

Enterostomies for acute abdominal surgical condition in children: An experience in a developing country

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Abstract

Background: Pediatric abdominal surgical condition that is complicated by gross peritoneal contamination may require enterostomy as a damage control or salvage procedure. Late presentations mostly seen in developing countries make creation of enterostomy a relatively common surgical procedure. The aim of this study was to evaluate the creation of enterostomy in children who presented with acute abdominal surgical conditions.

Methods: This was a retrospective study of children that had enterostomy in the pediatric surgery unit of Enugu State University Teaching Hospital, Enugu, Nigeria. Medical records of pediatric patients that had enterostomy over a 10-year period were assessed.

Results: There were 32 cases of enterostomies performed during the study period. There were 25 males (78.1%) and 7 females (21.9%) with a male to female ratio of 3.6:1. The age range of the patients was 3 weeks to 180 months, with a median age of 96 months. There were 1 neonate (3.1%), 10 infants (31.3%) and 21 children (65.6%) older than 1 year. The primary diagnoses were typhoid intestinal perforation in 21 patients (65.6%), intussusception 10 (31.3%) and intestinal atresia 1 (3.1%). Ileostomy was performed in 31 patients (96.9%) and jejunostomy in 1 patient (3.1%). Enterostomy was created at the time of initial laparotomy (damage control) in 21 patients (65.6%) while 11 patients (34.4%) had their enterostomy as a salvage procedure at the time of re-exploration. Peristomal skin complication was the most common complication recorded in our patients. Mortality was 12.5%.

Conclusion: Enterostomy is lifesaving in the management of acute abdominal surgical condition when there is gross peritoneal contamination in severely ill children. Proper surgical technique and electrolyte derangements are important considerations when enterostomies are created.

Keywords: acute, abdominal, developing country, enterostomy, surgical

Introduction

Acute abdomen is a clinical condition caused by a wide range of pathological entities that requires urgent medical or more often surgical treatment [1]. Creation of enterostomy is a relatively common procedure in pediatric surgery [2]. Construction of enterostomy in children is often a temporizing measure in the management of acute abdominal surgical condition [3]. When intestinal gangrene/perforation occurs on a background of peritonitis, performing intestinal resection and anastomosis is associated with lots of morbidity and mortality because of high incidence of anastomotic leak [4-6]. Thus, construction of enterostomy, during the initial surgery (damage control) or as a salvage procedure, especially in very ill patients may be life-saving. However, creation of enterostomy is not free of complications. Skin complications, stoma complications and psychological issues make enterostomy unacceptable to the parents/caregiver especially in developing countries [2,7]. The aim of this study was to evaluate our experience with regards to the creation of enterostomy in children who presented with acute abdominal surgical conditions.

Methods

This was a retrospective study of children aged 15 years and below who had enterostomy, for extensive peritonitis following acute abdominal surgical condition, between January 2009 and December 2018 at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH) Enugu, Nigeria. For the purposes of this study, extensive peritonitis was characterized by the presence of pus, faeces or both in the peritoneal cavity while acute abdominal surgical conditions included intestinal gangrene and intestinal perforation of any etiology. Anastomotic breakdown from intestinal anastomosis were also included. Patients who had colostomy as a form of enterostomy were excluded from this study. ESUTH is a tertiary hospital located in Enugu, South East Nigeria. The hospital serves the whole of Enugu State, which according to the 2016 estimates of the National Population Commission and Nigerian National Bureau of Statistics, has a population of about 4 million people and a population density of 616.0/km². The hospital also receives referrals from its neighboring states. Information was extracted from the case notes, operation notes, operation register, and

admission-discharge records. The information extracted included the age, gender, indications for the laparotomy, location of the enterostomy, post-operative complication and management outcome. The follow-up period was 12 months.

Ethical approval was obtained from the ethics and research committee of ESUTH. Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporations Chicago) was used for data entry and analysis. Data were expressed as percentages, median and range.

Results

Patients' demographics

There were 38 cases of enterostomies performed during the study period but only 32 cases had complete case records and formed the basis of this report. There were 25 males (78.1%) and 7 females (21.9%) which corresponds to a male to female ratio of 3.6:1. The ages of the patients ranged from 3 weeks to 180 months, with a median of 96 months. There were 1 neonate (3.1%), 10 infants (31.3%) and 21 children (65.6%) older than 1 year.

Primary diagnosis and age distribution of the patients

The various primary diagnoses of the patients and their corresponding age distributions are shown in table 1.

Location of the enterostomy

Thirty-one patients (96.9%) had their stoma created on the ileum (ileostomy) whereas 1 patient (3.1%) had his stoma created at the jejunum (jejunostomy).

Indication for the enterostomy

Twenty-one patients (65.6%) had their enterostomy as a damage control procedure during the initial laparotomy whereas 11 patients (34.4%) had their enterostomy as the salvage procedure during the repeat laparotomy, as shown in figure 1.

Post-operative complications

Eleven patients (34.4%) had peristomal skin complications whereas nine patients (28.1%) did not develop any complications. Other complications are depicted in table 2.

Outcome

Twenty-seven patients (84.4%) did well and were discharged. Four patients (12.5%) died whereas 1 patient (3.1%) signed out against medical advice. Out of the 27 patients that did well, 25 patients have had their enterostomy reversed.

Post-operative complication	Number	Percentage
Peristomal skin excoriations	11	34.4
None	9	28.1
Stoma complications	7	21.9
Surgical site infection	5	15.6

Table 2. Post-operative complications.

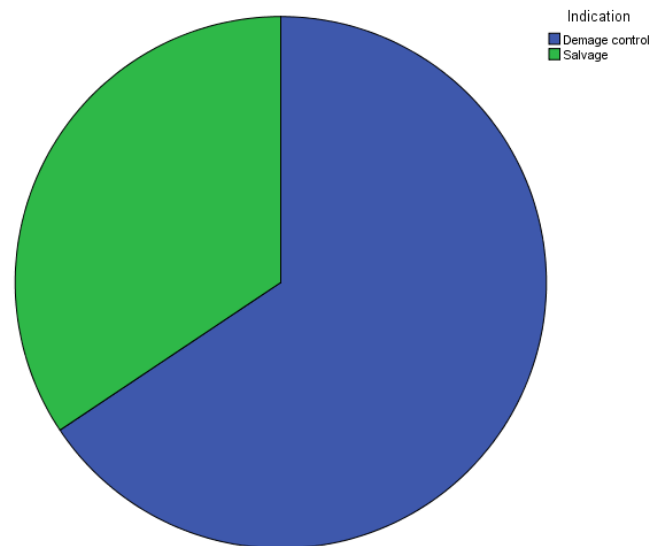


Figure 1. Pie chart showing the indications for the enterostomy

Discussion

The resolve to do primary intestinal anastomosis or to create an enterostomy following resection of a non-viable bowel is that of the operating surgeon. That resolve may be dicey in a background of gross peritoneal contamination. For an adequate healing of intestinal anastomosis, multiple factors are involved [8]. One of these factors is intra-abdominal sepsis which inhibits fibroplasia, angiogenesis and collagen formation [9]. Other factors are nutritional status, tissue vascularity, tension-free anastomosis and surgical technique [9].

The male dominance recorded in the present study is consistent with the reports of other studies [2,3,10]. The median age of our patient of 96 months is at variance with the report of the study done in northern Nigeria [3]. The differences in the median ages of the patients may be explained by the age discrepancies and primary pathology of the patients recruited for the different studies. For instance, the majority of the patients in the present study were more than 1 year old while in the study conducted in northern Nigeria, almost half of patients were less than 1 year. In the present study, typhoid intestinal perforation and intussusception were the most common pathologies necessitating enterostomy in children older than and younger than 1 year of

Age (Months) perforation	Intestinal atresia	Intussusception	Typhoid intestinal
Neonate (< 1 month)	1	-	-
Infants (< 12 months)	-	10	-
Children (> 12 months)	-	-	21

Table 1. Primary diagnosis and age distribution of the patients.

age respectively. These findings are similar to the report of Ameh et al. [3]. However, enterostomy for necrotizing enterocolitis was the most common indication in some series [11,12].

Creation of ileostomy was the most common performed enterostomy in the current study. Ileostomy was also the most commonly performed in other studies [13,14]. The part of the intestine used for stoma creation may depend on the site and extent of the primary pathology the patient presented with.

Enterostomies could be created as a damage control measure to minimize contamination and allow room for patient's further resuscitation and stabilization. Damage control enterostomy was done at the time of initial laparotomy. Any anastomosis done on the background of peritonitis in critically ill patients is most likely to leak. The increased incidence of anastomotic leak in such patient may be due to grossly edematous intestine and inadequate bowel blood supply in such clinical settings [3]. Majority of our patients in the present study had damage control enterostomies. This is in agreement with the reports of other researchers [3,10]. However, when anastomotic dehiscence occurs it may be unsafe to perform re-anastomosis in the same sitting. This is due to increased incidence of anastomotic leak. In such circumstance, an enterostomy as a salvage procedure may be the best option [3]. There is a documented reduction in mortality from 82.5% to 33.8% when enterostomy is performed for post-operative peritonitis [15]. About one-third of our patients had enterostomy as a salvage procedure.

Although enterostomy is lifesaving, it is not free of complications. Peristomal skin complication was the most common complication recorded in the current study. It is common complication of stoma creation due to high digestive enzyme content of the output fluids which also macerates the peristomal skin. Peristomal skin complications affects 18% to 73% of patients and its greatest incidence is recorded in ileostomy [16]. The skin complications range from mild erythema to full thickness ulcerations [16]. Ameh et al also reported skin excoriations as the most common complications in their patients [3]. However, other studies reported stomal complications such as stomal prolapse and stenosis as the most common complication [13,17]. The differences in complication patterns may be explained by the method of enterostomy and skill of the surgeon.

The mortality of 12.5% recorded in the current study is higher than the report of other authors [3,17]. However, there is a report of 22% mortality with regards to enterostomies [13]. The mortality resulting from enterostomy may be from the primary disease, from complications of enterostomy or from fluid and electrolyte derangements.

Conclusion

In the background of gross peritoneal contamination resulting from intestinal perforation or gangrene, enterostomy is necessary

as a life saving measure. Enterostomy may be used for damage control (at first operation) or for salvage (at re-exploration). In the immediate post-operative period, fluid and electrolyte loss from the enterostomy affect outcome. Early presentation and prompt interventions reduces the degree of peritoneal soilage which reduces the incidence of enterostomy creation.

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