



Research Paper

Spectrum Of Hernias Among Children on The Plateau

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ABSTRACT

Introduction: Hernia is one of the commonest congenital presentations to paediatric surgical clinics worldwide. Most literatures on paediatric hernias discuss mainly inguinal hernias as paediatric hernias, however just like in adults, the spectrum of paediatric hernias spans beyond the groin, to include the entire abdominal wall hernias and internal hernias.

Objective: This study aimed to describe the epidemiology of hernias in children on the plateau, highlighting its prevalence, management and outcomes.

Methods: This was a retrospective study where we analysed the medical records of children aged 0-17 years with hernias from 2017 to 2024. Data were obtained from 2 types of data sets. 1. hospital based patients records and 2. Community base medical records of children obtained during free medical outreaches in the 3 senatorial zones of plateau state

Results: A total of 589 patients' cases were reviewed, 437 males and 152 females with a male to female ratio of 2.8:1. The Mean age was 80 months. Types of hernia: 331(56.2%) had inguinal hernia, 207(35.1%) umbilical, 28(4.8%) paraumbilical, 11(1.9%) ventral, 5 (0.8%) epigastric, 4 (0.7 %) incisional hernia, 2 (0.3) congenital diaphragmatic (CDH) and 1 (0.2%) Transmesenteric hernias. There were 61(11.6%) cases of synchronous hernias. Presentation: 559 (94.9%) were elective and 30 (5.1%) emergencies (incarceration 24, 4.1%, obstruction 2, 0.3% and strangulation 4, 0.7%). Type of surgery performed: 360(58.0%) herniotomies, 253 (40.7%) herniorrhaphies and 8(1.3%) hernioplasties (Note: some patients had multiple hernias, more than 1 procedure). Complications: 19(3.1%) had complications recorded in 15 patients (9, 1.5% wound infection, 5, 0.8% recurrence, 3, 0.5% acquired undescended testis and 2, 0.3% testicular atrophies).

Conclusion: Hernia is prevalent in children on the plateau. Its surgery is relatively safe with low complication rate in our environment, despite not being able to assess data on the level of competences of those who performed these procedures outside the tertiary hospitals. Training of medical officers at nontertiary institutions could provide accessible safe surgical care, improve outcome and further reduce this complication rate.

Keywords: Spectrum, Hernia, Children, On the Plateau

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I. INTRODUCTION

Hernia is one of the commonest congenital presentations to paediatric surgical clinics worldwide(1). It results from protrusion of a viscus through a defect, recess or weakness of its containing cavity. These, in most cases are congenital in children however, in a few of these it may be acquired. Incidences vary depending on the type of hernia, and is slightly higher in pre-terms than term infants. (2,3,4) It is the most common elective paediatric surgical case on the elective operation list.

Most literatures on paediatric hernias discuss mainly inguinal hernias as paediatric hernias, however just like in adults, the spectrum of paediatric hernias spans beyond the groin. It can involve internal hernias although relatively uncommon such as the diaphragm, mesentery and Para duodenal recesses. Among all the hernias, Inguinal hernia is the commonest congenital hernia seen in children with an incidence of 3% in term neonates and 13% in preterm babies(2,3,4). Other forms of hernias in children include umbilical, paraumbilical,

epigastric, femoral, ventral, Spigelian, lumbar, diaphragmatic and para-duodenal hernias. There are other documented rare hernias like perineal hernias(5,6,)

Presentation is mainly elective and diagnosis is largely clinical, for external hernias. A history of a bulge or swelling, and examination findings consistent with a hernia help arrive at a diagnosis.(7) Internal hernias like diaphragmatic hernias present usually at birth with features of respiratory insufficiency. With the availability of better diagnostic tools, this can be detected prenatally(8,9,10). Transmesenteric hernia although rare in children, usually presents as an emergency with features of intestinal obstruction. A high index of suspicion is required for preoperative diagnosis and in most cases, diagnosis is made intraoperatively.(11) Hernias may also present with complications like obstruction, incarceration and even strangulation with gangrene

Although there is documented evidence of the spontaneous resolution of groin hernias(6,12,13), but treatment is surgery. Groin hernias arising from patent processus vaginalis are treated by herniotomy, while defects or weakness of the containing cavity are treated by herniorrhaphy or hernioplasty. Complications of surgery include wound infection, injury (especially in complicated and unskilled hands) to testicular vessels or vas deferens, which could subsequently affect the reproductive health of the child.

Here on the plateau, a large number of paediatric patients are managed for hernias at both secondary and tertiary health centres. This study aimed to analyze this data to describe the epidemiology of hernias in children on the plateau, highlighting its prevalence, management and outcomes.

II. METHODOLOGY

This is a retrospective cross-sectional study of all paediatric patients managed with hernias from 2017 to 2024 on the plateau. All the patients had surgery and were followed up for 8 weeks.

There were two types of data sources: 1. Hospital-based and 2. community-based.

1. Hospital-based data was collected from 1. Jos University Teaching Hospital, a tertiary level referral hospital for all hospitals in Plateau State, 2. Bingham University Teaching Hospital a church-based tertiary level hospital that cares for a significant number of paediatric cases and 3. Faith Alive Foundation, a faith-based Christian missionary hospital that offers free and specialised medical services to indigent patients including paediatric surgical patients.

B: community-based data source: data was collected from free surgical outreaches conducted in the 3 senatorial zones that make up plateau state. 75 patients were included

Ethical clearance was obtained for this study

Inclusion criteria

All children aged 0 to 17 years with hernias who were managed and followed up for a minimum of 6 weeks.

Exclusion

Any patient within the stated age range and managed but lost to follow-up within a month. Patients who presented within the study period but were not operated on within this period were also excluded.

Medical records of the patients retrieved included patient demography (age, sex,), type of hernia, complications if any, type of surgery and follow up complications. These data were imputed into an Excel spreadsheet and analysed using simple statistics (frequency, means, median and proportions).

III. RESULTS

A total of 589 patients' cases were reviewed, 437 males and 152 females with a male to female ratio of 2.8:1. The Mean age was 80 months. Types of hernia: 331 (56.2%) had inguinal hernia, 207 (35.1%) umbilical, 28 (4.8%) paraumbilical, 11 (1.9%) ventral, 5 (0.8%) epigastric, 4 (0.7%) incisional hernia, 2 (0.3%) congenital diaphragmatic (CDH) and 1 (0.2%) Transmesenteric hernias. See Figure 1. There were 61 (11.6%) cases of synchronous hernias. Presentation: 559 (94.9%) were elective and 30 (5.1%) emergencies (incarceration 24.4.1%, obstruction 2, 0.3% and strangulation 4, 0.7%). See Table 1. Type of surgery performed: 360 (58.0%) herniotomies, 253 (40.7%) herniorrhaphies and 8 (1.3%) hernioplasties (Note: some patients had multiple hernias, more than 1 procedure). Complications: 19 (3.1%) had complications recorded in 15 patients (9, 1.5% wound infection, 5, 0.8% recurrence, 3, 0.5% acquired undescended testis and 2, 0.3% testicular atrophies).

Case-by-case analysis

Inguinal hernia: A Total of 331 cases, 192 on the right, 96 (29.0%) were on the left, while 43 (13.0%) were bilateral. There were 296 males, 36 females, M: F 8.2:1, and a mean age of 36 months. Presentation: 315 (95.2%) elective, 16 (4.8%) emergency (12, 3.6% incarcerated, 1, 0.3% obstructed and 3, 0.9% strangulated). See Table 1. All patients had herniotomy, only one had herniorrhaphy. Postoperative complications: wound infection in 4 (1.2%), recurrence, 3 (0.9%), acquired undescended testes, 3 (0.9), and 2 (0.6%) testicular atrophy

Umbilical hernia: There were 207 cases, 131 (63.3%) were males, 76 (36.7%) females (M: F 1.7:1), with a mean age of 74 months. Fifty (24.2%) of these cases had other synchronous hernias, with inguinal hernia (32, 15.5%)

as the commonest associated hernia. Presentation: 196(94.7%) elective, 11, 5.3% emergency(10,4.8%incarceration and 1, 0.5%with intestinal obstruction.) All(100%)had herniorrhaphy. Complication: One patient had a superficial surgical site infection and 2(1%)had recurrence.

Paraumbilical herniaaccounted for 28 (2%) of all cases with 18 males, 10 females and a mean age of 104.8 months. The majority 20(71.4%) had paraumbilical hernia only while 8(28.6%) had synchronous hernias. All (100%) presented electively.Surgery: All(100%) had Simple closure, no postoperative complications recorded.

Ventral hernia: There were 12 cases, 7 males and 5 females, M: F 1.4:1. The mean age at presentation was 18.3 months. There was a synchronous inguinal herniain 2(16.7%) patients. Presentation: All Elective, 11 (91.7%)for closure while1, 8.3% presented withskin ulceration. Surgery: Hernioplasty 5(54.5%) and 6(45.5%) had herniorrhaphy. Complications: Superficial surgical wound infection 3(27.3%).

Epigastric hernia: Only 5 cases, 2 were males and 3 females (M: F 0.7:1) with a mean age of 86.4 months. Presentation was 100% elective, all had simple repair, and no complications were recorded.

Incisional hernia: 4 cases, Male 2, females 2, mean age 105 months. Presentation: All elective. Causes of hernia: 3 (75%) postoperative for typhoid ileal perforations and 1(25%) post laparotomy for intussusception. Surgery: Simple facial closure 3(75%) and 1(25%) had hernioplasty. There was no complication.

Diaphragmatic hernia: Two cases, a male and a female, ages were 8 and 9 weeks respectively. Both occurred on the left. Surgery: Both had mesh repairand no complications.

Trans mesenteric hernia: One case, age 3 years, female. Presentation: Emergency with intestinal obstruction and strangulation. Surgery: Laparotomy and no postoperative complications.

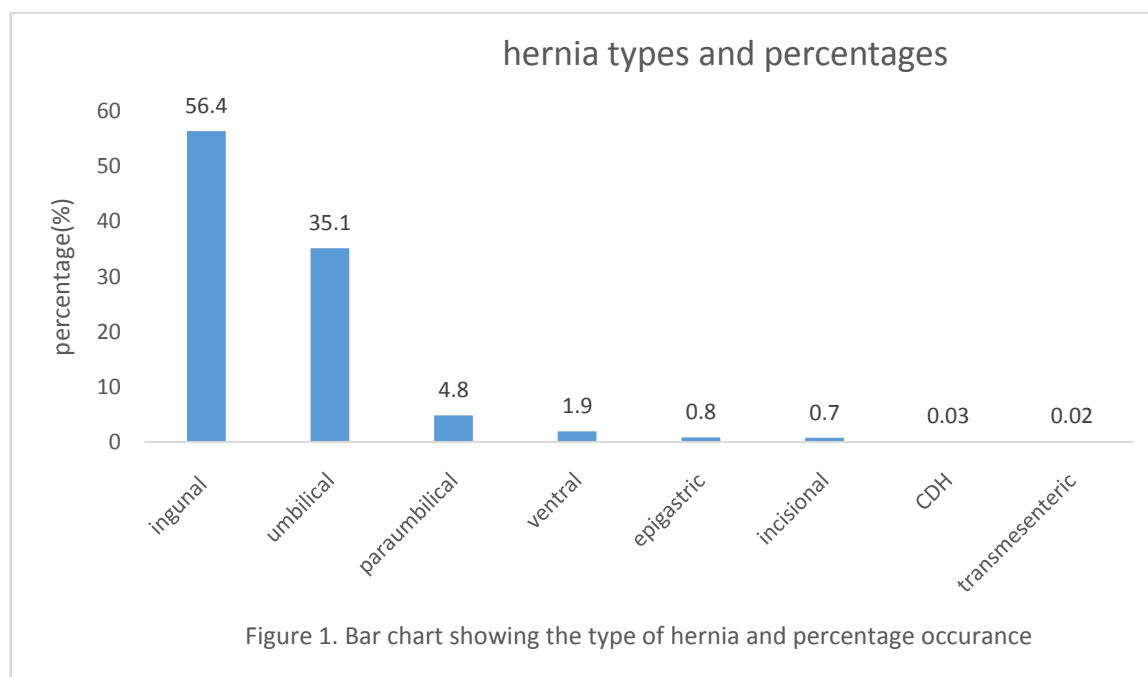


Table 1. patients' presentations by hernia type

Hernia type	Presentations						Total
	swelling	pain	ulceration	incarceration	obstruction	strangulation	
inguinal	315(53.5)	0	0	12(2.0)	1(0.2)	3(0.5)	331 (56.2)
umbilical	8(1.4)	188(31.9)	0	10(1.7)	1(0.2)	0	207 (35.1)
paraumbilical	8(1.4)	20(3.4)	0	0	0	0	28(4.8)
ventral	10(1.7)	0	1((0.2)	0	0	0	11(1.9)
epigastric	Nil	5(0.7)	0	0	0	0	5(0.8)
incisional	4(0.7)	0	0	0	0	0	4(0.7)
CDH	0	0	0	2(0.3)	0	0	2(0.3)
transmesenteric	0	0	0	0	0	1	1(0.2)
Total	345(58.6)	213(36.2)	1(0.2)	24(4.1)	2(0.3)	4(0.7)	589 (100.0)

IV. DISCUSSION

Our findings showed that more than half of our study population were males. This is similar to the studies done by Chen Y. H who reported that hernia is common among male children than females (10,14). Also, a study by Tigabie et al found a similar report in Africa among children with inguinal hernia (15). The majority of the patients presented as elective cases and only few as emergencies. Most common surgery performed was herniotomy. The overall complication rate was relatively low and comparable to other studies done in Africa (15).

Case by case analysis

Inguinal hernia was the commonest hernia seen with the right being the most frequent site. Majority presented as elective by the 3rd year of life, with males about 7 times more involved than females. Chen Y-H et al (14) had a similar finding. Also, Fu Y.W et al found similar result among preterm babies (16). A study in a reference health Centre in Bamako reported similarity in age at presentation but with a slightly higher female preponderance (17).

Complication rates among the inguinal hernia cases were few, mainly in the form of incarceration involving the right with almost all occurring in male neonates and infants. Similar study done in Africa also showed incarceration as the commonest complication and occurred more in infants (15, 18). While our recurrence rate was very low. Some studies in Europe however, had a higher recurrence rate compared to our study (19,20,21). The difference in their results could be due to the long follow-up period of up to 10 years, while ours was only 8 weeks.

Umbilical hernia was the second most common hernia type seen in our study. There was a slight male preponderance and the mean age at presentation was twice that of inguinal hernia. Most patients presented electively, but with symptoms that could be regarded as late presentation. Other studies reported a similar pattern of presentation. (22, 23, 24, 25). The reason for this relatively late presentation could be due to the awareness that spontaneous closure was likely to occur within the first 5 years of life, thereby delaying medical consultation and intervention (26). Emergency presentations were few following incarceration, with a single case of intestinal obstruction. This finding is similar to a study by Chirdan et al (24) and Emeka (27). However, a study done in Umuahia, Nigeria, reported that rates of emergency presentation and elective presentation were the same. (28)

Paraumbilical hernia

Paraumbilical hernia was less common than umbilical hernia and males still predominated in presentation. A study in Iraq had shown that paraumbilical hernia was rare in children but common in multiparous and obese women (29). In our study, all presented with abdominal pain and none had complications. We found out that about a 3rd of cases were associated with other forms of hernia, most commonly umbilical hernia.

Ventral hernia.

All the patients with ventral hernias occurred as a result of non-operative management of omphalocele major. A slight male preponderance was noticed, and the mean age at presentation was higher than expected. All except one patient presented without any complications. Our study showed that there was delayed surgical closure in our study population due to late follow-up on the part of the patients. Our desired management protocol is closure at six months of age.

Epigastric hernia

The incidence was very low and there was no significant sex preponderance found. The mean age was around the 7th year of life, and presentation was mainly abdominal pain. This is in concordance with some studies that reported that the most common symptom was abdominal pain and age at presentation was between 6.4 to 9 years (30,31). However, in other studies, the incidences of epigastric hernia were as high as 4 -6% in preschool children and the most common presentation was epigastric swelling (32, 33,34). Our low incidence and relatively late presentation may be because of our different health-seeking behavior where pain is the main indication for seeking medical attention. There was no recurrence within the period of follow up. Most studies, irrespective of the surgical approaches, recorded no recurrence (30,31,32,33,34).

Incisional hernia

Incisional hernia is less studied in children (35). Incidence of this hernia was lower than congenital hernias in our study and we found no sex variation. Mean age was the 1st decade of life and it occurred in

patients who had emergency contaminated or dirty abdominal surgeries, which could have resulted in wound infection with subsequent poor wound healing and dehiscence. Laurence D et al(35) also found that wound infection was a significant risk factor in development of incisional hernia.

Recurrent Congenital diaphragmatic hernia

In our study the patients presented with recurrent chest infection and vomiting following repair of congenital diaphragmatic hernia in a different tertiary centre. Mesh were used to repair the recurrence. Initial repairs were simple closures. Studies have shown that early recurrence as in this case was more in those with small defects, left sided defect and patch versus primary closure, but the differences were not statistically significant(36,37). This underscores the need for close and continuous follow up of these patients.

Transmesenteric hernia

This is a rare form of internal hernia in children. Our patient presented typically. Diagnosis was intra operative. Several case reports have shown the difficulty in preoperative diagnosis as seen in our study(38,39,40). High index of suspicion is needed for early intervention as delay increases the mortality rate

Conclusion

Hernia is prevalent in children on the plateau. Its surgery is relatively safe with low complication rate in our environment, despite not being able to assess data on the level of competences of those who performed these procedures outside the tertiary hospitals. Training of medical officers at nontertiary institutions could provide accessible safe surgical care, improve outcome and further reduce this complication rate.

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