

## Factors affecting prognosis in patients with short bowel syndrome

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**SUMMARY:** Factors affecting prognosis in patients with short bowel syndrome.

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*Aim of the study is to analyse physiopathological implications of massive intestinal resection and factors affecting prognosis in patients with short bowel syndrome.*

*Twenty massive intestinal resections were performed. The causes of bowel resection were: intestinal infarction (11 cases), Crohn's disease (5 cases), small bowel volvulus (4 cases). All intestinal resections were more than 50-60% of the intestinal length. In eighteen patients intestinal anastomosis was performed immediately. In all the patients postoperative therapy with parenteral nutrition (PN) was performed. The operative morbidity and thirty-day mortality were respectively 30% (6 cases) and 35% (7 cases). The diarrhea was the dominant symptom. The average weight was 20% lower compared to the initial weight.*

*The length of residual small bowel and type of anastomosis strongly affect survival of patients underwent massive intestinal resections. Parenteral nutrition (PN) has great importance in postoperative treatment. A useful treatment, in severe short bowel syndrome, can be small bowel transplantation.*

**RIASSUNTO:** Fattori prognostici in pazienti con sindrome da intestino corto.

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*Scopo dello studio è quello di analizzare le conseguenze fisiopatologiche di massive resezioni intestinali ed i fattori che influiscono sulla prognosi dei pazienti con sindrome da intestino corto.*

*Sono state eseguite venti resezioni intestinali estese. Le cause erano: infarto intestinale (11 casi), malattia di Crohn (5 casi), volvolo intestinale (4 casi). Tutte le resezioni intestinali hanno interessato almeno il 50-60% della lunghezza totale dell'intestino. In diciotto pazienti è stata eseguita una anastomosi in prima istanza e tutti i pazienti sono stati trattati con nutrizione parenterale totale. La morbilità e la mortalità postoperatorie sono state rispettivamente del 30% (6 casi) e del 35% (7 casi). La diarrea è stato il sintomo dominante. Il calo ponderale medio è stato del 20% rispetto a quello iniziale.*

*La lunghezza dell'intestino residuo ed il tipo di anastomosi influenzano la sopravvivenza dei pazienti sottoposti a massive resezioni intestinali. La nutrizione parenterale è uno dei cardini terapeutici della sindrome da intestino corto. Il trapianto intestinale sembra offrire risultati incoraggianti nelle forme gravi di sindrome da intestino corto.*

**KEY WORDS:** Short bowel syndrome - Prognostic factors.  
Sindrome da intestino corto - Fattori prognostici.

### Introduction

The short bowel syndrome is a clinical condition characterized by malnutrition, weight loss, steatorrhea and diarrhea. However, these clinical features depend not only on the extent of the resection but also on the site of resection, underlying intestinal disease, the presence or absence of the ileocolonic junction, the functional status of the remaining digestive organs and the adaptive capacity of the intestinal remnant. The normal length of adult small bowel varies from 275 to 800 cm, depending on method of measurement.

Short bowel syndrome generally appears when the length of residual small bowel is lesser of 150-200 cm (1, 5). Nevertheless, the quantitative data is not sufficient, because it is important that the affected segment is jejunum or ileum. The preservation of the ileo-cecal valve and the type of anastomosis performed are remarkable importance. It seems assessed in fact that the presence of the ileocecal valve and the colon, improves the hydro-electrolytic metabolism and the energetic balance in patients with short bowel syndrome (6, 7). Moreover specific complications that occur in these patients are of great interest to surgeons as increase incidence of nephrolithiasis, cholelithiasis secondary to altered bile salt, and gastric hypersecretion (10). Aim of our study is to analyse, in relationship to our personal experience, the pathophysiological implications following massive

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TABLE 1- DIGESTIVE CHARACTERISTICS OF 20 PATIENTS WITH SHORT BOWEL SYNDROME.

	<i>N. of patients (%)</i>	<i>Mortality (%)</i>	<i>Follow-up*</i>	
			<i>Dead</i>	<i>Alive</i>
<i>Causes of small bowel resection</i>				
Intestinal infarction	11 (55%)			
Crohn's disease	5 (25%)			
Small bowel volvulus	4 (20%)			
<i>Type of anastomosis</i>				
Jejunioileo anastomosis	10 (50%)	2 (20%)	1	7
Jejunocolic anastomosis	5 (25%)	3 (60%)	2	0
Jejunioileocolic anastomosis	3 (15%)	1 (33%)	0	2
<i>Stoma</i>				
Jejunostomy	2 (10%)	1 (50%)	1	0
<i>Remnant small bowel length (cm)</i>				
<50	4 (20%)			
50-99	8 (40%)			
100-150	8 (40%)			

*\*Survival excluding postoperative mortality: 9/13 (69.2%).*

small bowel resection and to define factors affecting prognosis in patients with short bowel syndrome.

## Patients and methods

From January 1992 to December 2000, twenty massive small bowel resections was performed at the Institute of General Surgery - University of Bari. The medium age of the patients was 52 years (range 26 - 74 years). In all the patients intestinal resection was more than 50-60% of the intestinal length.

The causes of operations were: intestinal infarction (11 cases), Crohn's disease (5 cases), small bowel volvulus (4 cases). In eighteen patients continuity of intestinal circuit was re-established simultaneously with anastomosis T-T. The type of anastomosis were: jejunioileo anastomosis: 10 cases (50%); jejunocolic anastomosis: 5 cases (25%); ileocolic anastomosis: 3 cases (15%). Two patients (10%) underwent jejunostomy. All the patients received post-operative therapy with parenteral nutrition (PN) and continued from 5 to 12 weeks, beginning progressively the passage to the oral feeding. The median follow-up was 58 months (range 12- 108 months).

## Results

The operative morbidity was 30% (6 cases) in connection with bronchopneumonia, cardiac failure, infections of the wound, etc. Thirty-day mortality was 35.% (7 cases). At the end of follow-up, 9 patients were alive and 4 were dead (Table 1). Causes of death were related to the primary disease having

led to massive small bowel resection. The higher mortality was in patients underwent right colectomy with jejunocolic anastomosis and in patients underwent jejunostomy. The dominant symptom in postoperative period was diarrhea (10-15 discharges/24h) that in the course of a few weeks was reduced to 4 -5 discharges/24h. The average decrease in weight was 20% of the initial weight. The main nutritional parameters altered was: albumin (< 3.5 g%), transferrin (< 180 mg%) and haemoglobin (< 12 g%). In the nine living patients persist a light hypoproteinaemia and a modest sideropenic anaemia. Of these patients, three (33.3%) developed cholelithiasis, two (22.2%) a peptic ulcer disease and two (22.2%) calcium oxalate renal stones. At the end of follow-up the corporal weight is stable and the alimentary habits were almost normal.

## Discussion

This study confirms some previously published data showing overall survival rates of 66-77% in adults with short bowel syndrome (2,3). Our survival rate was 69.2%, excluding postoperative mortality. A short bowel digestive circuit with jejunocolic anastomosis, in which at least part of the colon is in continuity, was found to be associated with higher survival (2,7). Jejunioileocolic anastomosis, in which the rem-

nant ileum and ileocecal valve are in continuity, further enhanced these patients' probabilities of survival (4).

In our experience in patients underwent right colectomy jejunocolic anastomosis and in patients underwent jejunostomy was a higher mortality (100%), because were a very small length of remnant small bowel and absence of ileocecal valve.

According to Messing et al. (4), it seems that a length of 100 cm of small bowel remnant, rather than 150 cm, is the upper limit of small bowel length that plays a negative role on survival, whatever type of anastomosis. The length of residual small bowel and type of anastomosis strongly affects survival of patients underwent massive intestinal resections. PN has great importance in postoperative treatment but, fortunately, many patients are able to undergo sufficient adaptation that they are maintained on enteral nutrition alone. Long-term PN has significant limitations as morbidity and effect of quality of life.

Cholelithiasis is a frequent problem in patients with a short bowel syndrome and in particular in those on long-term PN. In our experience tree (33.3%) of survival patients developed gallstones. Patients who have had distal ileal resection may have malabsorption of bile salts and be predisposed to cholesterol stones. Gallbladder stasis appears to be an important factor (10). The key to preventing cholelithiasis in these patients is early enteral feeding. If enteral feeding is not possible, the intermittent cholecistokinin administration may help prevent stasis (9). According to Roslyn et al. (8) we propose in these

patients prophylactic cholecistectomy before stones are formed.

Calcium oxalate renal stones occur in a quarter of patients with a retained colon (7). In our experience two patients (22.2%) developed nephrolithiasis. Calcium and oxalate usually form an insoluble complex in colon, but if free fatty acids are present in the colon they preferentially bind the calcium, so the oxalate becomes soluble and is adsorbed, giving rise to hyperoxaluria.

Transient gastric hypersecretion occurs for a few months to a year (at most) postoperatively. This is related to hypergastrinemia, the etiology of which is uncertain. The hyperacidity exacerbates malabsorption and diarrhea and may lead to complications of peptic ulcer disease. Fortunately, as in our two patients who developed peptic ulcer, the majority of these patients respond to medical management alone. We believe, that H<sub>2</sub> antagonists or proton pump inhibitors may be useful for decreasing gastric hypersecretion.

At present also surgical treatments have to be considered for patients with small bowel syndrome, especially intestinal transplantation that is clearly appropriate for patients with anticipated survival of less than twelve months related to PN-induced complications. It is needed to state that the long-term results of intestinal transplantation are not well known and morbidity remains an important obstacle to wider application of this procedure to patients with short bowel syndrome.

## References

1. Allard JP, Jeejeebhoy KN: Nutritional support and therapy in the short bowel syndrome. *Gastroenterol Clin North Am* 1989;18:589-600.
2. Gouttebel MC, Saint-Aubert B, Astre C, Joyeux H: Total parenteral nutrition needs in different types of short bowel syndrome. *Dig Dis Sci* 1986;31:718-723.
3. Jamum S, Ladefoged K: Long term parenteral nutrition: clinical experience in 70 patients from 1967 to 1980. *Scand J Gastroenterol* 1981;16:903-91.
4. Messing B, Crenn P, Beau P, Boutron Ruault MC, Rambaud JC, Matuchansky C: Long-term survival and parenteral nutrition dependence in adult patients with the short bowel syndrome. *Gastroenterology* 1999;117:1043-105.
5. Nightingale JMD: Clinical problems of short bowel and their treatment. *Proc Nutr Soc* 1994;53:373-391.
6. Nightingale JMD: Jejunaefflux in short bowel syndrome. *Lancet* 1990;336:765-768.
7. Nightingale JMD, Lennard-Jones JE, Gertner DJ, Wood SR, Bartam CI: Colonic preservation reduces need for parenteral therapy, increases incidence of renal stones, but does not change high prevalence of gallstones in patients with a short bowel. *Gut* 1992;33:1493-1497.
8. Roslyn JJ, Pitt HA, Mann LL: Parenteral nutrition-induced gallbladder disease: a reason for early cholecistectomy. *Am J Surg* 1984;148:58-63.
9. Sitzman JV, Pitt HA, Steinborn PA: Cholecistokinin prevents parenteral nutrition induced biliary sludge in humans. *Surg Gynecol Obstet* 1990;170:25-31.
10. Thompson JS: Surgical Aspect of the Short-Bowel Syndrome. *Am J Surg* 1995;170:532-536.