COLOSTOMIES IN INFANCY AND CHILDHOOD*

BY

R. A. MACMAHON, S. J. COHEN and H. B. ECKSTEIN

From The Hospital for Sick Children, Great Ormond Street, London

When considering the type and optimum time of treatment of such conditions as ano-rectal anomalies and Hirschsprung's disease in infancy, the choice usually lies between early definitive surgery, or a colostomy with postponement of the definitive surgery till the infant has reached a reasonable size. Often a decision in favour of colostomy is influenced by the widely held belief that this is a simple operation with minimal hazards and one that may be undertaken with relative impunity. Certainly Swenson (1957), in a follow-up of 200 patients treated for Hirschsprung's disease, found a mortality rate of 3%, and four out of the six deaths occurred in infants. This prompted the postponement of resection till the age of 12 to 18 months.

To establish the mortality and morbidity rates of this operation and, if possible, to assess the most satisfactory technique, it was decided to carry out a survey on all colostomies done at this hospital from 1956 to 1961 inclusive. In this series there were 122 patients who had a total of 129 colostomies. The number per year is shown in Fig. 1. The fact that the numbers have increased in the latter years indicates a diminishing vogue for primary definitive surgery in ano-rectal anomalies.

The age-groups at which the colostomies were performed are shown in Fig. 2. It can be seen that 41 cases, or nearly one-third, were performed in the first week of life and 54, or approximately 42% of the total number, were treated in the neonatal period, and of these almost all had ano-rectal anomalies or Hirschsprung's disease.

The indications for the colostomies are shown in Table 1.

This Table brings out the predominant position of ano-rectal anomalies and Hirschsprung's disease; 110 of the 129 colostomies were performed for one of these, either as a primary procedure or for a complication of a previous operation. Four of the cases included under the heading of Hirschsprung's disease presented in the neonatal period with intestinal obstructions, and at laparotomy seemed to

have a typical cone in the colon. However, rectal biopsies did not confirm this diagnosis and they recovered without further incident. They can thus only be labelled as cases of colostomy performed for suspected Hirschsprung's disease. The complications following operation for ano-rectal anomalies were pelvic infection, anal stenosis or recurrence of the recto-urethral fistula, while those for Hirschsprung's disease were, with one exception, pelvic infection or breakdown of the anastomosis following a Swenson type of operation.

Furthermore, it is of interest to note the varied uses of the colon in modern techniques. It has been used in plastic procedures involving abnormalities of the urinary tract, and for oesophageal replacement in oesophageal atresia. The seven indications listed as 'other' are a motley collection of trauma, perforation of the large bowel with peritonitis from other aetiology and elective surgery around the anus, such as the excision of a large haemangioma.

Points of technique in which we were particularly interested were the method of fixation of the colostomy to the abdominal wall, the type of colostomy and the time of opening. However, the recording of colostomy operation notes seems to have been regarded by the writers of operation notes as somewhat unimportant, because usually the operation note consisted of 'colostomy performed' and nothing more, so that no conclusions could be reached regarding the method of fixation. Similarly, information regarding the type of colostomy was meagre, but 82 were of the loop type, 17 were terminal, 12 were primarily defunctioning, and only four were of the spur type. While no definite conclusions can be reached from these figures, they do at least indicate that the spur type of colostomy is no longer popular. Published information on the subject of colostomy in infancy and its technique is also rather meagre, but Bishop (1961) advises a loop colostomy with a rod, with suture of peritoneum, muscle sheath and skin to the bowel wall, the peritoneum to sero-muscular layer being the most important. Nixon (1961), on the other hand, prefers a loop colostomy made over a skin bridge.

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FIG. 1.—The number of colostomies per year.

FIG. 2.—The ages at which colostomies were done.

FIG. 3.—The duration of the colostomy (excluding deaths). The duration of those not yet closed was taken at June 30, 1962.

The available information on the time of opening can be seen in Table 2. Two-thirds were opened at the time of operation and the majority of the remainder in the first 24 hours after operation. Little attention has thus been paid to the principle that a colostomy should be left for at least 24 to 48 hours before opening, provided the abdomen is not distended, so that the peritoneal cavity may become effectively sealed off.

Fig. 3 shows the duration of the colostomies, excluding deaths and taking the duration of those not yet closed to the end of June 1961. This, of course, loads these figures with short duration colostomies not yet closed. Nevertheless, it is obvious that most colostomies tend to be relatively long-term propositions. This is, in part, a reflection of the practice of leaving the definitive surgery in both ano-rectal anomalies and Hirschsprung's disease till 6 months to 1 year of age or even later.

The morbidity of colostomies as shown by this survey is rather surprising, especially when it is considered that the complications must be an underestimate because of the infrequent mention of colostomies in case notes. Only 43 of the 129 had no complications at all, and of these 14 died soon after the formation of the colostomy from a variety of causes mentioned later, so that there was hardly time for complications to develop. A list of the complications can be seen in Table 3. Skin excoriation of some degree is probably universal, though here only listed as occurring in 43, and the remedies tried are legion. It is, however, rarely serious. Prolapse was undoubtedly the major cause of morbidity in this series, with an incidence of

TABLE 1
INDICATIONS FOR COLOSTOMIES

Indications	No. of Cases
Ano-rectal anomalies	41
Complications after operation for ano-rectal anomalies	15
Hirschsprung's disease	41
Complications after operation for Hirschsprung's disease	13
Urinary abnormalities	6
Colonic replacements	6
Others	7
Total	129

TABLE 2
TIME OF OPENING OF COLOSTOMIES

Time	No. of Cases
On the operating table	77
First 24 hours	18
After 24 hours	13
Not stated	21
Total	129

TABLE 3
COMPLICATIONS OF COLOSTOMIES

Complications	No. of Cases
Skin excoriation	43
Prolapse	28
Diarrhoea	26
Bleeding	18
Wound infection	14
Stenosis	13
Retraction	9
Intestinal obstruction	5
Ileus	3
Death	3
Others	7

TABLE 4
BLOOD LOSS AT CLOSURE OF COLOSTOMY

Blood Loss	No. of Cases
< 50 ml.	11
50-100 ml.	7
100-200 ml.	16
> 200 ml.	5
Not stated	25
Total	64

TABLE 5
COMPLICATIONS OF CLOSURE OF COLOSTOMIES

Complications of Closure	No. of Cases
Infection of the closure wound	21
Fistula formation	8
Intestinal obstruction	6
Ileus	4

28; of these, nine cases had repeated reduction of the prolapse and eight had some form of operative procedure for the prolapse. Diarrhoea forms an interesting group, in that although organisms were grown in only four cases, 14 were treated with antibiotic or sulphonamide therapy. It appears that the treatment of diarrhoea in this type of case is sometimes based on the assumption that it is of infective origin even if the infective basis cannot be confirmed. Although there were only nine cases of retraction, four of these required some form of operative treatment. Laparotomy and freeing of adhesions were required in three of the five cases with intestinal obstruction. Bleeding was negligible and rarely required any treatment. The most important complication was, of course, death, and three infants (2.3%) died as a direct result of the colostomy. The seven cases listed as 'other', included fistula formation, recurrent vomiting, dehiscence of the wound around the colostomy and ulceration of the loop.

Lichtenstein (1955) mentioned all these complications plus others, but did not discuss the question of incidence. In contrast to the above, Wyllie (1957), in a review of Hirschsprung's disease treated by Swenson's operation, only mentions one complication: 'transverse colostomy is well withstood by infants, but hypochromic anaemia tends to develop . . .'. Similarly, Petit and Decaudaveine (1956) say that the disadvantage of right transverse colostomy is obstinate diarrhoea from the resulting limitation of absorption of fluids from the digestive tract.

The closure of the colostomies is generally regarded as a relatively minor procedure. The essential problem can be illustrated by the consideration of the blood loss. Excluding the deaths,

those closed with some other form of surgery and those not yet closed, there were 64 cases who had the colostomy closed as a single procedure. The recorded blood loss at each operation can be seen in Table 4. At least 16 had a blood loss of between 100 and 200 ml., and five had a loss of more than 200 ml., and 33 of the 64 were transfused at operation or post-operatively. To illustrate this further: of these 64, resection was undertaken with the closure in 27, 16 of whom required blood transfusion. Thus, the importance of pre-operative cross-matching of blood is obvious, even when a technically simple closure is anticipated.

A further interesting point is that 43 of these cases were recorded as having an intraperitoneal closure, so with the advent of antibiotics the fears of soiling the peritoneum seem to have disappeared. Certainly Bishop (1961) favoured an intraperitoneal anastomosis, and Poer (1950), in reviewing the subject of colostomy in present-day surgery, stated that intraperitoneal closure of a colostomy was not only a safer method than extraperitoneal closure but gave more satisfactory results.

Following closure of the colostomies there were other complications increasing the morbidity rate of closure. A list of these can be seen in Table 5. Infection occurred in at least one-third of the cases; fistula occurring in eight cases was also significant. Of the eight with fistula, three had to have the colostomy closed again, and in one of these the fistula recurred. The others closed spontaneously. Of the six that obstructed, three settled with gastric suction and intravenous therapy, while three had to be reopened, and in two of these the colostomy was re-formed. Goligher (1961), discussing the closure of colostomy in adults, states 'this operation has a notorious reputation for subsequent breakdown and leakage of faeces . . .', and this certainly also seems to be the case with children.

The deaths have been divided into those due to the colostomy itself, those due to the disease for which the colostomy was performed, and those due to some associated disease. Three were attributed directly to the formation of the colostomy, the causes being haemoperitoneum, peritonitis, and stenosis of the proximal colostomy opening, with recurrent diarrhoea and consequent fluid and electrolyte imbalance. Fourteen died from the primary disease, its complications or complications of treatment, and 11 died from other disease, including oesophageal atresia, congenital heart disease and prematurity.

We conclude from this survey that there is an appreciable mortality and morbidity associated with the formation and closure of a colostomy, that it is

usually a long-term problem in infancy and, further, that closure can be attended by appreciable blood loss and frequently involves a formal bowel resection and anastomosis.

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