Managing Newborn Ileostomies

Abstract:

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Abstract

The early post-ileostomy medical management of neonates is not clearly defined. A retrospective chart review of all infants who received an ileostomy March 2010- December 2011, identified the post-operative ileostomy progress of each infant. There were 16 cases of neonatal ileostomy during the study period. Over the first 14 postoperative days there was no weight gain. By 21 days the infants were gaining a median 140 g/week. The median stoma output was 5 mls/kg/dy during the first 7 days increasing to 17.5-20 mls/kg/dy. Weight gain or weight loss was closely related to the consistency and volume of the stoma output. Ten infants had a high stoma output >20mls/kg/dy (3 preterm, 7 term). This high stoma output was associated with sub-optimal weight gain. This study provides a template for the expectant management of newborn infants after an ileostomy. The critical issues are weight gain, stoma output and local and systemic complications.

Introduction

Ileostomies are commonly performed on newborn infants with surgical abdominal emergencies. It is a strategy that rests the bowel until physiological recovery takes place. The two large groups of newborns who require an ileostomy are preterm infants with necrotising enterocolitis (NEC)[1] and term infants with a wide spectrum of surgical conditions such a ileal atresia, Hirschsprungs disease and volvolus. The surgical technique involved in the creation of an ileostomy is well defined but the early post-ileostomy management of the infant is less clearly documented. Much of the skill and knowledge about newborn ileostomies lies in the hands of the neonatal surgical nurses rather than the medical staff. This study was undertaken in order to highlight the medical and surgical challenges encountered when managing newborns after an ileostomy. The study is timely in that the number of ileostomies is rising due to NEC complications in surviving very preterm infants.

Methods

The study group was newborn infants who underwent an ileostomy in the first month of life. All the ileostomies were performed at a single neonatal surgical centre (TSH). The operation was a proximal functioning ileostomy fashioned alongside a distal mucous fistula or a loop ileostomy. The infants had been transferred to the centre from neonatal units throughout the country because of acute abdominal problems. All infants who received an ileostomy March 2010-December 2011 were identified from the neonatal surgical logbook. In the case of each infant the case notes, operation details, fluid balance and nursing observation charts were obtained. The notes and charts were examined by one of us (MC). Each infantâ s birth weight, gestational age, age at surgery and underlying condition was documented. The post-operative ileostomy progress of each infant was recorded as follows: stoma output, weight gain/loss, parenteral and enteral feeding, types of milks administered, catheter-related infections, surgical stoma, and medications prescribed. Excessive stoma output was defined as greater than 20mls/kg/dy.

Results

There were 16 cases of neonatal ileostomy during the study period with 2 loop ileostomies and the remaining 14 having a proximal functioning ileostomy with distal mucous fistula. There were 8 preterm infants (median gestational age 32 weeks IQR 31-35 weeks) with a median birth weight of 1670g (IQR 1100-3170g). The 8 term infants (median gestational age 40 weeks IQR 38-42 weeks) had a median birth weight of 3320g (IQR 2940g-3900g). Only one infant in the preterm group had periventricular leuckodystrophy on cranial ultrasound.

Table 1 describes the underling surgical condition that necessitated the ileostomy. There was a wide range of surgical disorders among the term infants whereas the preponderance of the preterm infants had NEC. Table 2 shows the median weight gain/loss and stoma output for all the infants during the first 28 days following the ileostomy. Over the first 14 days there was no weight gain. By 21 days the infants were gaining 140g/week. The stoma output was 5 mls/kg/dy during the first 7 days increasing to 17.5-20 mls/kg/dy. Table 3 shows the post-ileostomy surgical and medical complications among the 16 newborn infants. Most of the complications were local stoma problems including stricture, prolapse, skin excoriation and cellulitis.

Ten infants had a high stoma output >20mls/kg/dy (3 preterm, 7term). The high stoma output was associated with poor weight gain. Median weight gain in this group during the first three weeks was 5g/wk (IQR -240g-+230g). Three infants had central venous catheter-related sepsis during their post-operative course.

Feeding

The enteral feeds were as follows- 5 exclusively expressed breast milk (EBM), 2 EBM and donor breast milk, 6 with EMB and a semi-elemental formula. The remaining 3 were fed exclusively with semi-elemental or elemental formula. 13 of the 16 infants reached full enteral feeds at a median of 17 days (IQR 12-25).

The medications prescribed were

Ranitidine 16 infants, Omeprazole 8 infants, Loperamide 2 infants, Metronidazole 1 infant, Erythromycin 2 infants. Alternate weeks of amoxicillin and metronidazole were used in two infants over a 6 week period. Antibiotics were commenced after consultation with the gastroenterology team in infants with persistent high stoma output.

Regarding discharge, 2 preterm infants were transferred back to the referring maternity hospital at 10 days and 14 days post-operatively. 3 infants were transferred to the gastroenterology service in another tertiary childrenâ s hospital in Dublin. 3 infants required reversal of their ileostomy due to complications during the same admission. Of the remaining 8 infants who were discharged home with their ileostomy from our centre, the median time to discharge was 42 days (IQR 35-77)

Discussion

This study attempts to set out the expectant progress, management and complications in newborn infants after an ileostomy. Ileostomies are of two types- loop ileostomy and end ileostomy with mucous fistula depending on operative findings and indication. All ileostomies in this study were the later. The critical issues in their management are weight gain, stoma output, local and systemic complications. The approach to these issues is set out in the paper. Weight gain is poor over the first 2 weeks, the median value being zero. Weight gain or weight loss was closely related to the consistency and volume of the stoma output. When the stoma output is thick and difficult to measure, it is considered normal. When the stoma output is greater than 20-30 mls/kg/dy, the infantâ s weight and fluid and electrolyte balance needs careful monitoring. Losses are usually watery and when stoma output exceeds 30mls/kg/dy the infant will not gain weight. During a high stoma output period the infant will require a reduction in oral feeds and

an increase in parenteral feeding. Excess losses from ileostomies can develop an array of acute acid base and electrolyte imbalances in association with volume depletion if not adequately monitored. High output states are caused by a number of factors. These include prematurity, malabsorption due to underlying gut pathology and short gut due to bowel resection[2].

In our institution, in just over half of the infants, the nursing staff re-cycled the proximal stoma output through the distal mucous fistula. The effluent is administered by infusion pump via a silicone urinary catheter in the mucous fistula anchored with minimal balloon inflation under strict aseptic conditions. It is suggested that this procedure may stimulate mucosal growth, prevent bowel atrophy and increase electrolyte and fluid absorption[3,4]. Close attention to fluid balance and avoidance of rapid administration causing abdominal distension and diarrhoea is important.[5] Ranitidine was universally prescribed. It acts by reducing gastric acid secretion which can contribute to high stoma outputs and poor weight gain. The rationale for administering amoxicillin and metronidazole is that they may reduce bacterial overgrowth within the bowel which interferes with absorption and thus increases stoma output[6]. However, the sucrose content of metronidazole may contribute to high stoma output. In our series 3 infants progressed from high stoma output to intestinal failure and required protracted parenteral nutrition under the care of gastroenterology. This is a particularly challenging condition, with a range of issues including nutrition, growth failure, chronic diarrhoea, vascular access and catheter-related sepsis, liver disease as well as many psycho social issues[7]. The aim of treatment is intestinal rehabilitation to enable children to become independent of parenteral nutrition. Successful treatment requires the close collaboration of general paediatricians, gastroenterologists and paediatric surgeons and the benefit of experience at specialized centres.

Local stoma problems are common. They range from skin excoriation and necrosis to stoma stricture and prolapse[8]. Ileostomy losses are usually watery and can be associated with skin excoriation and bowel dehiscence. Excoriation can be precipitated by ill-fitting ostomy appliances[9]. Obtaining an appropriate sized ostomy appliance for a preterm infant is a challenge. Prolapse happens because the bowel peristalsis places continual pressure on the stoma site. Daily vigilance of the stoma site is important in order that problems can be identified and managed at an early stage. Malabsorption is common for a variety of reasons. Many of the infants, particularly preterm infants have a proximal short bowel due to surgical resection. There may be mucosal atrophy secondary to the inability to initiate oral feeding[10].

The proportion of parenteral nutrition compared with enternal nutrition and weight gain on same can be a good indicator of functional capacity of gut e.g. if proportion of oral feeds exceeds 50%, it is a good indication that the bowel is absorbing. The type and volume of oral feeding that the post-ileostomy infant will tolerate varies widely and the involvement of a dietician, in particular a neonatal dietician is very important. In this series there was an emphasis on using breast milk either maternal or donor bank. The neonatal nurse can provide essential support to the mother while she is expressing and emphasising the positive contribution of the breast milk. The formula milks that were employed were Pepti- Junior (semi-elemental feed) and Neocate (amino-acids feed). These can be useful if malabsorption is suspected and may help to decrease stoma output. There is a fine line in stimulating the gut and overloading it in these infants.

The skill and knowledge of the neonatal surgical nurse and the stoma nurse is pivotal in the management of infants post ileostomy. They have a key role in the precise management of fluid and electrolyte balance and the prevention of complications. Once feeding has commenced close observation of the infant is required, paying particular attention to the appearance of the abdomen, nasogastric aspirates and the stool output. Close attention throughout the nursing shift to the stoma output, with 4-6 hourly calculations of the volume, observation of the consistency and appearance of the fluid is essential. The nurse must be alert to the signs of the bowelâ s intolerance of enteral feeds manifested by large stool output. Prompt intervention can prevent deterioration to the point of fluid and electrolyte imbalance. The neonatal nurse is best placed to inform the Neonatal/Surgical teams of the progress of the bowelâ s adaptation to enteral feeds.

In summary this paper provides an account of the progress and complications encountered by a cohort of newborn infants after an ileostomy. The findings provide a template for the care of these infants. It sets out how the attending doctor or nurse should approach the management of these high risk infants in the early post-operative period.

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