

Enterostomies and colostomies in infants and children

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Summary

Seventy-four enterostomies or colostomies were performed on 72 patients at Sami Ulus Children's Hospital in Ankara, between the years 1984 to 1988. 47 of the cases were newborns (65.3 %). The procedures were performed most frequently for Hirschsprung's disease (45.8 %) and anal atresias (26.4 %). The most accepted procedure was the right transvers colostomy (62.2 %).

The occurrence rate of the minor complications as wound infection, stomal prolapsus, excoriation of the skin, anemia and diarrhea were showed parallel-

ism by the similar reports. Major complications as the gangrene or necrosis of the exteriorised segment, peristomal dehiscence, stomal stricture, intestinal fistula were rare. In our series the 22 of the total mortalities were in the newborn period. There were no deaths primarily due to stomal procedures.

We evaluated the factors which affected the mortality rate in the newborn period and pointing the morbidity/benefit correlation on using the enterostomy and colostomy.

Key words: Jejuostomy, ileostomy, enterostomy, colostomy

Introduction

Enterostomy and colostomy procedures play important roles in the management of some surgical problems in infants and children. They are performed transiently or permanently, mainly for decompression of the gastrointestinal tractus, or sometimes to provide enteral nutrition by placing a tube into the upper GI tractus. Our purpose in this study is to clarify the real indications for colostomies and enterostomies and to explain the morbidity/benefit rate of these procedures.

Material and Methods

In this retrospective study, we evaluated 72 patients who underwent enterostomy and colostomy for several indications during the period between 1984-1988 at the Pediatric Surgery Department of Sami Ulus Children's Hospital.

Results

We performed 74 enterostomies and colostomies

Table I. Indications for enterostomy and colostomy

Indications	No. of cases	%
Hirschsprung's disease	33	45.8
Anal Atresia	19	26.4
Jejunioileal Atresia	7	9.8
Intussuseption	4	5.5
Meconium peritonitis	2	2.7
Meconium Ileus	1	1.4
NEC	2	2.7
Others	4	5.5
Total	72	100.0

in a group of 72 patients from 1984 to 1988. Of those, 48 were male and 24 were female. According to their ages, 47 were newborns (65.3 %), 17 were over 1 month old infants (23.6 %), and 8 were over 2 years old (11.1 %).

Indications: As seen in Table 1, Hirschsprung's disease was the predominant indication (45.8 %), and anal atresia was the second major reason (26.4 %) of operation. 16 enterostomies and colostomies were performed in the newborn group with Hirschsprung's disease. Following the Wangenstein-Rice X-Ray examination we planned colostomy in 14 of the 19 anal atresias. 5 had GI tractus perforations and stomal procedures were emergent operations.

Table II. Types of enterostomy and colostomy with frequency of use

Type	No. of cases	%
Right Transverse Loop Colostomy	46	62.2
Left Transverse Loop Colostomy	2	2.7
Sigmoid Loop Colostomy	2	2.7
Divine Colostomy	2	2.7
Cecostomy	4	5.4
Tube Jejunostomy	3	4.0
Spur Ileostomy	8	10.8
End Ileostomy	7	9.5
Total	74	100.0

Table III. Complications of enterostomies and colostomies

Complications	No. of cases	%
Gangrene and Necrosis	1	1.4
Peristomal Dehiscence	1	1.4
Stomal Stricture	1	1.4
Intestinal Fistula	1	1.4
Subcutaneous Infection	10	14.0
Prolapsus	11	15.3
Diarrhoea	30	41.7
Skin Excoriation	28	10.0
Dehidratation and Hyponatremia	16	22.2
Anemia	22	30.5

Techniques: As seen in Table II, right transvers colostomy was the major colostomy type of choice (62.2 %). Of those, 29 had Hirschsprung's disease, and 15 had anal atresia.

In all patients, tube jejunostomies were performed for early enteral nutrition. As spur type ileostomies, we performed 5 loop ileostomies, 2 double-barrelled ileostomies, 1 Mickulicz ileostomy. As end ileostomies, we performed 4 divine ileostomies 1 Bishop-Koop, 1 Hartmann's procedure, 1

terminal end ileostomy.

Complications: We observed several minor and major complications in 72 patients who underwent enterostomy and colostomy (Table III). Prior to definitive operations and closing the enterostomies and colostomies, 26 patients were died. 22 of them were newborn. Table IV shows the distribution of the factors affecting the mortality of our mortal patients.

Discussion

In our series, Hirschsprung's disease was found to be the major indication for enterostomy and colostomy which is parallel to former reports (5,6,15). Many authors suggest performing staged type pull-through operations by leaving ganglionic colon segment for a sufficient length at the distal part of the stoma (3,6). Because of that reason we preferred right transverse colostomies in 29 of 33 patient with Hirschsprung's disease. We performed left transverse colostomies in 2 patients with long segment aganglionosis including descendens colon, 1 ileostomy for TCA (Total Colonic Aganglionosis) and 1 loop cecostomy for cecum perforation as the primary procedures. These types of rare procedures can be accounted for in the literature (5,16,17).

Some authors prefer colostomy especially in high type anal atresia followed by a definitive pull-through operation (23,26). In the presence of risc factors like, serious associated congenital anomalies, prematurity, severe systemic diseases, GI perforation, sepsis, etc., staged type surgical procedures can be performed in intermediery types

Table IV. Distribution of the factors effecting mortality

Disease	No. of Mort.	LBW and Pre.	Ass. anomaly	Ass. sys. Dis.	Perit.	Dehid. Hyponat	Sepsis
Hirschsprung	5	5	-	4	1	1	5
Anal Atresia	10	4	2	2	5	-	9
Jejunoil. Atr.	6	2	-	-	2	2	6
Intussusception	2	-	-	-	2	-	2
Mecon.Perit.	1	1	-	-	1	-	1
NEC	1	1	-	-	1	-	1
Extrop. cloaca	1	-	-	1	-	-	1
Toplam	26	12	2	7	12	3	25

of anal atresia. In addition to that, the lack of the objective criteria to distinguish intermediate and high type anal atresia, primer sacroperineal approaches may be insufficient and abdominal approaches may become necessary. We performed right transvers colostomy in 15 of the 19 patients with anal atresia. During the pull-through operation, distal segment mobilization did not appear as a problem in 1 sigmoid colostomy, 2 divine colostomies.

In the patients with some other problems like, jejunoileal atresia, invagination, NEC (Necrotising Enterocolitis), meconium ileus and peritonitis, trauma, foreign body, Crohn's disease, intraabdominal malignancies which needed colostomies and enterostomies for treatment cause secondary complication effecting the intestinal wall, primary repairment may not be possible (1,2,7,8,9,12,13,14,18,19,20,21,22,27). Especially enterostomy types of our choice seen quite convenient for high type anomalies that may reduce enteral losses by permitting the passage to the distal part.

Complications: Subcutaneous infection as a minor complication was observed in 10 patients (14%). There were not significant differences in the number of patients with enterostomies or colostomies having that problem (6,15).

Distal loop prolapsus was identified in 9 of 11 patients with right transvers colostomy in which bagets or bridges were not used. This finding supports the concept about reducing that type complication by using a baget or bridge to separate proximal and distal ends as much as possible (8). Only one patient required revision.

16 patients had dehydration and hyponatremia as a result of the short remaining intestine. We had to performed revision in 2 of the 28 patients with skin excoriation because of the excessive intestinal losses (10,11). Anemia developed in 16 patients with colostomy and 6 patients with ileostomy resulting from short intestine and stomal bleeding. These minor complications were more severe in high type stomal procedures as mentioned in literature (4,5,6,10,11,15,22,24,25).

Table V. The time of postoperative deaths after colostomy

Time	Jejun.	Ileost.	Colos.	Total
First 24 h.	-	1	5	6
1 Day-1 Week	2	3	6	11
1 Week-1 Month	2	4	-	6
Late Period	-	1	2	3
Total	4	9	13	26

The major complications like exteriorised segment gangrene and necrosis occurred in 1 right transvers loop colostomy, peristomal dehiscense in 1 left transvers loop colostomy, fascial level stomal stricture in 1 right transvers loop colostomy. All occurred in patients with Hirschsprung's disease. One patient with colon polip had intestinal fistula following the extraperitoneal colostomy closure. The seldom existence of those major complications directly resulting from enterostomy and colostomy procedures are likely the literature knowledge (3,5,6,15).

Mortality: Beside of the pathologies arising from the primary disease, some predisposing factors like, prematurity, associated serious congenital anomalies, sepsis, peritonitis played a part of deaths of the newborn patients (2,20). In 14 patients with atresia with late application to hospital (meanly on 2.9'th day), complications were observed significantly. If the necessary preoperative resuscitation time exceeds 24 hours the mortality and morbidity rate rises. 8 of our patients in this situation died. Table 5 shows the postoperative mortality times which may be indicative for preoperative predisposing factors and postoperative clinical courses that may have role in mortality. The evaluation of postoperative mortality times may be helpful to show the effect of preoperative mortality times which may be indicative for preoperative predisposing factors and postoperative clinical courses that may have role in mortality. The evaluation of postoperative mortality times may be helpful to show the effect to preoperative predisposing factors that are especially important in the deaths within the first postoperative week (2). The deaths of 6 newborn patients with enterostomy in the period over 1 week following the operations were also indica-

tive for the effect of enterostomy losses causing to hyponatremia and dehydration.

Conclusions

The review of 74 enterostomies and colostomies led us to the conclusions that they are beneficial in the management of some surgical problems of infancy although the presence of some complications arise from the procedure which are not usually fatal.

In this series, Hirschsprung's disease and anal atresia were the major reasons (72.2 %) to perform enterostomy and colostomy. 65.3 % of patients were younger than 1 month of age. Right transvers colostomy was the most frequently employed type of operation (62.2 %).

The rare occurrence of the major complications resulting from colostomy suggests that there are appreciable hazards associated with the formation of the procedure itself. Most of the minor complications could be controlled in our cases.

In our experience, 6 patients' deaths following enterostomies were the result of the procedure causing to dehydration and hyponatremia. It may suggest early stomal closure in the case of excessive enterostomy losses.

The most important complication was of course death. It was regarded as impressive that most of the patients who died had other congenital anomalies and/or complications and some were late to apply to the hospital. Those factors were particularly effective in newborn group.

References

1. Bell RH: Intestinal anastomoses in neonatal surgery. *Ann. Surg.* 183:276, 1976.
2. Birch AG, Coran AG, Gross RE: Neonatal peritonitis. *Surg.* 61:305, 1967.
3. Bishop HC: Colostomy in the newborn. *Am J Surg.* 101:642, 1961.
4. Bower TR, Pringle KC, Soper RT: Sodium deficit causing decrease weight gain and metabolic

- acidosis in infants with ileostomy. *J Pediatr Surg* 23: 567, 1988.
5. Brenner RW, Swenson O: Colostomy in infants and children. *Surg Gynecol Obstetr* 1239, 1967.
6. Cain WS, Kiesewetter WB: Infant colostomy. *Arch Surg* 91: 314, 1965.
7. Ein SH, Stephens CA: Intussusception, 354 cases in 10 years. *J Pediatr Surg* 6: 16, 1971.
8. Ein SH: Divided loop colostomy that does not prolapse. *Am J Surg* 147: 250, 1984.
9. Gertler JP: Early ileostomy closure in NEC. *J Pediatr Surg* 22: 140, 1987.
10. Gibbs GE: Stoma care. *Am J Nursing* 72: 268, 1972.
11. Grosfeld JL: Care of the child with a colostomy. *Pediatrics* 59: 469, 1977.
12. Gross RE, Ware PF: Intussusception in childhood. *N Eng J Med* 239: 645, 1948.
13. Hyams SJ: Course and prognosis after colectomy and ileostomy for inflammatory bowel disease in childhood and adolescence. *J Pediatr Surg* 17: 400, 1982.
14. Kosloske AM: Operative technique for the treatment of NEC. *Surg Gynecol Obstetr* 149:740, 1979.
15. Macmahon RA, Cohen SJ, Eckstein HB: Colostomies in infancy and childhood. *Arch Dis Child* 38: 114, 1963.
16. Martin LW: Surgical management of Hirschsprung's disease involving the small intestine. *Arch Surg* 97: 183, 1968.
17. Martin LW: Surgical management of TCA. *Ann Surg* 343, 1972.
18. Musmeche CA, Kosloske AM: Enterostomy in NEC: An analysis of techniques and timing of closure. *J Pediatr Surg* 22: 479, 1987.
19. Nguyen LT: Meconium ileus: Is a stoma necessary. *J Pediatr Surg* 21: 766, 1986.
20. Nixon HH, Tames R: Etiology and treatment of small intestinal atresia. *Surg* 1: 41, 1971.
21. O'Neill J: Surgical treatment of meconium ileus. *Am J Surg* 119: 99, 1970.
22. Rothstein FC: Importance of early ileostomy closure to prevent chronic salt and water losses after NEC. *Pediatrics* 70: 249, 1982.
23. Santulli TV: Imperforate anus: A survey from the members of the surgical section. *J Pediatr Surg* 6: 484, 1971.
24. Schwartz KB: Sodium needs of infants and children with ileostomy. *J Pediatr Surg* 1: 62, 1966.
25. Shephard R, Kiesewetter WB: Hyperchloremic acidosis as a complication of imperforate anus with recto-urinary fistula. *J Pediatr Surg* 1: 62, 1966.
26. Stephens FD, Smith ED: Operative management of anal deformities. Chapter 9, pp: 213, 1971.
27. Welch KJ, Randolph JG: *Pediatric Surgery, Year Book, Vol 2, 1986*