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Spectrum of colorectal surgery operations performed in a single paediatric surgery unit in sub-Saharan Africa

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ABSTRACT

Background: Colorectal surgery is a budding subspecialty of paediatric surgery and typifies the advances in the management of surgical conditions in children. The colorectal burden in resource poor settings, though reported to be challenging, remains undocumented. The aim of the present study was to review the typical operative paediatric colorectal caseload in a single centre in sub-Saharan Africa. **Materials and Methods:** A retrospective review of the operative records of the division was conducted between 2009 and 2013. Data were obtained on the demography, diagnosis, procedure performed and type of anaesthesia used; entered into a computer using SPSS (IBM Corp; Armonk, NY) and analysed. **Results:** A total of 120 colorectal operations were performed in 90 patients with age ranging from 1 to 13 years. The major diagnoses were anorectal malformations (64.4%) and Hirschsprung disease (HD) (31.1%). The most often performed operations were colostomy (45.0%), posterior sagittal anorectoplasty (17.5%) and pull through (17.5%). The number of colorectal operations performed each year ranged from 12 in 2009 to 36 in 2012. A higher proportion of patients with anorectal malformations (46.6%) presented within the neonatal period compared with those with HD (17.9%), $P = 0.005$. The age at definitive surgery was less in patients with anorectal malformations compared to patients with HD ($P = 0.003$). **Conclusions:** Congenital malformations represent the bulk of the caseload in paediatric colorectal surgery in sub-Saharan Africa and patients typically present late; although patients with anorectal malformations present and are operated upon significantly earlier than those with HD.

Key words: Anorectal malformation, Hirschsprung disease, paediatric colorectal, spectrum of cases, subspecialty

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INTRODUCTION

Paediatric surgery as a speciality has evolved globally from the early days of being part of general surgery to becoming an independent specialty.[1,2] This progress is advanced in many centres in Europe and North America and further sub-specialisation is being supported by improvement in quality of care.[3,4] One of such sub-specialties is paediatric colorectal surgery, which is important considering the role that management of colorectal pathologies played in the development of paediatric surgery as a specialty and how advances in the care of colorectal disorders have come to mirror the progress of the specialty.[5]

In sub-Saharan Africa, the specialty of paediatric surgery has equally evolved, although at a slower pace[1,6] and caring for children with colorectal pathologies is challenging especially in settings where resources are limited.[7] Anecdotally as paediatric surgeons practicing in the sub-region, we see many patients with colorectal pathologies and often times collaborate in the care of patients. Attempts are being made to establish 'informal' regional centres where expertise abounds in caring for children with complex colorectal problems. However, there is paucity of information on the typical paediatric colorectal practice in the region. This also makes the terrain uncharted, in terms of what to expect, when surgeons travel to developing countries with the goal of offering assistance through surgical missions.[8,9]

Paediatric Surgery became a unit in our hospital in 1970 with a surgeon on staff. However, there were challenges between 1970 and 2002 when occasionally the lone surgeon was away or left and the unit was often time coordinated by general surgeons and urologists until 2002 when the division was resuscitated and had a fully trained paediatric surgeon. The division had since expanded with a complement of three full time paediatric surgeons.

The Association of Paediatric Surgeons of Nigeria, established to cater for the interest of specialists Paediatric Surgeons in the country, has evolved over time and expanded in terms of membership and opportunities for collaboration and the division has taken full advantage of these opportunities. The aim of this study was, therefore, to review the spectrum of operated colorectal cases in a single paediatric surgical unit in sub-Saharan Africa.

MATERIALS AND METHODS

Methods

A retrospective review of the operative records and in-patient register of the Division of Paediatric Surgery, in a teaching hospital in Nigeria between January 2009 and December 2013 was done. Data were retrieved from the records on the demography, hospital number, diagnosis, type of procedure performed and the form of anaesthesia administered to patients who had operative procedures involving the colorectal region. Patients who had rectal biopsies as part of evaluation for suspected Hirschsprung disease (HD) or who were older than 15 years at presentation were excluded from the study.

The data were entered into a computer using SPSS version 21 software (IBM Corp; Armonk, NY) and statistical analyses performed. Univariate analysis was performed and results presented as counts, ratios and percentages. The age at presentation was converted into a binary variable — using the neonatal period of 4 weeks to classify the age at presentation into those who presented during the neonatal period or outside the period. The age at definitive surgery was also dichotomised for cross tabulation into: 1 year or less and older than 1 year. Chi-square statistics was used to compare age at presentation or age at definitive surgery between patients with anorectal malformations and HD. The *P* value for statistical significance was set at <0.05.

RESULTS

A total of 120 colorectal operations were performed in 90 patients over the period of the study. There were 61 (67.8%) males and the male to female ratio was 2:1. The age at presentation ranged from 1 day to 13 years with a median age of 3 weeks; 31 (34.4%) patients presented to the hospital within the neonatal period. The majority of patients had either anorectal malformations (58, 64.4%) or HD (28, 31.1%); the rest had post-traumatic rectovaginal fistula (2), rectal prolapse (1) and rectal atresia (1). The most often performed operations were colostomy, posterior sagittal anorectoplasty (PSARP) and pull through procedures [Table 1]. A total of 50 patients had definitive surgeries performed for the treatment of congenital malformations: 20 had PSARP for high or intermediate type anorectal malformations, 21 had pull-through procedures on account of HD, five had anoplasty for low type anorectal malformations, four had posterior sagittal anorectovaginourethroplasty (PSARVUP) for cloacal malformations and the patient with rectal atresia had a PSARP.

Most (117, 97.5%) of the operations were performed under general anaesthesia; the exceptions being three colostomies in children aged between 2 and 8 days who were quite ill and the anaesthetists could not administer general anaesthesia.

The number of colorectal operations performed each year ranged from 12 in 2009 to 36 in 2012.

A higher proportion of the patients with anorectal malformations presented to the hospital within the neonatal period compared to those with HD [Table 2]. The age at definitive surgery was less in patients with anorectal malformations as 75.9% had a definitive surgery (PSARP, PSARVUP or anoplasty) performed before their first birthday, whereas 33.3% of the patients

Table 1: Types of colorectal operations performed during the study period

Type of operation	Number (%)
Colostomy	54 (45.0)
PSARP	21 (17.5)
Pull through procedure	21 (17.5)
Colostomy reversal	14 (11.7)
Anoplasty	5 (4.2)
PSARVUP	4 (3.3)
Thiersch procedure	1 (0.8)
Total	120 (100.0)

PSARP: Posterior sagittal anorectoplasty; PSARVUP: Posterior sagittal anorectovaginourethroplasty

Table 2: Comparison of the age at first presentation in patients with anorectal malformations and Hirschsprung disease

Diagnosis	Age at presentation			χ^2	*P* value
	≤1 month number (%)	>1 month number (%)	Total number (%)		
ARM	27 (46.6)	31 (53.4)	58 (100.0)	8.009	0.005
HD	5 (17.9)	23 (82.1)	28 (100.0)		
Total	32 (37.2)	54 (62.8)	86 (100.0)		

ARM: Anorectal malformations; HD: Hirschsprung disease

with HD had a pull through procedure at that age, $P = 0.003$ [Table 3].

DISCUSSION

The bulk of colorectal cases recorded in this retrospective review were congenital malformations with anorectal malformations and HD being responsible for 96% of the operations performed. This is not surprising being a paediatric surgical unit where congenital malformations are expected to constitute the majority (of cases seen) in this sub-specialty of paediatric colorectal surgery. In sub-Saharan Africa, inflammatory bowel diseases are rare[10] and none of the patients in the present study had ulcerative colitis or Crohn's disease unlike in North and South America, Europe or Asia where patients are often seen with inflammatory lesions of the bowel.[11] HIV/AIDS related colorectal or anorectal diseases such as anocutaneous or rectovaginal fistula requiring colostomy[7] were surprisingly not seen in the unit in spite of the country having a large burden of paediatric HIV.[12] Although acquired rectovaginal fistula in children tend to be seen as a pointer to HIV infection,[7] the two patients with rectovaginal fistulas in this study had prior history of perineal injury and were HIV negative; there was nothing in the history to suggest child abuse as well.

The patients quite often presented late in the study and 63% presented after the neonatal period. Delayed presentation is typical as reported from different centres in Nigeria.[13-15] The delay in presentation is often due to socioeconomic challenges, distance between place of residence and urban centres where paediatric surgical units are located[16] and poor awareness by mothers,[17] and perhaps health care workers[13] about the different spectrum of colorectal pathologies. The patients with HD particularly presented much later than those with anorectal malformations with only 18% of the patients operated on account of HD presenting with symptoms suggestive of the disease in the first 28 days of life. The more obvious nature of the anomaly in anorectal malformations coupled with the intervening periods of relief from chronic constipation in HD may be responsible for this observation.

Table 3: Age at definitive surgery in patients with anorectal malformations and hirschsprung disease

Surgery	Age at surgery			χ^2	*P* value
	≤1 year number (%)	>1 year number (%)	Total number (%)		
PSARP*	22 (75.9)	7 (24.1)	29 (100.0)	9.043	0.003
Pull through	7 (33.3)	14 (66.7)	21 (100.0)		
Total	29 (58.0)	21 (42.0)	50 (100.0)		

*PSARP included PSARVUP for cloacal malformations and definitive anoplasty. PSARP: Posterior sagittal anorectoplasty; PSARVUP: Posterior sagittal anorectovaginourethroplasty

The number of patients with anorectal malformations operated at major teaching hospitals in the region appears to be similar. An average of 12 patients was operated on each year on account of anorectal malformations in the division over the 5 year duration of the study. Uba *et al*.[15] operated on an average of nine patients each year on account of anorectal malformations in Jos, North-Central Nigeria. Similarly, Lukong *et al*.[14] have reported an average of 14 patients with anorectal malformations operated upon each year in Zaria, Northern Nigeria. Although these are all hospital based prevalence figures, with their limitations, and do not include patients who never made it to surgery, the figures suggest a similar case load of operated colorectal cases by surgeons in the region.

Four patients in this series had PSARVUP as definitive treatment for cloacal malformations. This type of surgery, especially in children with long common channels, represents one of the most challenging procedures that paediatric surgeons perform worldwide.[18] Others in the region have reported operating similar number of cases[13-15] of such severity. The challenge, however, is that operating on relatively small number of those cases may not allow individual surgeons to have adequate expertise that exposure to multiple cases of cloacal malformations or cloacal exstrophy will provide; hence, it may be worthwhile for centres to continue their efforts at collaboration[19] where surgeons in the sub-region often visit other centres when they have such cases and there may be a need to identify hospitals with greater resources to manage complex colorectal problems in children.

CONCLUSION

Congenital malformations represent the bulk of the caseload in paediatric colorectal surgery in sub-Saharan Africa and patients typically present late although patients with anorectal malformations present and are operated upon significantly earlier than those with HD. There is a need for continuous collaboration among paediatric surgeons in the sub-region to improve upon the management of complex colorectal problems.

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