



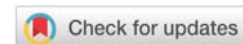
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## Research Article

# Incidence of appendices of the testis and epididymis in children who underwent groin/scrotal surgeries in a tertiary hospital in Enugu, Nigeria

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## Abstract

**Background:** Appendices of the testis and epididymis are small congenital structures attached to the testis and epididymis respectively. The aim of this study was to assess the incidence of appendices of the testes and epididymis in children who had inguinal and scrotal surgeries.

**Materials and methods:** This was a retrospective study of children aged 15 years and younger who underwent groin/scrotal surgeries between January 2015 and December 2019 at the pediatric surgery unit of Enugu State University Teaching Hospital Enugu (ESUTH), Nigeria. During the surgery, the presence or absence of appendices of testis and epididymis were assessed.

**Results:** A total of 521 inguinal/scrotal surgeries were performed during the study period but only 378 patients had appendices of the testis and epididymis: This gives an incidence of 72.6%. Infants were mostly affected and the right testis had more appendices. There were more inguinal hernia/hydrocele and herniotomy was the most performed surgical procedure. Surgical site infection was the most common post-operative complication but there was no mortality.

**Conclusion:** Appendices of the testes and epididymis although may be small and vestigial in children, it is quite common in children.

## Introduction

In the past, little attention was paid to the appendices of the testes and epididymis due to their small and vestigial nature. However, in recent years, pediatric surgeons and urologists have shown considerable interest in appendices of the testes and epididymis due to their involvement in torsion (acute scrotum) [1]. Cystadenocarcinoma of the testicular appendage has also been reported [2]. The appendix of the testis is a small pedunculated/sessile globular structure located at the upper pole of the testes just below the head of the epididymis and is considered to be remnant of the cephalic end of the paramesonephric duct. The epididymal appendix

is located on the head of the epididymis and represents the cranial blind end of the mesonephric duct [3]. The appendix testis is particularly susceptible to torsion because it is often pedunculated. The appendix testis accounts for 95% of cases of torsion of appendices of the testes and epididymis [4]. Although uncommon, multiple testicular and epididymal appendices can occur; this could be bilateral or unilateral. There is a report of a 14-year old male who had 2 torsions from 2 pedunculated testicular appendices [5]. Histologically, the normal appendix testis is made of loose gelatinous vascular connective tissue stroma covered by mullerian-type cuboidal to columnar epithelium. The testicular appendage may be responsible for controlling testicular descent and the amount of serous fluid



in the space of the tunica vaginalis [3,6]. The aim of this study was to assess the incidence of appendices of the testes and epididymis in children who had inguinal and scrotal surgeries.

## Materials and methods

This was a retrospective study of children aged 15 years and younger who underwent groin/scrotal surgeries between January 2015 and December 2019 at the pediatric surgery unit of Enugu State University Teaching Hospital Enugu (ESUTH), Nigeria. The testes were examined during the surgery for the presence or absence of appendices of the testes and epididymis. Confirmation of the presence of appendices of the testes and epididymis was done intra-operatively, not by imaging investigation. Patients who have had groin/scrotal surgeries at a peripheral hospital before referral to ESUTH for reoperation 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/km<sup>2</sup>. The hospital also receives referrals from its neighboring states. Information about the patients was extracted from the case notes, operation notes, operation register and admission-discharge records. The information extracted included the age, presenting symptoms, clinical diagnosis, intra-operative finding (presence/absence of testicular appendage), definitive operative procedure performed, complications and outcome of treatment. Ethical approval was obtained from the ethics and research committee of ESUTH and informed consent was obtained from the patients' caregivers. 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, median, mean, and range.

## Results

### Patients' demographics

A total of 521 inguinal/scrotal surgeries were performed during the study period but only 378 patients had appendices of the testis and epididymis: This gives an incidence of 72.6%. Details are depicted in Table 1.

### Appendices of the testis and epididymis (Side and types)

Two hundred and twenty-six (59.8%) appendices were found on the right side while 152 (40.2%) appendices were found on the left side. Three hundred and forty four (91%) patients had appendix testis and 34 (9%) patients had appendix

epididymis. None of the appendices was multiple in a single patient.

### Presenting symptoms/clinical diagnosis

The presenting symptoms depended on the pathology the patient presented with. For instance, children with inguinal hernia/hydrocele presented with groin/scrotal swelling. Patient with testicular torsion had testicular pain. Two hundred and ninety patients (76.7%) underwent inguinal surgeries for inguinal hernia/hydrocele while 88 (23.3%) patients had scrotal explorations for testicular torsion.

### Definitive operative procedure performed

Patients (76.7%) who had inguinal hernia/hydrocele received herniotomy. Those with testicular torsion were treated by orchidopexy (23.3%).

### Complications of treatment

Three hundred and forty (89.9%) patients had no complications. Twenty (5.3%) patients had surgical site infection, 18 (4.8%) had stitch sinus and 2 (0.5%) had hypertrophied scar.

### Outcome of treatment

All the patients achieved good recovery and were discharged home. There was no mortality.

## Discussion

In 1761, Morgagni described a hydatid at the globus major of the epididymis and a small fimbria at the upper end of the testis. Following the translation of Morgagni's work to English by Alexander in 1769, the 2 appendages were called "hydatids of Morgagni". Generally speaking, four testicular appendages have been identified: the appendix testis (a remnant of the paramesonephric duct), the appendix epididymis (a remnant of the mesonephric duct), the paradidymis (organ of Giralde) and the vas aberrans (organ of Haller). Morgagni made no distinction between epididymal appendix and a testicular appendix. He considered the appendix testis a ruptured hydatid [1].

In the present study, the incidence of appendices of the testes and epididymis is comparable to the result of Sahni, et al. [1]. However, this finding is at variance to the reports of Miliaras, et al. [7]. The occurrence of testicular and epididymal appendages is quite variable and may depend on the setting of assessment [8]. Most of the patients in the current study were infants. The high number of infants may be due to higher incidence of hernias/hydroceles in infants [9]. The age range of our patients is similar to the findings of Taqvi, et al. [10]. However, it is important to note that inguinal and scrotal surgeries may be performed at any age depending on the surgical indication and time of presentation. Herniotomy and scrotal explorations in children are performed as day case surgeries. However, in a background of associated comorbidities such as hemoglobinopathies, patients are admitted and observed closely in the hospital.

**Table 1:** Demographic characteristics of the patients (n=378).

Age group of the patients	
Neonate (less than one month)	126 (33.3%)
Older than one month	252 (66.7%)
Median age of the patients	3 years (2 weeks - 12 years)
The mean duration of hospital stay	12 hours (4-24)



There were more right sided appendices of the testis and epididymis in the index study. This is consistent with the report of other authors [11, 12]. Howbeit, Rakha, et al. reported more appendices on the left side [13]. The exact reason for the right or left predominance is not known.

Hernias, hydroceles and testicular torsions were the indications for inguinal and scrotal surgeries in the current study. Inguinal hernia is one of the most common conditions in children and is a frequent reason for surgical intervention [14]. Scrotal exploration for testicular torsion offered opportunity for examination of the testes for the presence of the appendices of the testes and epididymis.

Herniotomy was the predominantly performed surgical procedure in the current series. It is one of the most frequent operations performed in pediatric surgery practice [15]. The testes were assessed for appendices of the testis and epididymis during the herniotomy. Ibrahim, et al. also documented herniotomy as the most common surgical procedure [16]. Surgical site infection was the most common post-operative complication in our patients. Other studies also found surgical site infection as a common complication of inguinal hernia repair in children [16,17]. Dreuning, et al. reported stitch sinus and abnormal scar following inguinal hernia repair in children [18]. Other series also did not record any mortality [16,19]. However, Nilsson et al reported a seven fold increase in mortality risk in emergency groin hernia surgery [20].

## Conclusion

Appendices of the testes and epididymis although may be small and vestigial in children, it is quite common in children. They may play a role in testicular descent and in determining the quantity of serous fluid within the tunica vaginalis.

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