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Clinical Study of Congenital Inguinal Hernia and Hydrocele and their Management at Tertiary Care Center

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ABSTRACT

Inguino-scrotal swellings are one of the commonest problems in infancy and childhood throughout the world. Male hydrocele, most commonly non communicating type, accounts for 1-2% with male female ratio of 5:1. As a result of improved neonatal intensive care, more and more premature babies are being delivered and consequently the incidence of neonatal inguinal hernia and hydrocele is increasing. Although laparoscopic repair is an established treatment for inguinal hernia in adults, still it has got little role in the repair of paediatric inguinal hernias. Some surgeons favour the repair of inguinal hernia in paediatric age group by laparoscopic procedure, especially for bilateral cases. This study was intended to study the congenital Inguinal hernia and hydrocele and their management and to find out the associated anomalies and outcome of surgical intervention at tertiary care center. The present prospective clinical study was conducted from December 2020 to November 2022 amongst 76 patients with congenital inguinal hernia or hydrocele at tertiary care hospital. The Congenital Inguinal hernia was seen in 48 (63%) patients followed by Congenital hydrocele 27 (36%). Majority of the males (22) were in the age group of 0-3 and majority of females (7) were in the age group of 10-12 years. Out of all congenital inguinal hernia and hydrocele cases, only 17% patients were female. Thus, Male: Female ratio is 4.9:1.0. Right Sided swelling was seen in 67% patients while 30% patients having left sided swelling. Bilateral was seen in 3% cases only. Out of 76 patients, 4 patients had associated phimosis, 2 patients had hypospadias and 6 patients had undescended testis. Once swelling develops, it rarely resolves spontaneously especially after 2 years of age, so early surgical intervention in the form of inguinal herniotomy is the most appropriate management of congenital inguinal hernia and hydrocele. Otherwise, it can lead to the complications like obstruction and strangulation. Post operative complications are rare as it is an elective procedure but can be in form of minor complications such as tenderness or wound infection. Recurrence is usually rare in post operative period.

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Key Words
Hernia, hydrocele, congenital, inguinal, laparoscopy

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INTRODUCTION

Inguino-scrotal swellings are one of the commonest problems in infancy and childhood throughout the world. Male hydrocele, most commonly non communicating type, accounts for 1-2% with male female ratio of 5:1. Hernia can be defined as "Abnormal protrusion of a viscus or part of a viscus through a normal or abnormal opening in the wall of its containing cavity". Most inguinal hernias are unilateral, but 10% of the patients present with bilateral inguinal hernias. The incidence of inguinal hernia in premature infants has been reported to be about 5-30% with about two thirds being bilateral cases. They represent the conditions most requiring surgical repair in the paediatric age group[1]. Paediatric hernias and hydrocele are fundamentally the results of incomplete or abnormal obliteration of the patent peritoneal diverticulum called process us vaginalis which accompanies that the testis on its journey into the scrotum. In a female, a potential pocket associated with the round ligament, known as a diverticulum of Nuck corresponding to the process us vaginalis of males predisposes to formation of inguinal hernia in a female. Normally, the fusion of the processus continues after birth through infancy and childhood with some remaining patent even in adulthood but mostly occurs before 2 years of age[2].

The incidence of inguinal hernias is 0.8-4.4% or 10-20/1000 live birth. Whereas, Hydrocele, most commonly non communicating type, accounts for 1-2% with male: female ratio of 5:1. The risk factors include prematurity, low birth weight, family history, hydrops, meconium peritonitis, chylous ascites, liver disease with ascites, abdominal wall defects, ambiguous genitalia, hypospadias or epispadias, bladder exstrophy, cryptorchidism, cystic fibrosis and connective tissue disorders such as Ehlers-Danlos syndrome. As a result of improved neonatal intensive care, more and more premature babies are being delivered and consequently the incidence of neonatal inguinal hernia and hydrocele is increasing[3]. The presentation typically can be groin swellings which appear with increased intra-abdominal pressure such as crying or straining and may disappear spontaneously or with gentle manual pressure. The other features include groin pain during exercise which can be vague chronic sharp fleeting type. Abdominal distension, vomiting and absence of stool/flatus would suggest intestinal obstruction, perforation and peritonitis. On the other hand, hydrocele presents as a translucent smooth non-tender swelling[3].

The diagnosis is based on clinical history and examination and laparoscopic surgery with or without contralateral exploration. The complications include wound infection at 1-2% recurrences at 1% and uncommonly vas injury and testicular atrophy which commonly occurs after emergency surgery. Post operative complications are usually rare following elective operation whereas minor complications do occur after emergency operation. Once the diagnosis is confirmed, surgical closure of patent process us vaginalis (inguinal herniotomy) is the most common treatment in paediatric age group. Although laparoscopic repair is an established treatment for inguinal hernia in adults, still it has got little role in the repair of paediatric inguinal hernias. Some surgeons favour the repair of inguinal hernia in paediatric age group by laparoscopic procedure, especially for bilateral cases[4]. This study was intended to study the congenital Inguinal hernia and hydrocele and their management and to find out the associated anomalies and outcome of surgical intervention at tertiary care center.

MATERIALS AND METHODS

The present two-year prospective clinical study was conducted from December 2020 to November 2022 amongst 76 patients with congenital inguinal hernia or hydrocele at tertiary care hospital.

Inclusion Criteria: All patients below the age group of 18years, having congenital inguinal hernia or hydrocele and parents or guardians giving written informed consent.

Exclusion Criteria: Patient who left before completion of treatment, patients with secondary inguinal hernia or secondary hydrocele, patients not willing to enter study and patients who lost to follow up.

Study Procedure: Detailed history of patients including age, gender, presenting complaints, past surgical history, history of any disease, any addiction and immune-deficiency status was recorded.

Examination: All patients with congenital inguinal hernia or hydrocele were examined thoroughly and baseline findings were noted. Symptoms of swelling, pain associated with fever, constipation, vomiting, consistency, reducibility of swelling, impulse on coughing were noted. Diagnosis was then confirmed by radiological (ultrasonography) investigations.

Investigations: All patients were subjected to ultrasonography and diagnosis was confirmed. Pre-anaesthetic evaluation was done and patients were posted for routine operative procedures. Four cases of obstructed inguinal hernia had to be operated in emergency. Blood investigations such as complete blood counts with leucocytes, blood sugar level, pus for culture and sensitivity were done for inguinal abscess patients.

Observation: In this study we had enrolled and studied 76 patients having congenital inguinal hernia or hydrocele. The present study revealed following

observations. Out of all cases, Incidence of congenital inguinal hernia was highest 63% followed by hydrocele 36% and 1% case having congenital inguinal hernia with hydrocele. (Table 1) shows that Congenital Inguinal hernia was seen in 48 (63%) patients followed by Congenital hydrocele 27 (36%). (Table 2) shows that majority of the males (22) were in the age group of 0-3 and majority of females (7) were in the age group of 10-12 years. Table no.3 shows that out of all congenital inguinal hernia and hydrocele cases, only 17% patients were female. Thus, Male: Female ratio is 4.9:1.0. (Table 4) shows that Right Sided swelling was seen in 67% patients while 30% patients having left sided swelling. Bilateral was seen in 3% cases only. (Table 4) shows that, out of 76 patients, 4 patients had associated phimosis, 2 patients had hypospadias and 6 patients had undescended testis.

RESULTS AND DISCUSSIONS

This study intends to determine the age at presentation, sex distribution, sidewise distribution, associated anomalies, the complications at presentation, length of hospital stay and the post-operative complication rate of congenital hernia and hydrocele. In present study we found out 48 cases of inguinal hernia out of 76 i.e. 63% cases. It was 30 cases (75%, n = 40) in a study conducted by Himadra Koranga *et al*,[5] while it was 30(31%) in a study conducted by Geelani *et al*.[6] and 93 (46.5%, n = 200) in a study conducted by Keshava Murthy *et al*[7]. Incidence of inguinal hernia was 246 (95%, n = 258) in a study conducted by Parveen *et al*.[8]. In this study we found out 27 cases of congenital hydrocele out of 76 i.e. 36% cases. It was 10 (25%, n = 40) in a study conducted by Himadra Koranga *et al*.[65] and 12 (5%, n = 258) in a study of Parveen *et al*.[8]. While it was 69 (34.5%, n = 200) in studies conducted by Keshava Murthy *et al*.[7] 69 cases (34.5%).

According to literature maximum age group of presentation of congenital hernia and hydrocele in pediatric population is 1-3 yrs. In present study we found out 22 patients of 76 i.e. 29% presenting within 0-3 years of age group, thus, making it maximum reporting age group with 29 % cases followed by 26% i.e. 20 cases presenting in 7-9 years of age group. In a study conducted by Himadra Koranga *et al* [5] maximum numbers of cases were in the age group of 3-4 year (25%). In study done by Keshava Murthy *et al*.[7] Maximum children (39%) were in the age group of 3-6 years. 1-5 years age group was most common age group of presentation in study conducted by Parveen *et al*.[8] (65%), Singh *et al*.[10] (53%) and Rahul Tanvani *et al*.[9] (53%). In present study minimum numbers of cases were reported in age group of 16-18 years. According to literature male: female ratio of inguinoscrotal swellings in paediatrics age group is 6:1.

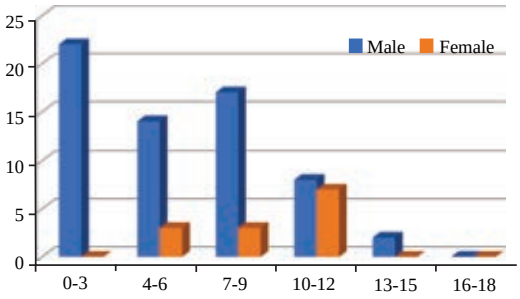

Fig. 1: Age distribution according to gender

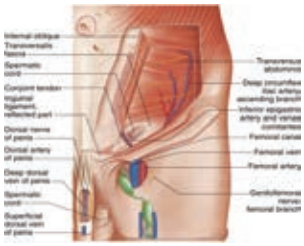

Fig. 2: Anatomy at inguinal canal

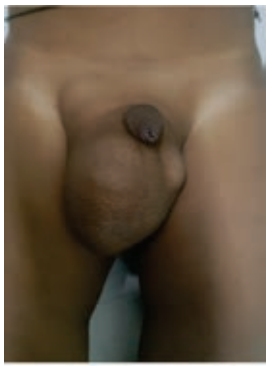

Fig. 3: Right sided Congenital Inguinal Hernia

Fig. 3: Left sided Congenital Inguinal Hydrocele

In present study we found out 63 male cases and 13 female cases, thus, giving sex ratio of 4.9:1. This male: female ratio was 5.1:1 in a study conducted by Parveen *et al*.[8]. While it was 22:1 in a study conducted by Keshava Murthy *et al*.[7] (191 male, 9 female). In studies conducted by Geelani *et al*.[6] and Himadra Koranga *et al*.[5] all were males and no 6:1. process us vaginalis closes around 40 weeks of gestation eliminating the peritoneal opening at the females

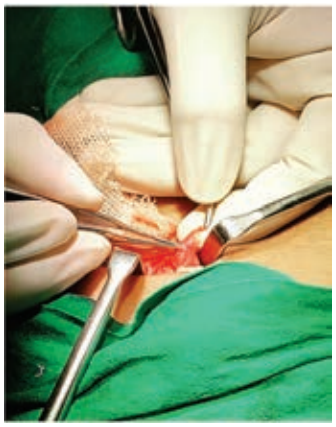

Fig. 4: Spermatic cord separation intraoperative image

Fig. 5: Separated hernia sac for herniotomy Intraoperative image

Table 1: Distribution of patients according to Inguinoscrotal swelling

Type	Total	Percent
Congenital Inguinal hernia	48	63
Congenital hydrocele	27	36
Congenital inguinal hernia with hydrocele	01	01
Total	76	

Table 2: Distribution of patients according to Age and Gender Distribution

Age Group (In years)	Male	Female	Total
0-3	22	00	22
4-6	14	03	17
7-9	17	03	20
10-12	08	07	15
13-15	02	00	02
16-18	00	00	00

Table 3: Distribution of patients according to gender and diagnosis distribution

Diagnosis	Male	Female	Total
Inguinal hernia	36	12	48
Congenital hydrocele	27	00	27
Hernia with hydrocele	00	01	01
Grand Total	63	13	76

Table 4: Distribution of patients according to side and diagnosis distribution

Diagnosis	Right	Left	B/L	Total
Inguinal hernia	30	17	1	48
Congenital hydrocele	20	06	1	27
Hernia with hydrocele	01	00	0	01
Grand Total	51	23	2	76

Table 5: Distribution of patients according to post operative complications

Complication	7 days F/U	2 weeks	4 weeks	8 weeks
Recurrence	-	-	-	-
Swelling	1	-	-	-
Tenderness	3	-	-	-
Infection	2	2	-	-
Total	6	2	-	-

were found. In normal development, the internal ring. Failure of this closure lead to an indirect inguinal hernia in paediatric population. An indirect inguinal hernia occurs more often on the right. This is believed to be attributed to the slower closure of a patent process us vaginalis on the right side compared to the left.

According to literature, Right sided inguinoscrotal swellings are more common than left in paediatric age group, with 45-60% being right sided, 15-25% being left sided and 15-30% being bilateral swellings with Right: Left ratio being 3:1-2:1. In our study we found out that 51 were right side i.e. 67%, 23 were left sided i.e. 30 % and 2 cases were bilateral i.e. 3% with Right: Left ratio of 2.2:1. In study conducted by Himadra Koranga *et al*[5], Right: Left ratio was 2:1. Amongst 40 cases, 24 cases were on the right side, 12 cases on the left side and 4 cases were bilateral. Similarly in study conducted by Singh *et al*[10] (2.1:1), Baishya *et al*.[11] (2:1), Tanwani *et al*.[9] (2.2:1), Right: left ratio was according to literature. But in studies conducted by Keshava Murthy *et al* [7] overall ratio of right to left was 3.2:1, 3.6% of all cases were bilateral. In a study conducted by Parveen *et al*[8], Right: left ratio was 1.5:1, less than that of literature.

According to literature incidence of undescended testis in pediatrics age group is 5-8%[1]. The testicle may reside in the retro peritoneum, in the internal inguinal ring, in the inguinal canal, or even at external inguinal ring. In the seventh or eighth months, the testicle descends along the inguinal canal into the upper scrotum and with its progress the process us vaginalis is formed and pulled along with the migrant testicle. This incidence increases upto 30% in preterm infants. Considering risk of spermatogonia after 2 years of age in undescended testis due to higher temperature, It is now recommended that the undescended testicle be surgically repositioned by 1 year of age. Unilateral undescended testis at inguinal canal is managed by orchidopexy whereas laparoscopy is helpful in management of abdominal undescended testis and bilateral undescended testis.

Phimosis is defined as the inability to retract the foreskin or prepuce covering the glans of the penis. It may either be physiological or pathological. In physiological phimosis, children are born with tight foreskin at birth and separation occurs naturally over time. This usually resolves at around 5-7 years of age. Pathological phimosis occurs due to scarring, infection or inflammation. Retraction of foreskin in these patients may lead to bleeding, scarring or psychological trauma. Patient may have difficulty in micturition or secondary infection. Treatment for phimosis varies depending on the child and the severity of phimosis. Treatment may include- gentle daily manual retraction, topical corticosteroid ointment application or circumcision. Hypospadias is a congenital anomaly in which the opening of the

urethra is on the underside of the penis instead of at the tip. It may be subcoronal, midshaft or penoscrotal. It may be associated with downward curve of the penis i.e. chordae. Surgical repair remains treatment of choice for hypospadias.

In present study, cases having associated undescended testis were managed by orchidopexy along with inguinal herniotomy, cases of associated phimosis were managed by circumcision and cases of associated hypospadias were managed conservatively at present. In present study, Undescended testis was the most common associated congenital anomaly (6 cases i.e.7.8%), followed by phimosis (4 cases i.e. 5.2%) and hypospadias (2 cases i.e. 3.4%). In a study conducted by Singh *et al*[10], Undescended testis was most common anomaly (3 cases i.e. 5.6%) followed by phimosis (2 cases i.e. 3.7%). In a study conducted by Keshava Murthy *et al*[7] incidence of undescended testis was 38 cases i.e. 19%. While in a study of Himadra Koranga *et al*.[5], only 2 cases (5%) of same were noted.

According to literature 3-6 % cases of inguinal hernia in pediatric age group present with intestinal obstruction, of them around 5-10 % are obstructed. In present study, 4 out of 48 cases (8.3%) of inguinal hernia presented with intestinal obstruction. All 4 patients were operated on a same day of admission on emergency basis. In 2 cases out of 4, omentum was content of hernia sac whereas one case had small bowel as a content with normal vascularity hence content were reduced and herniotomy was performed. In a 4th case which was presented as obstructed inguinal hernia, intra operatively appendix was the content of hernia sac, appendicectomy was performed and herniotomy was done after reduction of content. In a study conducted by Himadra Koranga *et al*.[5] out of 40 children, there were no complications noted. In studies conducted by Keshava Murthy *et al*.[7] 3 cases (1.7% of all cases) of complicated inguinal hernia presented as irreducible hernia, without any signs of strangulation, in a study conducted by Dinesh Jadhav *et al*.[12] out of 50 children, there were 2 cases of incarceration but no strangulation or gonadal infarction. No complications were reported in patients who presented as congenital hydrocele at the time of presentation.

In present study, follow up of patients was kept at 7 days, 2 weeks, 4 weeks and 8 weeks. While no complications were found in 68 cases (89.5%) at the end of 8 weeks, Infection was the most common post operative complication with 4 cases (5.2%) at the end of 2 weeks, second being tenderness in 3 (3.9%) cases followed by swelling at operative site in 1 case (1.3%) and no case of recurrence was noted in present study. According to studies conducted by Keshava Murthy *et al* [7] One case (0.7%) had recurrence of inguinal hernia, Geelani *et al*.[6] One case (3.2%) had recurrence of inguinal hernia, Himadra Koranga *et al*.[5] In the post-operative period of 40 children, during the period of 5 months study there was no incidence of recurrence while wound hematoma being most common post operative complication noted (2 cases). Study conducted by Singh *et al*[10] had reactive hydrocele as most common complication in 16 cases (29%). While 3 cases had post operative wound infection. In present study it was found that average length of hospital stay amongst inguinal hernia patients was 3.9 days with minimum being 3 days and maximum being 7 days. Patients having post operative complication were having increased duration of stay. Which was like studies conducted by Geelani *et al*[6] with mean hospital stay of 4.46 days and higher than study conducted by Keshava Murthy *et al*.[7] in which mean hospital stay was 2.46 days. In present study, for cases of congenital hydrocele, average length of hospital stay was 3-8 days, while a single case of hernia with hydrocele had a post operative stay of 4 days.

CONCLUSION:

Inguinal hernia and hydrocele in children remain one of the most common congenital anomalies observed by surgeons. It can develop at any age, even in the neonates, 1-5 years age group remains the most common age group of presentation with male children being more commonly affected. Once swelling develops, it rarely resolves spontaneously especially after 2 years of age, so early surgical intervention in the form of inguinal herniotomy is the most appropriate management of congenital inguinal hernia and hydrocele. Otherwise, it can lead to the complications like obstruction and strangulation. Post operative complications are rare as it is an elective procedure but can be in form of minor complications such as tenderness or wound infection. Recurrence is usually rare in post operative period.

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