



Original Article

## Etiology of Inguino-Scrotal/Labial Swelling in Children and Its Pattern of Management: A Cross-Sectional Study

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### ABSTRACT

*Inguino-scrotal and inguino-labial swellings occur due to inguinal hernia, hydrocele, testicular torsion, epididymo-orchitis, undescended testis, inguinal lymphadenitis, inguinal abscess, testicular tumour and rarely hydrocele of the canal of Nuck. This cross-sectional study was conducted in the department of paediatric surgery, Jalalabad Ragib-Rabeya Medical College Hospital, during the period of two and a half years from January 2021 to July 2023 to find out the causes of inguino-scrotal/labial swelling in children and its pattern of management. A total of 125 patients of inguino-scrotal/labial swellings, aged up to 14 years were included. Children with hydrocele whose age was below two years were excluded from this study. Patients were diagnosed by history, examination and investigation. Patients were managed surgically and conservatively. Incidence of inguino-scrotal/labial swelling was 2.5%. The age of the patients ranged from 29 days to 14 years, with the mean age of 5.17 (SD 2.85) years. Majorities (61.6%) of the patients were below the age of 5 years. The male-female ratio was 10.36:1. More than half (56.8%) of the swellings were on the right side. Inguinal hernia (44.8%) was the commonest cause of inguino-scrotal/labial swelling, followed by hydrocele (25.6%). About 91.2% of patients were treated surgically and 8.8% of patients received medical treatment. The outcome was uneventful/cured in 94.4% of cases, while 5.6% of patients developed some form of complications. Postoperative hospital stay ranged from 2 to 8 days with a mean of 2.76 (SD 1.14) days. So, it may be concluded that inguinal hernia is the commonest cause of inguino-scrotal/labial swelling in children. The outcome of inguino-scrotal/labial swelling is excellent.*

**Keywords:** *Inguino-scrotal/labial, Children, Inguinal hernia, Hydrocele.*

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### INTRODUCTION

Inguino-scrotal and inguino-labial swellings are common surgical problems in children. Inguino-scrotal/labial swelling may be due to hernia, hydrocele, testicular torsion, epididymo-orchitis, undescended testis (UDT), inguinal lymphadenitis, inguinal abscess, testicular tumour and rarely hydrocele of the canal of Nuck. Hernia is the commonest cause of inguino-scrotal/labial swelling<sup>1,2</sup>.

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The incidence of inguino-scrotal/labial swellings depends on the type of pathology, age, gender and gestational age. The incidence of inguinal hernia in children varies from 1% to 4%, and it can be as high as 30% among premature infants. The incidence of UDT is 3.8% and 30% in term and preterm, respectively<sup>3,4</sup>. Incidence of torsion testis is 0.004% for boys of paediatric age<sup>5</sup>.

The aetiology of inguino-scrotal/labial swelling depends on types of disease. The processus vaginalis (PV) is an outpouching of peritoneum through the inguinal canal to the scrotum that helps the descent of the testis. The proximal portion of the PV obliterates normally. Failure to obliteration forms a potential sac through which abdominal

structure or fluid can be pushed into this sac. These conditions are called hernia and hydrocele, respectively<sup>3</sup>. A similar process occurs in girls as the round ligament of the uterus descends into the groin at the labia. If the PV remains patent, it extends into the labia majora and is known as the canal of Nuck. Failure of obliteration of the canal of Nuck causes female inguinal hernia<sup>6</sup>. Sometimes, testes fail to descend and arrest in their path, which is called undescended testis. About 80% of undescended testis are palpable and located in the inguinal canal or below. Abdominal testes are nonpalpable<sup>3,4</sup>. Inguinal abscess is uncommon in children. Majorities are primary, where the source of infection is not detectable. However, in secondary abscess, infection spread from adjacent structures<sup>7,8</sup>.

Inguinal hernia commonly presents during the first year of life with intermittent swelling in the groin, scrotum, or labia, which appears during activities causing increased intra-abdominal pressure and usually disappears on rest. Sometimes the content of a hernia is entrapped within the sac; the condition is called incarceration. An incarcerated inguinal hernia presents as an irreducible swelling. Incarceration may progress to obstruction or strangulation. Inguinal hernias are more common on the right side. The male-to-female ratio is 3:1 to 10:1<sup>2,3,4</sup>. Hydroceles are two types (communicating and non-communicating). Communicating hydrocele allows passage of the fluid between the peritoneal cavity and the processus vaginalis. Non-communicating hydrocele is again divided into vaginal, infantile, and encysted hydrocele of the cord (figure-1,2)<sup>3</sup>. Hydrocele presents as a translucent, non-tender inguinal/scrotal swelling. Diagnosis of hernia and hydrocele is based on history and clinical examination. However, in a few cases where examination reveals inconclusive findings, ultrasonography (USG) may aid the diagnosis<sup>3,4</sup>. Herniotomy is treatment of hernia when it is diagnosed. Hydrocele of a newborn can be observed the first 2 years unless it is large or painful. If not resolved spontaneously, herniotomy with or without excision of the sac should do<sup>3,4,9</sup>.

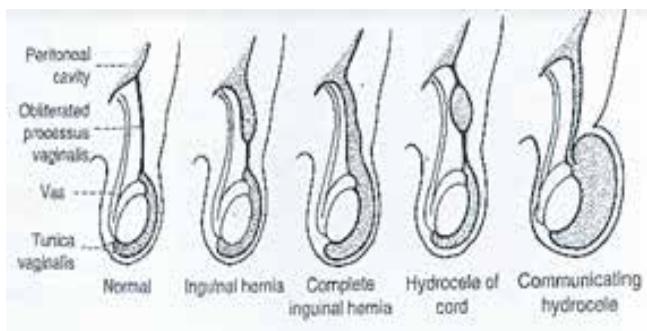


Figure-1: Fate of processus vaginalis (male)<sup>3</sup>.

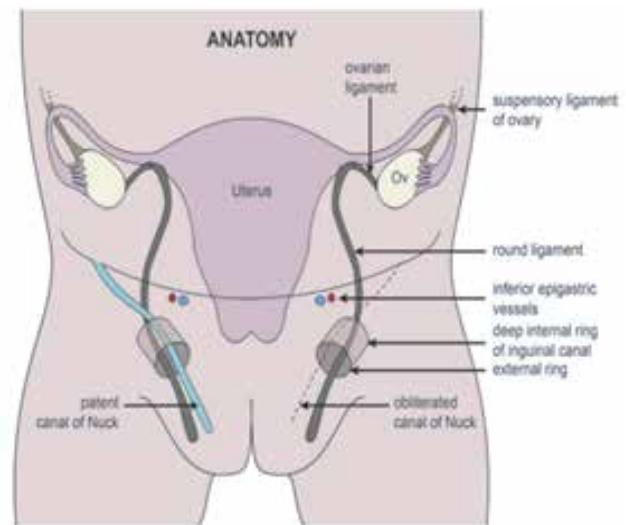


Figure-2: Fate of processus vaginalis (female)<sup>6</sup>.

Patients with UDT present as absence of testis in the corresponding hemiscrotum or swelling of the inguinal region in the case of a palpable testis. Palpable undescended testes are diagnosed clinically. USG sometimes aids the diagnosis. If the testis does not descend within the first 6 months, orchidopexy is the treatment for the preservation of function and to avoid complications<sup>3,4,10</sup>.

Torsion testis is the twisting of the spermatic cord, which leads to a compromised testicular blood supply and subsequent testicular infarction. Torsion of the testis presents as severe pain in the scrotum, lower abdomen and thigh. On examination, the scrotum is swollen, erythematous, and tender; the testis is high up and transversely orientated. The intensity of pain increases on elevation of the scrotum. Sometimes torsion testis is difficult to distinguish from epididymo-orchitis and idiopathic scrotal oedema (ISE), which also presents as scrotal pain, swelling, and erythema, but testicular orientation and lie are normal. Patients feel comfort on elevation of the scrotum in both cases. Doppler USG is the investigation of choice for acute scrotum, such as torsion testis, epididymo-orchitis and ISE. When Doppler USG is not available or diagnosis is equivocal, exploration is the treatment of choice for acute scrotum. Epididymo-orchitis and ISE are usually managed conservatively. Torsion of the testis is a surgical emergency, and orchidopexy is the treatment if the testis is viable. However, in the case of non-salvageable testis orchidectomy should be done. At the same time, the contralateral normal testis must be fixed with the scrotal wall<sup>2,3,10,11</sup>.

Presenting features of inguinal abscess include groin pain, swelling and limitation of leg movement. Inguinal abscess is usually diagnosed clinically. Ultrasound confirms the

diagnosis and delineates the areas of collection. Antibiotics alone are insufficient in most cases and drainage is required<sup>12,13</sup>. Patients with primary inguinal abscess should assess for features of immunodeficiency such as failure to thrive, recurrent infections, etc.<sup>14</sup>.

There are studies on inguino-scrotal/labial swelling in western countries and South Asia. But, till now, very little literature exists about the inguino-scrotal/labial swelling and its management in Bangladesh. So this study has been designed to find out the causes of inguino-scrotal/labial swelling in children and its pattern of management in a tertiary care hospital.

## MATERIALS AND METHODS

This cross-sectional study was conducted in the department of paediatric surgery (both outdoor and indoor), Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet, during the period of two and a half years from January 2021 to June 2023. All cases of inguino-scrotal/labial swelling up to 14 years of age were included in the study. The guardians of the patients who refused to enrol in the study and refused to take the proposed treatment were excluded from the study. Children with hydrocele whose age was below two years were also excluded from this study. During the study period, a total of 7909 patients were admitted or attended in the paediatric surgery department. Among them, 197 patients were diagnosed with inguino-scrotal/labial swelling. Among the 197 patients, 125 patients were enrolled in this study, fulfilling the inclusion and exclusion criteria. Patients with inguino-scrotal/labial swelling were diagnosed by history, examination, and investigations as per the data collection sheet. Informed written consent was obtained from the legal guardians of the patients after a full explanation of the details of the disease process and purpose of the study. The parents were counselled about the importance of compliance and regular follow-up with a standard protocol. Data included age, gender, period of gestation (preterm or term), site, clinical feature, cause, management and outcome of treatment. Patients who need surgery received the appropriate care, while others received conservative management. In case of complications, concerned surgeons were consulted, and appropriate steps were taken. After treatment, the patients were followed up with a standard protocol. Ethical issues were maintained properly in the study. All the collected data were compiled and analysed using SPSS.

## RESULTS

Incidence of inguino-scrotal/labial swelling was 2.5%. The age of the patients ranged from 29 days to 14 years, with the mean age of 5.17 ( $\pm 2.85$ ) years. Majorities (61.6%) of

**Table-I:** Demographic and clinical profile of patient, n=125.

Parameter	Frequency	Percentage	
Age (years)	0 to 1	5	4
	1 to 5	72	57.6
	6 to 10	42	33.6
	>10	6	4.8
Mean age ( $\pm$ SD) in years	5.17 $\pm$ 2.85		
Sex	Male	114	91.2
	Female	11	8.8
Male female ratio	10.36:1		
Side	Right	71	56.8
	Left	40	32
	Bilateral	14	11.2
Maturity	Full term	114	91.2
	Preterm	11	8.8
Presentation*	Swelling	125	100
	Pain	47	37.6
	Fever	33	26.4
	Erythema	32	25.6
	Absence testis	6	4.8
	Ulceration	3	2.4
Site	Inguino-scrotal	62	49.6
	Scrotal	33	26.4
	Inguinal	20	16
	Inguino-labial	10	8

\*Most of the patient had multiple clinical presentations

**Table-II:** Causes of inguino-scrotal/labial swelling, n=125.

Parameter	Frequency	Percentage
Hernia	56	44.8
Hydrocele	32	25.6
Abscess	10	8
UDT	7	5.6
E-Orchitis	6	4.8
Torsion testis	5	4
ISE	5	4
Cellulitis	2	1.6
Hemangioma	1	0.8
Sebaceous cyst	1	0.8
Total	125	100

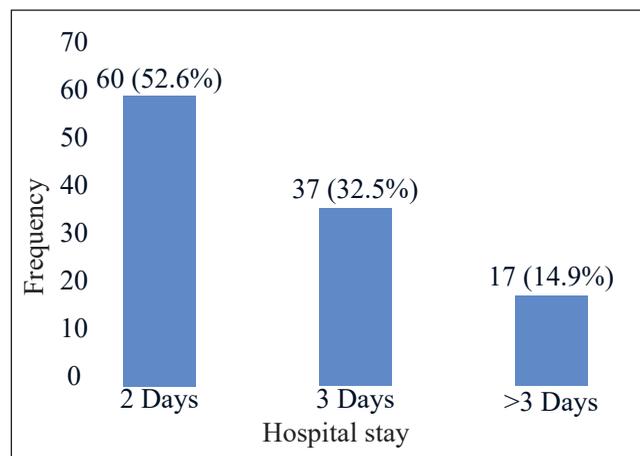
the patients were below the age of 5 years. Out of 125 patients, 114 (91.2%) were male and 11 (8.8%) were females. Most of the babies (91.2%) were born as term babies and the remaining (8.8%) children were preterm. More than half (56.8%) of the swellings were on the right side, 32% were left-sided, and 11.2% were bilateral. Almost half (49.6%) of the patients belonged to

**Table-III:** Treatment options of inguino-scratal/labial swelling, n=125.

Parameter	Frequency	Percentage
Medical treatment	511	8.8
Surgical treatment (n=114; 92.2%)		
Herniotomy	88	70.4
Incision and drainage	10	8.0
Orchidopexy	7	5.6
Exploration, detortion with orchidectomy	3	2.4
Exploration, detortion with orchidopexy	2	1.6
Wound debridement & dressing	2	1.6
Excision of haemangioma	1	0.8
Excision of sebaceous cyst	1	0.8
Total	125	100

**Table-IV:** Outcome of inguino-scratal/labial swelling, n=125.

Outcome	Frequency	Percentage
Uneventful (recovered/cured)	118	94.4
Scrotal haematoma	5	4
Complications		
Wound infection	1	0.8
Granuloma	1	0.8
Total	125	100



**Figure-3:** Post operative hospital stay, n=114.

inguino-scratal while 26.4% were scrotal, 16% were inguinal, and 8% were inguino-labial. All patients (100%) had swelling; other presentations were pain (37.6%), erythema (25.6%), fever (26.4%), absence of testis (4.8%) and ulceration (2.4%) (table-I). Regarding causes, 44.8% were hernia and 25.6% were hydrocele. Other causes were inguinal abscess 8%, UDT 5.6%, epididymo-orchitis 4.8%, torsion testis and ISE 4% each, cellulitis 1.6%, sebaceous cyst and haemangioma 0.8% each (table-II).

Treatment options were medical 8.8% and surgical 91.2% (table-III). The outcome was uneventful/cured in 94.4% of cases; while 5.6% of patients developed some form of

complications who recovered subsequently (table-IV). Length of postoperative hospital stay ranged from 2 to 8 days with the mean of 2.76 ( $\pm 1.14$ ) days (figure-3).

### DISCUSSION

In this study, the hospital incidence of inguino-scratal/labial swelling was 2.5%. According to literature, the prevalence of inguino-scratal/labial swelling varies in types of disease pathology, gestational factors, age and gender of the patient. The incidence of inguinal hernia in term babies is 0.8-4.4% and in preterm babies, it is significantly higher at 30%<sup>2,3,4</sup>. Similarly, the incidence of undescended testis (UDT) in preterm babies is significantly higher (as high as 30%) than in term babies (3.8%)<sup>3,4</sup>. However, the incidence of torsion testis in men younger than 18 years is less (0.0025% - 0.004%) than hernia and UDT<sup>5</sup>.

The age of the patients ranged from 29 days to 14 years, with a mean of 5.17 ( $\pm 2.85$ ) years. The majority of the patients (61.6%) were below the age of 5 years. Our result is consistent with two Indian studies that 60% of patients presented within 5 years<sup>15,16</sup>. In another study, Singh et al. showed that 88.7% of patients were below the age of 5 years, in which 26.4% were infants<sup>17</sup>. However, in our study, infantile patients were only 4%.

In this study, the male-to-female ratio was 10.36:1, which was similar to the studies of Singh et al. and Keshava et al., which had male-to-female ratios of 12.3:1 and 8.2:1, respectively<sup>17,18</sup>. However, Dsouza et al. in a clinical study of inguino-scratal swelling in children found the ratio was much higher (24:1)<sup>19</sup>.

In this study, about half (49.6%) of the swelling was inguino-scratal, 26.4% of cases were scrotal, 16% of cases were inguinal, and 8% of cases were inguino-labial. This result is supported by the study of Singh et al. that the majority (58.5%) of patients presented with inguino-scratal swelling<sup>17</sup>. But this result is dissimilar to the study of Verma et al., who found inguinal swellings in 77.3% of cases, whereas 13.6% and 9.1% of cases were scrotal and inguino-scratal swellings, respectively<sup>20</sup>.

According to literature, right-sided pathology is more in the inguino-scratal region due to delayed descent of the right testicle. Thereby delay in obliteration of processus vaginalis<sup>3,4,10</sup>. In our study, 56.8% of the swelling occurred on the right side and 32% occurred on the left side, while 11.2% were bilateral. This result is similar to the study by Verma et al<sup>20</sup>. They found right-sided pathology in 59.1% of cases, while 29.5% were left-sided and bilateral in 11.4% of cases. The result of right-sided preponderance is also shown by Ingale et al., Koranga and Chandrasekaran, Keshava and Naveen, and Wani et al<sup>15,16,18,21</sup>.

Prematurity is identified as a significant risk factor

associated with inguinal hernias, congenital hydrocele, and undescended testis<sup>3,4</sup>. In our study, about 8.8% of cases were born as preterm babies, which was close (10%) to the study of Jadhav et al<sup>22</sup>. However, a study done by Shing et al. found that prematurity was associated with 30.2% of cases of inguino-scrotal swellings<sup>17</sup>.

It is evident from this study that inguinal hernia (44.8%) was the commonest cause of inguino-scrotal/labial swelling, followed by hydrocele (25.6%). This result was similar to other studies<sup>1,16,17,20,23</sup>. But, this result was dissimilar to the findings of Wani et al. that hydrocele was the commonest cause of inguino-scrotal/labial swelling<sup>21</sup>. In this study, inguinal abscess was the 3<sup>rd</sup> most common cause (8%) of inguino-scrotal/labial swelling.

In this study, in addition to swelling (100%), about 37% of patients presented with pain. Other presentations were fever, erythema, absent testis, and ulceration. These features are similar to other studies<sup>3,4,16,17,23</sup>.

Modalities of treatment of inguino-scrotal/labial swelling depend on the types of disease. Surgery is the treatment for hernia, hydrocele (age more than 2 years), UDT, torsion testis and abscess. Medical treatment is effective in the case of epididymo-orchitis, ISE and sometimes cellulitis<sup>3,4,10</sup>. In this study, treatment options were surgical in 91.2% of patients and medical in 8.8% of cases. Medical treatment was applied in patients with epididymo-orchitis and ISE. Medical treatments were rest and elevation of the scrotum, analgesics, antihistamines, and antibiotics (where needed), while surgical treatments were herniotomy in 70.4% of patients, incision and drainage in 8% of patients, orchidopexy in 5.6% of patients, exploration of the scrotum followed by orchidopexy in 1.6% of patients, exploration of the scrotum followed by orchidectomy in 2.4% of patients, wound debridement in 1.6% of patients, and excision of sebaceous cysts and haemangiomas in 0.8% of patients each.

The prognosis of inguino-scrotal/labial swelling is good, but cellulitis leading to necrotising fasciitis (Fournier's gangrene) and neglected cases of torsion testis are associated with a high morbidity or mortality<sup>10</sup>. The present study revealed that the outcome was excellent in 94.4% of patients, while 5.6% of patients developed some form of complications. Among the patients who developed complications were scrotal haematoma (4%), wound infection, and foreign body granuloma (0.8% each). This result is consistent with Reddy et al., where the overall complication rate was 7.5%<sup>1</sup>. Among them, scrotal haematoma was 5% and wound infection was 2.5% of cases.

Length of postoperative hospital stay ranged from 2 to 8 days with the mean of 2.76 (SD 1.14) days. Postoperative hospital stay was 2 days in 52.6%, 3 days in 32.5%, and >3 days in 14.9% of cases. Hospital stay was more in the cases

of inguinal abscess, cellulitis, and patients who developed complications. Uncomplicated hernia, hydrocele, and sometimes UDT can be managed as day case surgery<sup>3,4,10</sup>. Studies done by Salam et al. in BSMMU and Parveen et al. in CMH performed routine paediatric hernia repair on a day case basis<sup>24,25</sup>. So, the long postoperative hospital stay is due to the absence of day case surgery facilities in this institute.

## CONCLUSION

Inguino-scrotal/labial swelling is not an unusual presentation in children. It is a symptom of varied pathology. Hernia is the most common cause of inguino-scrotal/labial swelling in children. The outcome of inguino-scrotal/labial swelling is excellent if it is managed appropriately in time. A day case surgery facility of an institute can reduce the hospital stay of an inguino-scrotal/labial surgery patient.

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