

ORIGINAL ARTICLE

Hernias in children: the experience of a paediatric surgical team during free surgical outreach missions at a tertiary health institution in Southern Nigeria

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ABSTRACT

BACKGROUND:

Hernia is one of the surgical challenges in children. The surgical importance of hernia includes the tendency to undergo complications such as simple obstruction, strangulation, and peritonitis from perforation of strangulated viscus.

OBJECTIVE:

The aim is to describe the pattern of presentation and treatment outcome of hernias in children managed during free surgical outreach missions.

METHODS:

Setting: Department of Surgery, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria. A cross-sectional study that involved children that participated in two free surgical missions by Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria, and Leicester Royal Infirmary Hospital, United Kingdom which took place on August 22-29, 2022, and November 6-10, 2023.

RESULTS:

In the free surgical mission of 2022, 115 children were screened for operations for elective surgical procedures. However, 110 had successful screening, and proposed surgeries were performed on them while 5 patients were dropped from the list because of upper respiratory tract infection and malaria. The age range of children managed was between 0-16 years. 0-5 years accounted for 58 cases, 6-11 years accounted for 36 and 12-16 years accounted for 16. 250 patients were screened for the second edition of the free surgical mission which held in 2023; however, 177 patients were certified fit for surgery and the proposed surgical procedures were carried out.

CONCLUSION:

Hernias are common in children; our experiences at the two surgical missions showed hernias as the commonest condition that required operation during the surgical mission exercises.

KEYWORDS:

Hernias, Children, Paediatric, Surgical, Team, Experience, Free Surgical Outreach, Tertiary, Health, Institution, Southern Nigeria.

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INTRODUCTION

Hernia is defined as a protrusion of a portion of an organ or tissue through an abnormal opening within the cavity containing it. The abnormal defect may be congenital or acquired. Hernias in children usually present with swelling at the affected sites. The swelling usually comes out during exertion and goes in while the child is lying down or at rest. A hernia may be present for months or years without symptoms, however, symptoms of complications may occur without any prior notice. Such symptoms include vomiting, constipation, abdominal swelling, and signs of peritonitis in the presence of strangulation and perforation. The generally accepted protocol to manage hernia in children is to operate as soon as possible to avoid untoward complications.^{1,2,3}

The diagnosis of hernias in children is clinical with the appearance of swelling on the affected site or side. Hernias in children occur in more males than females. Inguinal hernia is the most common type of hernia that occurs in children. Other types of hernias that may occur in children include; Umbilical hernia, Epigastric hernia, and para-umbilical hernia. Hernias in children may be confused with the following: hydrocele both in females and males; testicular torsion, testicular tumor, epididymo-orchitis, haematocele, and scrotal haematoma especially in males.^{4,5,6}

The commonest complication of untreated hernias is intestinal obstruction which results from bowel loop entrapment within the defective wall. This complication mostly manifests with irritability, vomiting, abdominal pain, colicky abdominal pain, constipation, and abdominal swelling. In Males, the testis, bowel loops, omentum, bladder, or appendix may be part of the contents of the hernia sac. In females, the ovary, bowel, omentum, or bladder may constitute the contents.^{7,8}

Obstruction of groin hernias is commoner in males than females. In males, this obstruction occurs more in infants with resultant strangulation of the bowel and testis if not promptly treated; hence, early surgical intervention will prevent the occurrence of these complications. The treatment for inguinal hernias and hydroceles in children is herniotomies while some paediatric surgeons will prefer trans-inguinal hydrocelectomy for hydroceles in children.^{9,10} It is

noteworthy that the treatment of hernias in children in the presence of defects remains herniorrhaphy; such hernias where defects exist and will require herniorrhaphy as the best choice of surgical treatment include epigastric hernia, umbilical hernia, para-umbilical hernia, and excisional hernia. During the procedure of herniorrhaphy, the fascial defects are usually closed with non-absorbable sutures for tissue apposition or mesh repair.^{11,12}

Morbidity and mortality from hernias are common in untreated cases. Early prevention at the hospital and prompt surgical intervention by specialist personnel leads to reduced morbidity, mortality, and good prognosis.^{13,14} Complications encountered following the surgical management of inguinal hernias in children include; recurrence, hydrocele formation, testicular torsion, iatrogenic undescended testis, and surgical site infection.^{15,16}

We embarked on this study to present our experience on the presentation, management and outcome of hernias in children during paediatric surgical missions that involved two tertiary health facilities from the United Kingdom and Nigeria.

METHODS

This study was carried out using longitudinal techniques as study design. Questionnaires were used to obtain information from parents, guardians, and members of the surgical team. The study centered on two surgical missions organized by the paediatric surgical team Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria, and the paediatric surgical team of Leicester Royal Infirmary Hospital, United Kingdom.

The first surgical mission took place in 2022 while the second surgical mission in 2023. During the first surgical mission, a total number of 110 children were operated on for various surgical conditions while in 2023, 177 children were operated on for different surgical conditions; making a total of 287 for the two paediatric surgical missions. Before the commencement of the missions, screening exercises to select medically fit patients were conducted at the Olabisi Onabanjo University Teaching Hospital by the

paediatric surgical team, volunteer surgeons and resident doctors from the department of surgery and sister health facilities within the state.

Approval for the conduct of the free surgical exercises were given by the Ogun State Ethical Committee and the Health Research Ethical Committee of Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State. In order to recruit participants for the surgical exercises; adverts were placed through radio, electronic, and social media to announce the intentions of Ogun State Government, management of Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria and Leicester Royal Infirmary Hospital, United Kingdom to collaborate in a free surgical missions which were organized for indigent children with surgical pathologies. Patients were selected through screening sessions which were organized by the host paediatric surgical units and the management of the Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State. At the end of the screening exercises, patients who met the required minimum standards for administering anaesthesia and undergoing the proposed surgical procedures were enlisted for the surgical outreach missions. The data obtained were entered into a structured questionnaire, saved, processed and analysed using SPSS (Statistical Package for Social Sciences) version 29.

The recruited children with surgical conditions were schedule for the proposed surgical procedures through rotational groups composed of surgeons and resident doctors from Olabisi Onabanjo University Teaching Hospital and Leicester Royal Infirmary Hospital, United Kingdom. The cases enrolled into this study were mostly day-cases, minor and intermediate category surgical cases.

Inclusion criteria:

1. Children aged between 0-16 years with surgical conditions
2. Children with surgical conditions who were certified by the anaesthetics
3. Children with surgical conditions who completed the mandatory pre-operative laboratory tests and their results were considered normal

Exclusion criteria:

1. Patients aged above 16 years
2. Patients with derangement in their laboratory result
3. Patients who needed major surgeries and prolonged admission as in-patient
4. Patients who co-morbid medical conditions such as upper respiratory tract infection and malaria
5. Patients who did not present with groin swellings

RESULTS

In the free surgical mission of 2022, 115 children were screened for operations for elective surgical procedures. However, 110 had successful screening and proposed surgeries were performed on them while 5 patients were dropped from the list because of upper respiratory tract infection and malaria. The age range of children managed during the free surgical expedition were aged between 0-16 years.

The characteristics of the eighty (67.8%) patients who presented with hernias and hydroceles were further studied. 65 (76.4) out of the 80 cases of were hernias while 15 (18.8%) were hydroceles. Out of the 65 cases of hernias, 57 were inguinal hernias, and 8 cases of other types of hernias were distributed as follows: umbilical hernia 5 (7.7%), epigastric hernia 2 (3.1%), and incisional hernia 1 (1%).

Out of 110 patients who had surgeries, 80 (67.8%) patients presented with hernias and hydroceles. 65 (76.4) out of the 80 cases of were inguinal hernias while 15 (18.8%) were hydroceles. Out of the 65 cases of hernias, 57 were inguinal hernias, 8 cases of other types of hernia were distributed as follows: umbilical hernia 5 (7.7%), epigastric hernia 2 (3.1%), and incisional hernia 1 (1%). (Table 1: Represents hernia distribution in patients who presented for the free surgical mission in 2022).

55 out of the 65 cases of hernias occurred in males while 10 cases were seen in females. In the 57 cases of inguinal hernias, 35 occurred on the right side while 12 cases occurred on the left side and 10 cases were bilateral. 250 patients were screened for the free surgical mission in 2023, however, 177 patients were certified fit for surgery and the proposed surgical procedures were carried out. Hernias were responsible for 118 cases, hydrocele 27. Out of the 118 cases of

hernias, 98 (83.1%) were inguinal hernias, other types of hernias observed were umbilical hernia 10 (8.4%), epigastric hernia 6 (5.1%), and incisional hernia 4 (3.4%). (Table 2: Represents hernia distribution in patients who presented for the free surgical mission in 2023).

Table 1. Hernia distribution in patients who presented for the free surgical mission in 2022 and 2023

Varieties of hernias	2022 N=65 n (%)	2023 N=118 n (%)
Inguinal hernia	57 (87.7)	98 (83.1)
Umbilical hernia	5 (7.7)	10 (8.4)
Epigastric hernia	2 (3.1)	6 (5.1)
Incisional hernia	1 (1.5)	4 (3.4)

83 (84.7%) out of the 98 cases of hernias occurred in males while 15 (15.3%) cases were seen in females. In the 98 (83.1%) cases of inguinal hernias, 53 (54.1%) occurred on the right side while 31 (31.6%) cases occurred on the left side and 14 (14.3%) cases were bilateral. Out of 118 cases of hernias, males accounted for 101 (86%) cases while females accounted for 17 (14%) cases (Figure 1).

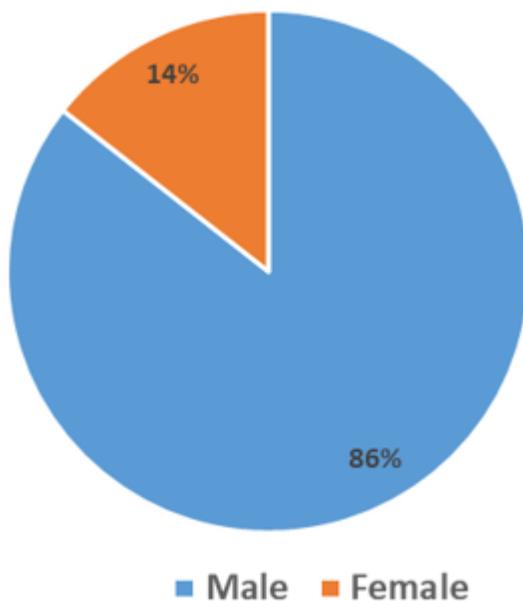


Figure 1. Sex distribution of patients with hernias

The patients operated during the surgical missions were discharged within 24 hours except for those with

indications for further admission such as post-anaesthesia nausea and vomiting, immediate post-operative febrile conditions and patients on urethral catheters and nasogastric tubes. Discharged patients were followed-up and monitored for at least six months at the paediatric surgical out-patient clinic for the presence of any un-resolved surgical problems and post-operative complications. The obtained data were analysed using SPSS (Statistical Package for Social Sciences) version 29.

DISCUSSION

Summary of key findings

In the free surgical missions of 2022 and 2023, 365 children were screened for the surgical expeditions. 183 presented with hernias and were operated as indicated. All the cases were done under general anaesthesia and majority of the cases were discharged as day cases. Few cases with immediate post-operative or anaesthetic complications were admitted into the paediatric surgical ward for observation and to be discharged whenever the affected patients were declared stable to go home. The free surgical missions enabled indigent children with mostly inguinal hernias to be operated; thereby preventing the complications associated with untreated inguinal hernias.

Free surgical outreaches and missions serve as a potent strategy to operate on large volumes of patients with minor, intermediate and major paediatric surgical categories of operations which could not have been possible following the usual protocols for managing children with elective surgical conditions.

In addition, the free surgical mission provided an opportunity for exchange of skills, ideas, exposures, experiences and knowledge between the participating paediatric surgeons from the two collaborating paediatric surgical divisions of Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria, and Leicester Royal Infirmary Hospital, United Kingdom. The free surgical missions also provided the enabling environment to assess the functional state of the hospital facilities and amenities such as power supply, laboratory service, maintenance of clean environment, availability of consumables and human resources.

Strengths and limitations of the study

The strength of the study lies with the ability of the surgical personnel to combine the provision of free surgical services to the affected volume of children and to undertake the study of the observations made during the two free surgical missions. The information obtained from this study will serve as a pilot finding that will make a way for further research work on this topic. The information that will be passed to the public will help in filling existing knowledge gaps on the management of hernias in children. The limitations of this study include inadequate pre-operative preparation, lack of personnel, inadequate laboratory services, unstable power supply, shortage of consumables, inadequate specialists surgical and anesthetic personnel, inadequate bed spaces, unsatisfactory post-operative care because of the large turnover of the patients. Other limitations are poor post-operative wound care and follow-up at the out-patient clinic as a result of non-compliance to discharge instructions.

Comparison with previous studies on the topic

Hernias are responsible for the commonest surgical challenges of children; they usually present as swellings through structural defects which may be congenital or acquired; note that congenital causes of hernias account for more than the acquired causes. Congenital hernias usually result from defects from the fascia such as epigastric, umbilical, lumbar and spigelian hernias. Congenital hernias resulting from weaknesses in the natural openings that occur in the groin which may be associated with non-obliteration of the processus vaginalis will lead to the occurrence of groin hernias.^{17,18}

Risk factors that are known to predispose to the formation of hernias in children include the following; chronic cough, straining to pass urine, chronic constipation, raised intra-abdominal pressure from ascites and intra-abdominal masses. Another cause of acquired hernias is the breakdown of abdominal wounds; this is known as incisional hernia. Hernias occurs more in males than females in children.^{19,20}

The reason for this observation is linked to the descent of the testis through the deep and superficial rings in male children. The common differential diagnosis of inguinal hernias in male children are hydroceles, testicular

torsions, epididymo-orchitis and testicular tumor while the differential diagnosis of hernias in female children are hydrocele of the canal of nuck.^{21,22}

Hernias may present as elective conditions or as emergencies. The elective conditions should be treated as soon as possible to avoid unpleasant complications while the emergency presentations need immediate surgical intervention to prevent complications such as strangulation of the intestine and gangrene of entrapped testis in males or to treat existing complications such as intestinal obstruction, strangulation with perforation and peritonitis.^{23,24}

Hernias occur more in males than females while inguinal hernias account for most of the hernias in children. Varieties of other hernias that occur in children are epigastric, umbilical, para-umbilical, spigelian lumbar and incisional hernias. The occurrence of hernias in children may be congenital or acquired. The predisposing factors to the physical appearance of hernias are chronic cough, constipation, raised intra-abdominal pressure, and straining to pass urine and stool. The symptoms and signs of hernias are swelling at the affected side or site, vomiting, abdominal swelling, and constipation when obstructed. Obstruction of a hernia may be simple or strangulated. In simple obstruction, there is no cut-off of blood supply to the incarcerated loop of bowel while in strangulated obstruction, there is loss of blood supply to the entrapped segment of bowel, testes, or ovary.^{25,26}

Interpretation of the findings

In our study during the free expedition, inguinal hernias were responsible for more cases of hernias than other varieties. The incidence of inguinal hernias in children occurred more in males and pre-term children.^{27,28}

The overall incidence of inguinal hernias has been reported to be between 3 to 5% in full-term infants and 13% in pre-term infants. Inguinal hernia was also found to occur more on the right side than left side. This finding is in keeping with the findings of other workers.^{29,30}

Implications of findings

The diagnosis of hernias is usually clinical as a result of the obvious swellings that appear on the affected side. Most of the patients managed during the surgical

expedition were day cases; admissions were for patients with post-operative complications and post-anesthesia nausea and vomiting. The treatment of such hernia was herniotomy while the other cases of hernias with structural defects in the walls containing the contents are treated by herniorrhaphy through tissue apposition with non-absorbable sutures or mesh repair. Our patients were followed up for a minimum of six months. Complications observed in our study were surgical site infections and scrotal haematoma. No mortality was observed during the surgical expedition exercise.

CONCLUSION

Our findings from the surgical expedition exercise showed a preponderance of hernias as the elective surgical pathology in children who came for the free surgical outreach. Inguinal hernia was the commonest type of hernia and it occurred more in males and was mostly right sided.

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CONFLICT OF INTEREST

None declared

AUTHORS' CONTRIBUTIONS

Nwokoro Chigbundu C (Lead author and initiator of research process); Amosu Lukmon Olusesan (Clinical management, manuscript review, data analysis and data interpretation); Adeyinka Timothy (Clinical management); Ogundele Ibukunoluwa O. (Manuscript review, data analysis and data interpretation); Oso Adewusi Rotimi (Literature review and Methodology); Igbagbolere Abiodun Babajimi-Joseph (Data entry and clinical management); Kalesanwo Emmanuel (Literature review, data collection and entering); Adewole Adeleke David (Literature review).

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