In the United States of America, an average of 90 intestinal transplants have been performed per year since 2019. [79]

Pediatric patients who develop life-threatening complications of irreversible intestinal failure have been considered for intestinal transplantation, and where 30% of intestinal transplants in both the United States and the United Kingdom are only performed in these two countries around the world. With a reported 10-year survival of 40% of patients with this option. But specifically, it is considered that the ideal donor in intestinal transplantation is one who has between 50% and 70% of the recipient's body weight; but this problem must be solved in the first instance. [80] Bowel transplant strategies are constantly improving, as the main hurdles appear to be patient selection and timing of intestinal transplantation, as well as long-term immunological hurdles. Unlike other organ transplants, severe acute rejection is associated with poor survival of the patient and the graft itself. [81, 82] Even with significant advances in surgical techniques and immunosuppression, up to 44% of intestinal transplant recipients still die within 5 to 10 years of intestinal transplantation. [83] In Mexico, this surgical option or opportunity to live is not carried out.

SURGICAL REFLECTIONS

1. There is no health policy or regulation at the national or state level and institutional of any health agency in Mexico of a specialized "Special Nutrition" service

2. The use of a pharmacological synergy in short bowel syndrome is very useful, safe, hopeful or promising, since it potentiates its chemical-physiological effects on the remaining intestine and allows the control of phase I with fasting:
 1. Considerably reduce the loss of fluids and electrolytes, through the stoma or through the evacuation itself. (The synergy of Omeprazole 40 mg /12hrs I.V. Octeotride 0.5 mcg / 8 hrs. S.B.)
 2. Increases intestinal absorption. (The combination of hyoscine butyl bromide, 40 mg per day, 10 mg I.V. C/8 hrs and loperamide 8 to 16 mg per day each day, orally)
 3. Decreases intestinal transit. (The combined use of hyoscine butyl bromide, 40 mg per day, 10mg I.V. C/8 hrs and loperamide 8 to 16 mg per day each day, orally)
 4. Anatomical elongation only pharmacological. (hyoscine butyl bromide 40 to 80 mg/day c 6 hrs/I.V.
1. In Mexico, only surgeons (or the General Surgery service) are the only specialists who treat short bowel syndrome and in almost all third and second level hospitals, they do not have a specialized "Special Nutrition" service (and in which there is the service, it is also managed by surgeons exclusively).
2. Due to the above reflection, in the absence of a specialized and regulated "Special Nutrition" service, in Mexico there are few hospitals or almost none that have patients with total parenteral nutrition on an outpatient basis or at home.
3. Each patient should be individualized according to the anatomical length of the small intestine posterior to the ligament of Treitz, age, comorbidities, added pathologies, and underlying disease, for the following options:
 1. Fasting and exclusive Total Parenteral Nutrition.
 2. Mixed nutrition (Total Parenteral and progressive elemental oral diet)
 3. Exclusive progressive elemental oral nutrition.
 1. It should be considered that starting a diet, even specialized with an anatomical short bowel segment (<100 cm) without ileocecal valve, is counterproductive, because it causes hormonal hypersecretion with secretory diarrhea and no absorption. With massive loss of fluids, electrolytes and proteins.
 2. On the other hand, it should be considered that having an intestinal segment >100 cm, with an ileocecal valve, it is of high value to promote the absorption function of the intestine with a low-calorie diet, with little solvent and with an elemental protein chain. (achieving hemostasis, stimulating intestinal villi and promoting intestinal adaptation)
1. The diagnosis of short bowel syndrome is essential and should be classified as an anatomical short bowel syndrome (<100 cm), which is far from being a physiological short bowel syndrome.
2. It is essential to count the residual small intestine numerically and adequately in the most realistic way possible and to consider that a massive intestinal ablation or even an intestinal resection such as a right hemicolectomy with ileostomy, which may behave as a physiological short bowel syndrome, with a rapid adaptation. It should be considered that intestinal functionality is not dependent only on the length of the small intestine and therefore its definition is sometimes absurd.
 1. Colon preservation is often a critical determinant for independence from intravenous support and a patient's self-sustaining nutritional bowel adaptation.
 2. It is evident that having a complete colon intestinal adaptation is much superior and leads to an accelerated recovery.

3. Performing an upper stoma (jejunostomy) near the ligament of Treitz should be avoided at all costs and if possible. Its consequences are fateful or catastrophic.
 - Es diferente el pronóstico de un síndrome de intestino corto con válvula ileocecal viable que sin ella. Las posibilidades de adaptación intestinal de los pacientes que tienen válvula ileocecal de vivir y con cierta calidad de vida son exponencialmente mayores de los que no cuentan con ella.
 - El equipo quirúrgico de este manuscrito ha realizado la técnica de la nueva “válvula de Blanco”, con resultados óptimos, con buena calidad de vida y logrando una autosuficiencia nutrimental en cuatro pacientes.
 - Se debe de tomar en cuenta el número de deposiciones, sus características, en cada paciente y continuar ajustando el manejo farmacológico antes puntualizado, potencializando así la técnica quirúrgica empleada en el síndrome de intestino corto anatómico; con un control y seguimiento a más de 5 años.

Final Comment

It is essential to carry out serious scientific research of type I evidence, with preclinical studies that are carried out in animals and physiological models in the laboratory, analyzing the physicochemical properties and behavior of the compound in vivo and in vitro, or type I and II experimental tests, with the progression of clinical research studies in their 4 phases. (not by expert consensus, not by clinical practice guidelines, not by recommendations, etc. Something very distinctive of these last two decades, an idiom acculturated by pharmacological emporiums) of this pathological condition so challenging that is SBS, and that it is based on statistical evidence and transcendental final results in patients with a satisfactory quality of life; exhausting new paradigms, using exclusively the scientific method and not only by empiricism (experience of experts) which is repetitive, absurd or even non-existent; with the goals or purposes of reducing mortality, morbidity and economic/social/psychological costs on a full and large scale.

Conflict of Interest

The authors stated that they had no potential conflicts of interest regarding the research, authorship and/or publication of this article.

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