

Clinical and Nutritional characterization of patients with massive intestinal resection in Ribeirão Preto, SP, Brazil

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ABSTRACT

Background: Short bowel syndrome (SBS) is a clinical situation due to extensive intestinal resection or dysfunction of the absorptive system of the small intestine. When these patients are not submitted to nutritional therapy their maximum survival is six months. In Brazil there are few reference centers for the treatment and follow-up of these patients and information about their characterization is scarce. **Objective:** To describe enterectomized patients attended during the period from 1996 to 2007. **Methods:** All medical records of the patients attended at the Nutrology service of HCFMRP-USP were analyzed retrospectively. Data were collected and analyzed descriptively using the contingency test and the Wilcoxon–Mann-Whitney test for independent samples. **Results:** Thirty-eight patients with a mean age of 52 years at the time of enterectomy were analyzed, 47% of them males and 53% females. The main etiology of SBS was mesenteric ischemia (73%). Of these patients, 67% had some risk factor associated with atherosclerosis. No significant differences in eating habits were detected between the period before and after surgery. After surgery, 39% of the patients developed a significant weight loss and 79% developed some type of complication, surgical in 34%, infectious in 66% and of both types in 21%. Survival was 9.5 years. **Conclusion:** Extensive resections of the small bowel may be associated with atherosclerosis and represent an important nutritional risk, with a significant weight loss during the first year, which seems to be related to increased morbidity. Adequate nutritional therapy is associated with increased survival.

Key-words: short bowel syndrome, mesenteric thrombosis/ischemia, parenteral nutritional therapy, nutritional evaluation.

INTRODUCTION

Short bowel syndrome (SBS) occurs after an extensive resection of the small intestine (with < 200 cm remaining in adults) that changes the normal absorptive process of nutrients and fluids.¹ In adults, SBS usually is due to vascular obstructions such as ischemia and volvuli and also to inflammatory intestinal diseases such as Crohn's disease.

In intestinal failure, the inability to absorb nutrients, fluids and electrolytes eventually leads to clinical

deficiencies, and if an increased oral intake is insufficient to compensate for malabsorption, support with parenteral nutrition is necessary.²

Signs and symptoms are detected in the immediate postoperative period, with profuse watery diarrhea, weight loss, dehydration and malnutrition, which intensify with the offer of nutrients by the oral or enteral route. These events will depend on the site and the extent of resection, as well as on the ability to adapt of the remaining intestine.³⁻⁵

When these patients are not submitted to nutritional therapy their survival is a maximum of six months.⁶ It is not clear how many individuals have SBS in the United States but, based on data from Europe, the incidence is approximately 2 per million.⁷ In Brazil this number has not been defined so far and few reference centers exist for the treatment and follow-up of this population group, with a scarcity of information regarding its characterization. Thus, the objective of the present study was to describe enterectomized patients attended at a reference center in Brazil during the period from 1996 to 2007.

METHODS

This was a retrospective study of the medical records of all patients submitted to extensive enterectomy and attended at the Metabolic Unit of the Division of Nutrology, Department of Internal Medicine, University Hospital, Faculty of Medicine of Ribeirão Preto (HCFMRP), University of São Paulo, from 1996 to 2007.

Patients with a remaining small bowel of less than 1 meter and with a transit time through the small intestine of less than 15 minutes were considered to have SBS.

The data obtained by reviewing the medical records of HCFMRP available in the Medical Archives service were: gender, age, reason for the intestinal resection, characteristic of abdominal pain before resection, remaining intestinal portion, weight evolution, eating habits, risk factors associated with the disease, and prevalence of infectious complications.

The eating habits were evaluated using the 24 h recall data registered in the medical records at the first and last hospitalization of the patients. After the information was collected, energy, protein, carbohydrates, lipids and fibers were calculated using the Nutwin software programmed for the foods and habitual portions consumed by the Brazilian population.

A weight loss was considered to be significant when it exceeded 10% of the patient's weight over a period of 6 months or 7.5% of the patient's weight within 3 months, as described by Blackburn et al.⁸

For the calculation of alcohol consumption, data regarding the type of drink and the quantity consumed daily were collected and the alcohol content of each drink was then determined in order to obtain the daily alcohol intake.

Statistical analysis

A descriptive analysis of the result obtained was performed and the data were also analyzed by a contingency test and by the Wilcoxon-Mann-Whitney test for independent samples. The level of significance was set at $p \leq 0.05$.

RESULTS

The above data were not available in all medical records. We analyzed the medical records of 38 patients with a mean age of 52 years at the time of enterectomy, 47% of them males and 52% females. The characteristics of the study population are summarized in Table 1.

The main etiology of SBS was mesenteric ischemia (73% of cases), followed by Crohn's disease and cancer of the colon, as can be seen in Figure 1. The mean duration of pain before enterectomy was 9.5 days for mesenteric ischemia, 60 days for Crohn's disease and cancer of the colon, 10 days for intestinal perforation, and 18 hours for intestinal torsion. In all patients studied the remaining portion of the small intestine was less than 80 cm.

Sixty-seven percent of these patients had one or more risk factors associated with thromboembolic disease such as diabetes mellitus, hypertension, dyslipidemia, obesity, heart failure, cardiac arrhythmia, previous cerebrovascular accident, Chagas disease, smoking, and alcohol consumption (Table 1). Fifty-two percent of the patients were smokers, consuming on average 18 11 cigarettes a day, and 42.5% were drinkers consuming on average 142.3 120 ml alcohol a day.

No significant differences were detected between the preoperative and postoperative period regarding eating habits. On the occasion of the first hospitalization, mean calorie intake obtained by the 24 hour food recall was 1700 974 kcal, 59 11% from carbohydrates, 18 4% from protein, 24 9% from lipids, and 19 16 g from fiber. On the occasion of the last hospitalization, mean calorie intake was 1644 636 kcal, 54 9% from carbohydrates, 19 6% from protein, 26 6% from lipids, and 17 8 g from fiber.

After surgery, 39% of the patients suffered a significant weight loss, and 79% of the patients developed some type of complication, with infection occurring in 66% of them. Among the infectious complications, *Staphylococcus* sp infected 65% of the patients and *Candida* sp infected 12%. Mean time since the first hospitalization was 68 64 days (median: 43).

Mean survival of the patients who were followed up was 9.5 years.

DISCUSSION

As also reported in the literature, the most common cause of major intestinal resection in the present adults was mesenteric thrombosis and/or ischemia, which result in extensive necrosis of the small intestine, possibly also involving the ascending colon and half of the transverse colon.⁹

The SBS occurring after massive resection of the small intestine is characterized by diarrhea, malabsorption, and weight loss. These patients typically continue to consume regular meals but frequently require parenteral

nutrition in order to maintain an adequate status in terms of nutrition and hydration.

During the immediate postoperative period, all patients required parenteral nutritional therapy, with the oral and/or enteral diet being reintroduced later after 21-30 days in a gradual and slow manner, with the food tolerance of each patient being observed. At present, even though not all of them require parenteral nutrition, all require supplementation with polyvitamins and mineral salts.

In the present study, it was observed that, despite the nutritional guidance, most patients did not follow the suggestions of a home feeding plan in an adequate manner regarding the quantity and fractionation of the diet, since no significant differences in eating habits were detected between the preoperative and postoperative period. In addition, the patients under-reported the foods consumed, since hyperphagia is a common occurrence among the patients attended at the Metabolic Unit of HCFMRP-USP.

Fernández-Estívariz *et al.*¹⁰ detected a high usual food intake among their patients, demonstrating that hyperphagia occurs in SBS, whereas other patients showed a low intake of energy and protein, which may be inadequate to maintain body weight even in the absence of massive intestinal failure/resection.

Hyperphagia is necessary in order to avoid dependence on parenteral nutrition in many patients with SBS.^{11,12} Parenteral nutrition also seems to induce satiety in some individuals. However, gastrointestinal symptoms including exacerbation of diarrhea, bacterial growth and/or partial intestinal obstruction impair the consumption of the large quantities of calories needed to maintain patient weight without parenteral nutrition.

In addition, there is wide variation among individuals regarding tolerance to lactose, hypotonic fluids and specific food groups or specific foods.¹³⁻¹⁵

Weight loss is expected in view of the great reduction of absorptive surface.

In 1996 Marchini *et al* studied 18 patients with a diagnosis of SDS and malabsorption syndrome for 3 years and detected an initial and progressive weight loss until a point of equilibrium was reached at about 16-18 kg/m². In the same study, during patient follow-up there was one death and the major problems arising in the long term did not seem to be related to the offer of energy or protein. The indicators related to energy and protein show that there is stabilization of the weight/height ratio², of the arm fat index and of other indicators, although there is a tendency to a fall of the arm muscle circumference. These data may indicate that the offer of energy and protein was close to sufficient levels.¹⁶ In the present study, despite the weight loss, the patients had a long survival, demonstrating the benefits of the nutritional therapy applied.

Chronic intestinal failure may be associated with life risk complications and this condition is, of itself, highly incapacitating, impairing the quality of life.¹⁷

There are literature reports of hemorrhagic digestive complications and peptic ulcers, cholelithiasis, lactic acidosis, as well as other metabolic, septic and vascular complications.^{1,18}

In the present study most patients developed some type of complication, especially infectious ones. The most prevalent germs were *Staphylococcus sp* and *Candida sp*.

Most of the infectious complications were due to catheter contamination. There are several factors related to infection of the central venous catheter (CVC), among them the migration of microorganisms from the patient's skin to the lumen of the catheter¹⁹, CVC manipulation for drug administration,²⁰ clinical conditions of the patients that require a central access,²¹ and the use of parenteral nutrition, the last one being a risk confirmed by Beghetto *et al.*²²

Regarding the epidemiology of the more prevalent microorganisms in the study population, we observed that 65% of the infections were caused by *Staphylococcus sp*, data similar to those reported by Colomb *et al.*,²³ who showed a 67% incidence of infection with these microorganisms. Santarpia *et al.*²⁴ detected a 55% incidence of this infection in their study. The results of the CDC (2002)²¹ and of Machado *et al.*²⁵ respectively showed 50% and 48% CVC colonization by the same microorganisms.

Studies have also demonstrated a high prevalence of fungal infections, especially when parenteral nutrition is used. In the present study there was a higher prevalence of *Candida sp*, reaching a 12% rate. A study from a group of the University of Virginia detected 22% of cases of fungal catheter infection related to the use of parenteral nutrition.²⁶ Some authors suggest that the reason for this higher prevalence of colonization with fungi is related to parenteral nutrition itself²², whose glucose- and lipid-rich composition may permit *Candida sp* to produce a glycocalyx similar to that of bacteria, facilitating biofilm formation.²⁷ According to the literature, other factors that may explain this increase in incidence are patient immunosuppression as well as diseases of the gastrointestinal tract,^{28,29} as is the case for patients with SBS.

However, the strategies adopted regarding the diet and parenteral nutritional therapy proved to be effective in maintaining the BMI of the patients within normal limits.

CONCLUSION

Short bowel syndrome is a serious disease with high morbidity and mortality, a significant weight loss, and a high prevalence of infectious diseases, and requires a multidisciplinary team for patient follow-up and treatment. Nutritional therapy is important in order to reduce the number of patients at nutritional risk and to treat them, reducing the complications related to the disease and prolonging the survival of these patients.

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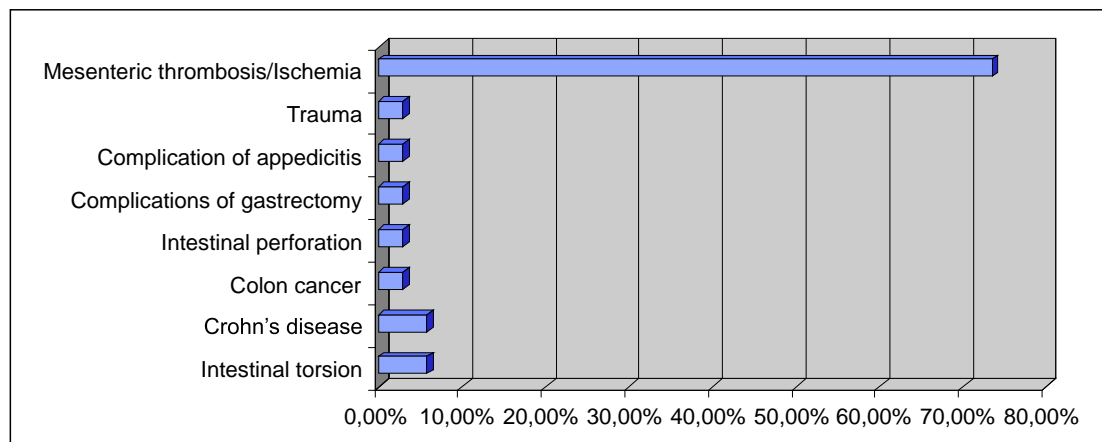
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Figure 1: Causes of enterectomy**Table 1. Characteristics of the study population**

Gender (female/male)	52.6%/47.3%
Age (years)	51.7
Initial BMI (kg/m ²)	22.05
BMI after 12 months (kg/m ²)	20.5
Presence of risk factors associated with the disease *	
Absence	31.70%
1	14.60%
2	26.80%
3 or more	26.50%

* the risk factors considered were: diabetes mellitus, arterial hypertension, dyslipidemia, obesity, heart failure, Chagas disease, smoking, alcohol consumption, cardiac arrhythmia and cerebrovascular accident.

Table 2- Evolution of the anthropometric parameters

	First hospitalization	Last hospitalization
	Mean±SD	Mean±SD
Weight(kg)	57 ±12	51±11
Height (m)	1.6±0.07	1.6±0.07
BMI (kg/m ²)	22±5	20±4
AC* (cm)	25±4	22±3
TSK* (mm)	13±7	10±5

*AC= arm circumference; TSK= triceps skinfold