

Pediatric Stomas: A Study in a Teaching Hospital, Our Experience

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Received: 25 December 2022; **Accepted:** 10 January 2023; **Published:** 16 January 2023.

Citation: C.K. Emeka, O. Nkiruka, E.W. Unebike. (2023). Pediatric Stomas: A Study in a Teaching Hospital, Our Experience. Journal of Clinical and Medical Reviews (JCMR). 1(1). DOI:10.58489/2836-2330/010.

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Abstract

A stoma is a purposeful surgical connection of a segment of a hollow viscus (intestine, ureter) to the anterior abdominal wall and can be a life-saving procedure. The aim of this study was to evaluate our experience in respect of stomas (ileostomies, colostomies, ureterostomies) performed in children. This was a retrospective study of children who had stoma created at the pediatric surgery unit of a teaching hospital in Enugu, Nigeria. Children who had intestinal or urinary tract stomas were included in the study and covered a 10-year period. The information analyzed included the patients' age, gender, diagnosis, indications for the stoma creation, type of stoma (colostomy, ileostomy and ureterostomy), post-operative complications and treatment outcome. A total of 112 stomas were created in children during the 10-year study period. There were 80 (71.4%) males and 32 (28.6%) females. Hirschsprung's disease and typhoid intestinal perforation were the first and second most common indications for stoma creation. Colostomy creation and peristomal skin excoriations were the most performed stoma and most common post-operative complication respectively. Eleven (9.8%) patients expired due to respiratory failure and uncontrollable sepsis. Stoma creation may form an essential component for the treatment of surgical conditions in children and it can be life-saving. Stomas can be created for disorders of the intestinal and urinary tracts. There may be stoma complications accounting for morbidity experienced in these patients.

Keywords: Colostomy, experience, ileostomy, pediatric, stoma, ureterostomy.

Introduction

A stoma is a purposeful surgical connection of a segment of a hollow viscus (intestine, ureter) to the anterior abdominal wall [1]. Pediatric stoma is a commonly performed lifesaving surgical procedure and stomas have a role in the management of congenital and acquired pathological urological and intestinal conditions [2]. However, stomas are associated with significant complications, social isolation and reduction in quality of life [3]. The indications for stomas creation in children vary from one patient to another. The reason for stoma formation may be for decompression of the bowel or urinary tract, diversion of urinary or fecal flow or protection of anastomosis [3, 4]. The frequently performed stomas in children include colostomy, ileostomy and ureterostomy. Other forms of stomas such as vesicostomy and jejunostomy are rarely

performed [3, 5]. In pediatric surgery practice, creation of stomas is always a temporizing measure such as in anorectal malformation and Hirschsprung's disease [6]. Stomas are not without complications, there are attendant complications and morbidity [Nastro]. Successful stoma formation is pivotal to early definitive management surgeries. It's been reported that 20% to 70% of the patients who had stomas developed complications [5]. Some of the documented complications include ischemia, hemorrhage, infection, stenosis, fistula formation, prolapse, hernia formation, bowel obstruction and peristomal excoriations [7, 8]. The decision to create stoma is usually taken following judicious review of the preoperative and intra-operative findings. There has been no previous documentation of the experience of surgeons with regards to stomas in children our tertiary center. The aim of this study was

to evaluate our experience in respect of stomas (ileostomies, colostomies, ureterostomies) created in children.

Materials and Methods

This was a retrospective study of children who had stoma created at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH), Enugu, Nigeria. Children who had both intestinal and urinary tract stomas were included in the study. However, patients older than 15 years of age and those with inadvertently created fistula such as post-operative enterocutaneous fistula were excluded from this study. The study covered a 10-year period, from January 2011 to December 2020. 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 analyzed included the patients' age, gender, diagnosis, indications for the stoma creation, type of stoma (colostomy, ileostomy, and ureterostomy), post-operative complications and treatment outcome. The follow-up period was 12 months. Ethical approval was obtained from the ethics and research committee of ESUTH and informed consent from the patients' caregivers was not required due to retrospective nature of the study and identities of the patients were not compromised. Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporation Chicago Illinois) was used for data entry and analysis. Data were expressed as percentages, mean, and range.

Results

Patients' demographics

A total of 112 stomas were created in children during the 10-year study period. There were 80 (71.4%) males and 32 (28.6%) females. The mean age of the patients was 5 years with a range of 1 month to 10 years.

Diagnosis (n=112)

The diagnosis of the patients is shown in Table 1.

Table 1: Diagnosis of the patients

Diagnosis	Number of patients (%)
<i>Hirschsprung's disease</i>	49 (43.8)

<i>Typhoid intestinal perforation</i>	43 (38.4)
<i>Anorectal malformation</i>	15 (13.4)
<i>Intussusception</i>	3 (2.7)
<i>PUV (Late presentation)</i>	2 (1.7)

PUV=Posterior urethral valve

Indications for the stoma creation

The indications for the creating of the stoma are depicted in Table 2.

Table 2: Indications for creation of the stoma.

Indications for the stoma creation	Number of patients (%)
<i>Failure of fecal decompression</i>	35 (31.3)
<i>HAEC</i>	18 (16.1)
<i>Leak following intestinal repair</i>	18 (16.1)
<i>Gross peritoneal contamination</i>	15 (13.4)
<i>ARM with fecal contamination of the urinary tract</i>	11 (9.8)
<i>Dilated and tortuous ureters</i>	10 (8.9)
<i>Anastomotic leak</i>	5 (4.4)

HAEC=Hirschsprung's disease; ARM=Anorectal malformation

Type of stoma created

The types of stomata created in the patients are shown in Table 3.

Table 3: Types of stoma

Types of Stoma	Number of patients (%)
<i>Colostomy</i>	64 (57.2)
<i>Ileostomy</i>	38 (33.9)
<i>Ureterostomy</i>	10 (8.9)

Post-operative complications

There were complications in 21 (18.8%) patients. Peristomal skin excoriations was documented in 8 (7.1%); prolapse 7 (6.3%); and 2 (1.8%) patients each, had prolonged hemorrhage, stomal stenosis and parastomal hernia.

Treatment outcome

The outcome was good in 101 (90.2%) patients. However, 11 (9.8%) patients expired due to respiratory failure and uncontrollable sepsis.

Discussion

The first deliberate surgical colostomy was recorded in 1710 when Littre named a stoma as a treatment for anustresia, a congenital anomaly in which the anus is not properly developed. In 1750, colostomy was

performed in a 73-year old lady by name, Margaret White. A French surgeon, Jean Amussat compiled a list and published stoma operations performed between 1716 and 1839. A surgeon named Pillore performed an end colostomy in a woman who had malignant tumor of the rectum. The first successive outcome of colostomy in newborn baby, who had imperforate anus, was performed in 1793. A handbook on surgical construction of a colostomy was published in 1798 by a Danish surgeon, Hendrick Callisen. In 1851, the first known urostomy was created in a child [9, 10, 11].

In the present study, an average of 11 stomas was performed per year. This is at variance with the report of other series on creation of stomas [12, 13]. The cohort of patients (pediatric/adult) recruited in the different studies may explain the discrepancies in incidence. Furthermore, the number of colostomies, ileostomies and ureterostomies performed in a particular setting may vary from one study to another and from time to time. More males were affected in the current study. Other researchers also documented this male predominance [12, 13]. The exact reason for this is not known. However, the higher incidence of pediatric abdominal surgical emergencies in male may explain it [14]. The mean age of our patients was 5 years. The wide age ranges of pathologies that could necessitate stoma creation may be responsible for this. For instance, the peak age of intussusception is quoted as 6 months whereas typhoid intestinal perforation occurs in older children [15, 16]. Again, anomalies such as anorectal anomalies and Hirschsprung's disease are congenital abnormalities whose symptoms may be present at birth or at a tender age.

Hirschsprung's disease was the most common indication for stoma creation in the current series. Hirschsprung's disease, which is also called intestinal aganglionosis, is developmental anomaly of the enteric nervous system caused by defective migration, proliferation, differentiation and survival of neural crest cells leading to complete absence of ganglia in the gut wall [17]. Late presentation of children with Hirschsprung's disease in our setting may account for the high number of colostomies performed. However, one stage transanal pull through procedure (without stoma) suffices in children who present early with Hirschsprung's disease.

Typhoid intestinal perforation was the second most common reason for stoma formation in our patients. Typhoid (enteric) fever is multisystem infection caused by the bacteria, *Salmonella enterica* serovar typhi and *Salmonella enterica* serovar paratyphi A

and B which are transmitted through feco-oral route by ingestion of contaminated food and/or water [18]. It is a public health problem that is seen mostly in developing countries due to lack of potable drinking water, poor hygiene and improper waste disposal [19]. Typhoid intestinal perforation is a common surgical complication of typhoid fever which causes leakage of intestinal contents into the peritoneal cavity causing peritonitis. The primary treatment of typhoid intestinal perforation is closure of the ileal perforation in 2 layers after excising the edges of the perforation. However, in a background of multiple intestinal perforations and gross peritoneal contamination, creation of ileostomy may be lifesaving [20].

Anorectal anomalies represent a spectrum of abnormalities involving the anus, rectum, urinary and genital systems. Not all types of anorectal anomalies will require a stoma: High anomalies, absence of fistula and fecal contamination of the urinary tract are the indications for colostomy in anorectal malformation. Posterior urethral valve is a congenital obstructive membrane of the male urethra and one of the most common causes that lead to lower urinary tract obstruction in males [21]. Cutaneous ureterostomy is not a frequently performed surgical procedure in children with posterior urethral valve. The indication for ureterostomy in posterior urethral valve is impending renal failure when the ureter and upper urinary tract are markedly dilated and tortuous and cannot drain properly. In massively dilated upper urinary tract, cutaneous ureterostomy corrects blood urea nitrogen, creatinine and serum electrolyte values [22]. It is worthy to note that ureterostomy is not the treatment for posterior urethral valve but a temporizing measure.

The exact reason for stoma creation varies widely. Generally, stomas provide outlet for evacuation of feces and urine. This outlet (stoma) could be done as part of resuscitation and stabilization of critically ill patients. Failures to decompress the intestinal and urinary tract are general indications for stoma creation.

In the index study, colostomy was the most performed stoma. Colostomy is the exteriorization of part of the colon to the anterior abdominal wall and is an important component of many surgical procedures for fecal diversion. The pathologies requiring the creation of colostomy includes Hirschsprung's disease and anorectal malformation. The anatomical type of colostomy performed depended on the pathology involved: Sigmoid colostomy and transverse colostomy are mostly performed [12].

There were post-operative complications in about one-fifth of the patients with peristomal skin excoriations as the most common. Peristomal skin excoriations refer to the loss of skin integrity and this can be due to chemical injury, mechanical destruction, infectious conditions, immunologic reactions and disease-related conditions [23]. Peristomal skin problem caused by chemical injury from stool or urine is the most frequent whereas allergic contact dermatitis is quite rare [23]. The degree of peristomal skin excoriation may range from mild dermatitis to full thickness skin necrosis and ulceration [24].

The overall outcome of stoma creation is good despite the need for another surgery for stoma undiversion. Morbidity results mostly from the stoma complications and mortality may occur from the primary pathology necessitating the stoma creation.

Conclusion

Stoma creation may form an essential component for the treatment of surgical conditions in children and it can be life-saving. Stomas can be created for disorders of the intestinal and urinary tracts. There may be stoma complications accounting for morbidity experienced in these patients.

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