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Original Research Article

"A CLINICAL STUDY OF INGUINAL HERNIA IN PAEDIATRIC AGE GROUP WITH SPECIAL REFERENCE TO COMPLICATIONS AND OUTCOME IN A TERTIARY CARE HOSPITAL"

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ABSTRACT:

Background: Inguinoscrotal swellings are one of the commonest anomalies in infancy and Childhood throughout the world. Among the inguinoscrotal swellings, inguinal hernia and hydrocele top the list in frequency. They represent the conditions most frequently requiring surgical repair in the pediatric age group.

OBJECTIVES:

1 To know the age, sex and side prevalence of inguinal hernia in children.
2 To know the clinical presentation of inguinal hernia in children age ranged from 1day to 12 years.
3 To study management of inguinal hernia in children
4 To study post-operative complications.

MATERIAL & METHODS: **Study Design:** Prospective hospital based observational study. **Study area:** Department of General Surgery, Hitech Medical College and Hospital, Rourkela. **Study Period:** Mar. 2019 – Feb. 2020. **Study population:** All Patients fulfilling the inclusion criteria with diagnosis of inguinal hernia. **Sample size:** study consisted a total of 30 cases. **Sampling method:** Simple Random sampling method. **Study tools and Data collection procedure:** Congenital inguinal hernia was diagnosed by taking detailed history from parents in the form of site, size, variability of size, history of non-reducibility or any underlying straining for micturition or presence or absence of testis in scrotal sac, were collected in a prescribed proforma which contains history, clinical examination, investigation and management in one-year time bound study.

Results: In the present study the duration of symptoms, up to 1 week seen in 1/30(3%)case, from 1 week to 1 month seen in 2/30(7%)cases, from 1 month to 1 year is seen in 13/30(43%) cases and next from 1 year to 5 years in 11/30(37%) cases, more than 5 years' duration of symptoms seen in 3/30(10%) cases.

CONCLUSION: Inguinal hernia and hydrocele in children remain one of the most common congenital anomaly observed by surgeons. The threat to loss of testis, ovary or a portion of bowel due to incarceration or strangulation remains. Prompt diagnosis and early treatment of the inguinal hernia continues to be the mainstay if these complications are to be avoided.

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Keywords: Inguinal hernia, neonatal intensive care, orchidopexy

INTRODUCTION:

Sir Percivall Pott, described hernias in 1756 as: "The disease which makes the subject of the following tract, is one in which mankind are, on many accounts, much interested. No age, sex, rank, or condition of life, is exempted from it; the rich, the poor, the lazy, and the laborious, are equally liable to it; it produces certain inconvenience to all who are afflicted by it, It sometimes puts the life of the patient in such hazard, as to require one of the most delicate operations in surgery; and it has in all times, from the most ancient down to the present, rendered those who labor under it subject to the most iniquitous frauds and impositions." [1]

Inguinoscrotal swellings are one of the commonest anomalies in infancy and Childhood throughout the world. Among the inguinoscrotal swellings, inguinal hernia and hydrocele top the list in frequency. They represent the conditions most frequently requiring surgical repair in the pediatric age group.

Hernia is a Latin term meaning rupture of a portion of a structure. It can be defined as a "protrusion of a viscus or part of a viscus through a normal or an abnormal opening in the wall of its containing cavity."[2]

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. All pediatric inguinal hernias require operative treatment to prevent the development of complications, such as inguinal hernia incarceration or strangulation.

Hence the present study was undertaken to study inguinal hernia in paediatric age group with special reference to complications and outcome.

OBJECTIVES:

1.To know the age, sex and side prevalence of inguinal hernia in children.

2. To know the clinical presentation of inguinal hernia in children age ranged from 1day to 12 years.

3. To study management of inguinal hernia in children

4. To study post-operative complications.

MATERIAL & METHODS:

Study Design: Prospective hospital based observational study.

Study area: Department of General Surgery, Hitech Medical College and Hospital, Rourkela.

Study Period: Mar. 2019 – Feb. 2020.

Study population: All Patients fulfilling the inclusion criteria with diagnosis of inguinal hernia.

Sample size: study consisted a total of 30 cases.

Sampling method: Simple Random sampling method.

Inclusion criteria:

1. Patients with confirmed diagnosis of inguinal hernia
2. Patients age ranging from 1day – 12 years
3. Patients whose parents willing to be part of the present study.

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Exclusion criteria:

1. Patients with obstruction, strangulation, perforation
2. Patients with congenital heart diseases developmental anamolies.
3. Patients whose parents are not willing to participate in the study.

Ethical consideration: Institutional Ethical committee permission was taken prior to the commencement of the study.

Study tools and Data collection procedure:

Congenital inguinal hernia was diagnosed by taking detailed history from parents in the form of site, size, variability of size, history of non-reducibility or any underlying straining for micturition or presence or absence of testis in scrotal sac, were collected in a prescribed proforma which contains history, clinical examination, investigation and management in one-year time bound study.

After obtaining the history children were examined systematically which includes examination of inguinal and groin region, scrotum and its contents. Respiratory system, cardiovascular system and per abdomen to know other associated congenital anomalies like undescended testis and other connective tissue disorder.

Children were subjected to routine investigations like Hb%, BT, CT and USG for CPPV. Children with unilateral inguinal hernia underwent US examination using a 7.5- MHz linear transducer. If a CPPV was visible as a hydrocele owing to the inflow of physiologic ascites into a processus vaginalis on straining, then US scanning were performed while the patient was at rest and while inducing straining by standing or crying. A groin with a hydrocele in the inguinal canal on straining was diagnosed as a CPPV and cases were followed for 1 year to know development of C/L hernia.

Female children with hernia were evaluated for inter sex problems in the form of ultrasonography of abdomen and buccal Barr bodies.

After proper evaluation of preoperative condition and appropriate preparation, surgery is considered. Surgery is decided by age. If the children <1 year of age, Mitchell banks operation is selected where in herniotomy done without opening the external oblique aponeurosis. If the children >1 year of age, Fergusson technique is selected where in herniotomy done after opening the external oblique aponeurosis, under suitable anesthesia as decided by anesthesiologist. After the surgery, children were nursed in post-operative ward with one dose of IV antibiotics. Post-operative complications were being taken care off. Observed for 6 hours and finally decided to discharge once patient is fit for discharge on the same day. All patients were asked to attend the General surgery OPD for follow-ups.

Statistical analysis:

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. Independent t test or Mann Whitney U test was used as test of significance to identify the mean difference between two quantitative variables and qualitative variables respectively. P value <0.05 will be a statistically significant study.

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OBSERVATIONS & RESULTS:

Table 1: Age distribution

Age (yrs)	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
No	2	2	4	2	3	5	1	2	2	2	2	3

The age of the patients ranged from day1 to 12 years. They were divided into 12 groups, each with a gap of 1 year. The maximum numbers of cases were in the age group of 5-6 years 5/30 (16 %) and the minimum number was in the age group 6-7 years1/30(3.3%). 16/30 (53.3%) of cases were between 2 to 7 years.

TABLE 2: SHOWING SEX DISTRIBUTION

Sex	No of cases	Per (%)
Male	26	87
Female	4	13
Total	30	100

In this study of 30 cases, 26/30(87%) cases were males and 4/30(13%)cases were females, the ratio being 6.6:1.

TABLE 3: SHOWING SIDE DISTRIBUTION

Side	No. of Cases	Per (%)
Right	18	60
Left	9	30
Bilateral	3	10
Total	30	100

Among these 30 cases, 18/30(60%) cases were on the right side, 9/30(30%) cases on the left side and 3/30(10%) cases were bilateral. Of those 18 cases on the right side,14 were boys and 4 were girls. Among the 9 cases on the left side and 4 bilateral, all were boys.

TABLE 4: SHOWING DURATION OF SYMPTOMS

Duration	No. of patients	Per (%)
1 – 7 days	1	3

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1 week – 1month	2	7
1month – 1 year	13	43
1 year – 5 years	11	37
> 5 years	3	10

In the present study the duration of symptoms, up to 1 week seen in 1/30(3%)case, from 1 week to 1 month seen in 2/30(7%)cases, from 1 month to 1 year is seen in 13/30(43%) cases and next from 1 year to 5 years in 11/30(37%) cases, more than 5 years' duration of symptoms seen in 3/30(10%) cases.

TABLE 5: SHOWING SYMPTOMATOLOGY

Symptoms	No. of patients	Per (%)
Asymptomatic swelling	28	93
Dull aching pain	0	0
Acute presentation	2	7

In the present study 28/30(93%) cases presented as asymptomatic swelling, 2/30 (7%) cases have acute presentation.

In the present study all 30(100%) cases are presented with indirect inguinal hernia only.

TABLE 6: SHOWING ASSOCIATED CONGENITAL ANOMALIES

Associated anomalies	No of cases	Percentage (%)
Hydrocele	9	30
Undescended testis	2	7
Hypospadias	1	4

In this series, there were 9/30(30%) cases of hydroceles of which 6 were on the right side and 3 on the left side. There were 2/30(7%) cases of undescended testis. All were on the right side and located in the inguinal pouch. They underwent orchidopexy at the time of hernia repair and the testis was placed in the sub dartos pouch. 1/30(3%) case was associated with Hypospadias.

PREOPERATIVE SONOGRAPIC EVALUATION OF CPPV :

In our study 27/30(90%) cases (25 boys and 2 girls) with unilateral inguinal hernia underwent US examination using a 7.5 MHz linear transducer.In 27 cases 2 cases (6%) were diagnosed

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by US as CPPV. Out of 2 cases 1 was on right side,1 one left and all were boys and all are below 2 years. 1 case developed C/L inguinal hernia on right side after 6 month.

In our study 24/30(80%) cases received GA, 3/30(10%) cases received caudal block (0.25% bupivacaine, 1 ml/kg), and 3(10%) cases received spinal anesthesia. Postoperatively it was noticed that patients were comfortable with caudal block (good analgesia) compared to other types.

TABLE 7: OPERATIVE TECHNIQUE FOR HERNIOTOMY

Technique	No. of patients	Percentage (%)
Mitchell banks	3	10
Ferguson technique	27	90

All cases underwent Herniotomy. Mitchell banks operation was done for 2/30(7%) cases that were below 1 year, where in, herniotomy was done without opening external oblique aponeurosis.

Ferguson technique was done for 28(93%) cases that were above 1 year, where in herniotomy done after opening the external oblique aponeurosis. Herniotomy was done with or without complete excision of the sac. In case of partial excision for male child, the distal portion was kept slit open to prevent hydrocele formation whereas in the case of female the distal portion of the sac was completely removed.

The hernial sac for every female patient was always widely opened and inspected before twisting and ligating. Sliding component was not found in our study. In the case of associated hydrocele, who were having PPV high ligation of the patent processus vaginalis at the deep ring was done and distal portion was kept slit open.

The most common abdominal organ found in the sac was small intestine in 24(80%) cases followed by omentum in 6(20%) case

POST OPERATIVE ANALGESIA:

Postoperative analgesics were provided on a routine basis and were consist of either acetaminophen suppository (10mg/kg every 4 hours for 24 hours, then as needed) or diclofenac suppositories in children more than 1 year or caudal block.

For 27/30(90%) cases intraoperative rectal suppositories were put at the end of surgery and observed that 90% of cases were comfortable and were not required additional analgesia.

For 3 cases caudal block given, it was observed that post operatively these patients were comfortable without additional analgesia up to 6 hours after surgery.

DURATION OF HOSPITAL STAY

Most operations are performed on a Day care basis and sent on day of surgery.

1 case had inadequate pain control and 1 case had emesis and were kept under observation in the recovery room.

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1 case that were discharged on the day of surgery had emesis and came next day in unresponsive state with pin point pupil due to hypoglycemia.
Patient recovered after infusion of 25% Dextrose. Average duration of stay was 1.2 days.

COMPLICATIONS: In this series of 30 children, there were 1/30(3%) case of incarceration. But none had strangulation and gonadal infarction. In the post-operative period of 30 children, there were 2 cases of wound infection and 1 case had hypoglycemia. No other complications were noted.

Recurrence: During the period of 2 years' study and follow up period of 12 weeks to 24 weeks, 1(3%) cases had a recurrence.

DISCUSSION:

Inguinal & Scrotal swellings in children form a majority of surgical conditions requiring treatment. Inguinal hernia repair is the most frequently performed operations in the pediatric age group. The legendary Robert Gross had said "There is nothing as interesting as an inguinal hernia." In controlled population based studies, there are between 10 and 20 inguinal hernias per 1000 live births.[3]

In the present study of 30 cases, the youngest patient was 2 month of age and oldest was 12 years old. 50% of cases were between 2 to 7 years. According to Okuribido et al[4] 47.4% cases were between 3 to 7 years of age, Adesunkamani AR et al[5] 71% cases are below 5 years of age. Wright JE[6] 87% of cases were below 7 years,65%cases were below 5 years & 25% of cases were below 1 year of age. In Rakesh kumar study[7] 46% of cases were between 2 to 7 years of age. In the present study 50% of caseswere between 2 to 7 years of age. The figures in the present study correlates well with other studies mentioned.

In all the studies of inguinal hernia in children, there is male preponderance. Female cases were evaluated for intersex. USG was done to rule out intersex, we have not found case of intersex. In Grosfeld J.L study[8] boys are 87.5%, girls are 12.5% and male to female ratio is 7:1. In Ralph M Larsen et al[9] boys are 91.7%, girls are 8.3% and male to female ratio is 11:1. In Willia B Keisewetter study[10] boys are 86%, girls are 14% and male to female ratio is 6:1. In Marc I Rowe study[11] boys are 87%, girls are 13% and male to female ratio is 7:1. In Rakesh kumar study[7] goys are 92% and girls are 8% and male to female ratio is 11.5:1. In the present study 26/30(86%) cases are boys and 4/30(14%) cases are girls and male to female ratio is 6.6:1. The figures in the present study correlates well with other studies mentioned

Childhood inguinal hernias are generally more predominant on the right side and this has been attributed to the delay in descent of the right testis. B/L cases were evaluated for intersex and connective tissue disorder but were not associated. In Rowe and Grosfeld et al [12] study 55 to 60% cases presented with right side swelling,25% cases presented with left side swelling and 15% cases presented with bilateral swelling. In Michel Gilbert et al[13] study 63.5% cases presented with right side swelling,27% cases presented with left side swelling, and 9.5% cases presented with bilateral swelling. In Muhammad T et al[14] study 60% cases presented with right side swelling,30% cases presented with left side swelling, and 10% cases were presented with bilateral swelling. In Rakesh kumar study[7] 64% cases presented with right side swelling,28% cases presented with right side swelling, 8% cases are presented with bilateral swelling. In the present study 18/30(60%) cases presented with right side swelling,9/30(30%)cases presented with left side swelling, and 3/30(10%) cases presented

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with bilateral swelling. The figures in the present study correlates well with other studies mentioned

In the present study the duration of symptoms, from 1 day to 1 week is seen in 1/30(3%) cases,1 week to 1 month seen in 2/30(7%) cases, 1 month to 1 year is seen in 13/30 (43%) cases and next from 1 year to 5 years in 11/30 (37%) and more than 5 years' duration seen in 3/30(10%) cases. The delay in recognizing the swelling in inguinal region is due to size. Size may be small where patients / parents could not able to pick up or the surgeon is unable to confirm its presence. According the Llyod and Rowe[15] the incarceration of inguinal hernia is 17% on right side and 7% on left side with over all rates being 12%. In our study 1/30 case of incarceration seen on the right side with 3% and overall rate being 3% this showed that incarceration is more common on right side.

Direct inguinal hernias in children are rare and represent 0.5% to 1% of all groin hernias. In a study by Wright J.E[6] 1.2% cases presented with direct hernia, In Gorsler and Schier study[16] direct hernia cases are 3.9. Fonkalsrud et al[17] reported only 0.2% cases in their study are direct hernia. Rakesh kumar study[7] showesd 2% cases are presented with direct inguinal hernia. In our study no case was found to have direct hernia and all are indirect hernia cases only.

In present study, 2/30(7%) cases of undescended testis were detected, all of them were on the right side and situated in the superficial inguinal pouch. These patients had orchidopexy at the time of hernia repair and testis was placed in the subdartos pouch. According to Orver Swenson,[18] the commonest site for undescended testis is superficial inguinal pouch. From this study we can noticed that commonest site is superficial inguinal pouch. Out of 30 cases in this study, association of hypospadias was observed in 1(3%) case. According to Andre Hebra[19], hypospadias is associated with an increased risk of inguinal hernia.

In our study 27 patients with unilateral inguinal hernia underwent US examination. In 27 cases 2 cases (7%) were diagnosed as CPPV. Out 2 cases 1 on right side, 1 on left and all were boys and were within 2 years. Hata S; Takahashi Y et[20] al studied 348 patients with unilateral inguinal hernia. All underwent US examination using a 7.5 MHz linear transducer and a groin with a hydrocele in the inguinal canal on straining was diagnosed as a CPPV and was explored bilaterally through surgery.

Recent 'Inguinal Hernia' guidelines of the Association of Surgeon of the Netherlands[21] there is no indication for routine C/L exploration. In this study only the side with an obvious hernia was operated. Carneiro PM et al[22] concluded in his study that the risk of occurrence of contralateral inguinal hernia following unilateral inguinal herniotomy is not significantly excessive when compared by age or sex.

In the post-operative period of 30 children, there were 2 cases of wound infection and 1 case had hypoglycemia. No other complications were noted. All of them responded to conservative treatment. Carneiro P.M.R.[23] had six years' retrospective review of 397 herniotomy in 380 children up to the age of 10 years and encountered 16 minor post-operative complications. Lawrence R. Moss and Edwin I. Hatch[24] in a study of 384 patients who underwent inguinal hernia repair during a 5 years' period found 9 minor post-operative complications.

During the period of 2 years' study and follow up period of 12 weeks to 24 weeks, 1/30(3%) cases had recurrence. Recurrent inguinal hernias are relatively un-common. Reports from

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most children's document an incidence of 1% to 2%. The recurrence may be associated with comorbid conditions including increased abdominal pressure, prematurity, malnutrition, and anemia and connective tissue disorders.

CONCLUSION:

Inguinal hernia and hydrocele in children remain one of the most common congenital anomaly observed by surgeons. The threat to loss of testis, ovary or a portion of bowel due to incarceration or strangulation remains. Prompt diagnosis and early treatment of the inguinal hernia continues to be the mainstay if these complications are to be avoided.

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