A PRPSPECTIVE STUDY OF INGINAL HERNIA IN INFANCY AND CHILDHOOD

Muntkhab-UL-Nafae, Raiees Ahmad , Imran Abdullah , Aftab Akbar , Umer Mushtaq , Yawar Nisar ,Imtiyaz Sofi

Author affiliations :

Muntkhab-UL-Nafae Raiees Ahmad Malla, Altaf Akbar , Senior Resdents; **Umer Mushtaq , Yawar Nisar, Balwinder Singh ,Imtiyaz Sofi,** Post Graduate Scholars:
Department of Surgery , Government Medical College ,Srinagar ,Kashmir. (India)

Abstract

Background: The incidenceof inguinal hernia in children is very high (0.8-13%); male to female ratio being 9-10:1, one of the very common pediatric surgery problem . A Prospective Observational Study of inguinal hernias in infancy and childhood was conducted in a tertiary care hospital , to study the pattern of inguinal hernias in pediatric population in Kashmir .

Materials and Methods: A total of 100 pediatric hernia cases were studied. The data was collected from history taking, general physical examination, other parameters and their case files and was analyzed and statistically significance of parameters calculated.

Results: The results of our study showed that the maximum number of patients are diagnosed in the age group of <3 years. Children with bilateral inguinal hernia are associated with an increased percentage of congenital anomalies. Right sided inguinal hernia are more common overall, but left sided hernia should be considered as a high risk for bilateral exploration of the groin.Weighing the complications with respect to its advantages or rather pros and cons of bilateral versus unilateral exploration, definitely bilateral exploration should be considered in high risk groups.

Conclusion: Weighing the complications with respect to its advantages or rather pros and cons of bilateral versus unilateral exploration, definitely bilateral groin exploration should be considered in high risk groups.

Keywords:

Pediatric inguinal hernia, Unilateral and Bilateral Hernia, Groin Exploration,Herniotomy.

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Correspondence:

Dr. Raiees Ahmad Malla, Room.No: 205,Doctors Hostel, Karan Nagar, Srinagar. (M): 8803012651 ;
E MAIL :mallahraiees@gmail.com

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Introduction

The basic defect in inguinal hernia in childhood, is failure of processus vaginalis to close, so that from birth the peritoneum of abdominal cavity protrudes to varying levels along the spermatic cord and even down to the testis.[1] Neither the anatomy nor function of inguinal mechanism nor any of its constituent parts – the muscles, ligaments, fascia and nerves – are in any way defective. There is no real inguinal canal when the newborn has a hernia. As the baby grows, the internal ring moves laterally away from the external ring and inguinal canal begins to form[2]. The incidence of inguinal herniae in children is very high (0.8-13%); male to female ratio being 9-10:1.4,5 Around 70-80% of children presenting with unilateral inguinal hernia just after they are born, have a bilateral patent processus vaginalis. The patent processus vaginalis closes spontaneously by around 2 years of age hence decreasing the incidence to about

40%. Approximately 50% of these herniae might develop a clinically apparent hernia later on in life, the other 50% remaining obscure.[3-6]

After unilateral herniotomy recurrences have been shown to occur on the contra lateral side with figures ranging from 4-31%. There is an increased incidence of inguinal hernia in premature infant and a bilateral presentation is more common.[7] In children with unilateral inguinal hernia the reported incidence of contra lateral patent processus vaginalis is 46%.[8] Reports in literature quote an overall risk of developing contralateral herniae in the range of 10-15%,[9,10] Although contralateral patent procesus vaginalis is patent in 46%, the risk of contralateral hernia development is 10-15%, meaning 1/6 patients with unilateral hernia develop contralateral hernia. Inspite of all the above mentioned controversies, given the possibility of development of contralateral hernia in a relatively high percentage of patients soon after unilateral repair, some surgeons prefer to perform bilateral approaches.[11,12]

Materials And Methods

The study entitled "A prospective study of inguinal hernias in infancy and childhood" was conducted in the Postgraduate Department Of General Surgery Sheri Kashmir Institute of Medical Sciences Soura Srinagar. The study was prospective observational study of inguinal hernias in pediatric age group patients presenting to hospital for treatment of inguinal hernias. All the patients include in our study had either unilateral or bilateral inguinal hernia at presentation to hospital. The research project was undertaken to study the inguinal hernia in infants and children in terms of:

- Age of presentation
- Sex distribution
- Mode of presentation.
- Associated congenital anomalies.
- Socio -demographic charteristics of studied subjects
- Number of cases having bilateral inguinal hernia with unilateral presentation.

The data was collected from history taking, general physical examination, other parameters and their case files and was analyzed. The below mentioned parameters from each patient included in our study were taken into account.

1. Detailed history, including present, past medical, surgical history personal and family history.
2. Thorough general physical examination and systemic examination particular with emphasis on examination of abdomen, groins, testis and male or female external genital organs.
3. Detailed local examination of the hernia site, starting with inspection of the hernia followed by Cough impulse tests, getting above the swelling, reducibility, finger invagination test, internal ring occlusion test, leg raising test, Zeiman's test, silk glove test, digital rectal examination and examination of the contralatral side.
4. All routine baseline investigations were done which included CBC, KFT, Electrolytes, LFT, Routine urine examination, Chest X-ray, X-ray abdomen and pelvic organs. All patients entitled for the study were subjected to ultrasonography of abdomen and pelvis and ultrasonography of both groins. A total of 100 cases of peadiatric hernias were studied.

The patients included in our study were thoroughly evaluated and parameters recorded: (i) were incidence of inginal ingunal hernia both unilateral and bilateral hernia in different age groups, (ii) sex distribution of patients, (iii) mode of presentation, (iv) associated congenital anomlies, (v) Socio-demographic Characteristics of the Studied Subjects and (vi) any specific association of inguinal hernia in peadiatric population.

Results And Observations:

The results obtained in our study were tabulated as follows:

1. Age And Sex Distribution Of Patients In Our Study: The study shows that for infants less than one year of age, the number of cases were 24 in which 22 were males and 2 were females. In the age group of 12-23 months we had 50 patients (42 males and 8 females). In the age group of 24-35 months we had 16 patients (15 males and 1 female) and in the age group >36 months we had a total of 10 patients (8 males and 2 females)

2. Socio-demographic Characteristics Of The Studied Subjects: From rural areas we

Table – 1
Unilateral Exploration and Pneumoperitoneal Insufflation among the Studied Subjects

		Male		Female		Total		p value
		n	%	n	%	n	%	
Unilateral (RS) Exploration		42	48.3	5	38.5	47	47	0.009 (Sig)
Pneumoperitoneal Insufflation Test on Contalateral side	Positive	16	38.1	5	100	21	44.7	
	Negative	26	61.9	0	0	26	55.3	

had a total of 53 (53%) cases. From urban settings we had a total of 47 (47%) cases. Total number of males were 87 (87%) and total number of females 13 (13%).

3. Congenital Anomalis In Studied Subjects : In our study, hydrocephalus is found in 3 males and 1 female i.e. 4%, intra-abdominal tumours in 1 male and 1 female i.e. 2%, omphalocele in 3 males and 1 female i.e. 4%, prematurity in 10 males and 2 females i.e. 12% hypospadias being present in 18 patients all of whom are males.

4. Mode of Delivery Among The Studied Subjects: In the study, full term normal delivery is the mode of birth in 45 males and 7 females. Caesarean section in 32 males and 4 females. Vacuum assisted delivery in 1 male and 1 females and preterm delivery in 9 males and 1 female. The study also demonstrates premature births (<37 weeks of gestation) in 9 males and 2 females while normal term births (>37 weeks of gestation) in 78 males and 11 females as shown in table 4.

5. Presentation Of Hernia Among The Studied Subjects:

a. We had 7 males with bilateral presentation at onset and 5 females with bilateral presentation

b. 80 males with unilateral presentation included 50 right sided and 30 left sided inguinal hernias. 8 females with unilateral presentation had 5 right sided and 3 left sided inguinal hernias.

6. Symptoms Of Hernias In Studied Subjects: 58 males and 12 females with bulge in groin. 2 males and 4 females had symptoms of pain in groin while as 27 males presented with swelling in the scrotum

7. Exploration Of Groin In Studied Subjects:

a. The table below (table -1) depicts the results of unilateral right sided exploration in a total of 42 subjects, out of which 21 cases tested positive and 26 tested negative. Among the 21 positively tested cases 16 were males and 5 females. Out of the 26 negatively tested cases, all were males.

b. The table- 2 below shows results of bilateral exploration in the selected children. A total of 53 bilateral explorations were done. The results were as follows: Unilateral sacs were found in 19 patients (left sided) out of which 17 were males and 2 were females. Bilateral sacs were detected in 34 children, out of which 28 were males and 6 were females.

8. Established Post-surgical And Post-pneumoperitoneum Insufflations Diagnosis Of The Studied Subjects:

The below table-3 depicts, cases of bilateral inguinal hernias with unilateral presentation. A total of 43 cases were found to have such a presentation (37 males and 6 females). Cases of true unilateral inguinal hernias were 45 (43 males and 2 females). A total of 12 subjects were found to have bilateral groin hernias at the time of clinical presentation (7 were males and 5 were females).

Discussion:

This study was a prospective study conducted in the Department of Pediatric Surgery, SKIMS, Srinagar. There were no specifications regarding age group, hence the age groups ranging from, birth to upper limit of pediatric age group, was taken into account. This study was carried out involving 100 pediatric patients. The number of children with unilateral inguinal

Table – 2
Bilateral Exploration of the Studied Subjects

		Male		Female		Total		p value
		n	%	n	%	n	%	
Bilateral Exploration		45	51.7	8	61.5	53	53	0.492 (NS)
Hernial Sac	Left	17	37.8	2	25	19	35.8	
	Bilateral	28	62.2	6	75	34	64.2	

herniae, having occult contralateral herniae, is very common and the number of visits to OPD is very frequent, hence this study was taken up.

How and when to manage inguinal herniae in children, still poses to be a question mark, especially if it is a unilateral groin hernia. It is very distressing for the parents and very embarrassing for the surgeon, to once again face the same problem, or recurrence on the contralateral side, without doing much about it during the first surgery. Routine bilateral exploration has been advocated by some surgeons,[13-15] but if we keep the complications in mind (risk of damage to cord structures, infertility, testicular atrophy etc.) this approach has a lot of detractors.

Hence, we have aimed our study in removing the misconceptions regarding this problem and setting up some future trends about future groin explorations.

The incidence noted by us was 2.75% of total hospital admissions. The reported incidence in the literature is 0.8% to 13%. It is similar to our incidence as well as that reported by Bock JE, Sobye JV et al. [16]. in their study done in the year 1955 in determining the frequency of contralateral inguinal hernias in children. Grossfeld JL in 1989[17] conducted a study on incidence of inguinal hernia in newborns and children. He concluded that 1 to 5% of all newborns and 9-11% of those born prematurely had a bilateral patent processus vaginalis.

In our study, out of 100 children we had 13 females and the rest 87 were males pertaining to a male female sex ratio of 8.7:1.3. Somewhat similar ratio has been reported in literature by Keiswatter WB et al. in 1958[18] and Clausen et al. in 1958[19].

In our study we found that 24 children (24%) had inguinal hernias in the age group of less than one year; 50 children had inguinal hernias in the age group of 1 year to less than 2 years (50%). Between 2-3 years we had 16 children and above 3 years we had 10 children. In the year 1986 TJ Powel, JA Hallows et al.[20] conducted a study on the age of presentation of inguinal

Table – 3
Established post -surgical and post -pneumoperitoneum insufflations diagnosis of the studied subjects

		Male		Female		Total		p value
		n	%	n	%	n	%	
Case of B/L inguinal hernias with U/L presentation	Yes	37	42.5	6	46.2	43	43.0	0.806 (NS)
	No	50	57.5	7	53.8	57	57.0	
Cases of U/L inguinal hernias with U/L presentation	Yes	43	49.4	2	15.4	45	45.0	0.022 (Sig)
	No	44	50.6	11	84.6	55	55.0	
Cases of B/L inguinal hernias with B/L presentation	Yes	7	8.0	5	38.5	12	12.0	0.002 (Sig)
	No	80	92.0	8	61.5	88	88.0	

herniae in children. He concluded that 17% of 497 boys and 2% of 498 girls had a hernia by 3 years of age, a total cumulative prevalence of 9.2%.

In our study which was conducted on 100 patients, we found that 47 patients reported from urban settings and 53 patients from rural areas. This might be ascertained to the fact that patients from urban areas prefer private setup facilities with respect to patients from rural areas who, are directly referred to the hospital. In a study done by Mohammad Iqbal Sheikh in the year 1997 in the Department of Surgery, SKIMS, Soura, Srinagar is was found that 54% of patients belonged to urban areas whereas 46% belonged to rural areas.

In our study, 55 patients with inguinal hernias presented on the right side, 33 patients with hernia on the left and 12 patients with bilateral hernias. JD Atwell in the year 1962[21] conducted a study on 159 children. Out of them 60.6% had right sided inguinal hernia, 24.4% had left sided and 15% had bilateral inguinal hernias.

In our study, 70 patients presented with swelling or bulge in the groin which was noticed either by the father or the mother or self. 6 patients had history of pain in the groin, as generally noticed by mother who stated that the child had restriction of movements on the involved side of the groin and cried on initiating of performing the movement. 27 patients had swelling in the scrotum. Allan B. Wolfson (2009)[22] did a study upon symptoms of paediatric inguinal hernia and concluded that most common symptom was a dull, aching pain and continuous discomfort at the involved groin site.

In our study, 27 patients had funicular or complete inguinal hernia, whereas 70 patients had incomplete partial inguinal hernia. Mc Laughlin and Kleager (1956)[23] have reported partial funicular type in 68% and complete funicular type in 32%. Silk Glove Sign was positive for 80.5% (i.e. 70 out of 87 male patients) and 53.2% (i.e. 7 out of 30 female patients).. In females the numbers may be less because the cord contains no structure. Hence it is concluded that silk glove sign is a good predictor of presence of patent processus vaginalis.

In the present study we did pneumoperitoneum insufflation test in 47 patients. Depending upon age and weight appropriate amount of air was introduced into the peritoneal cavity. In our study we have introduced air ranging from 900 to 1500ml. Objective assessment of intra-abdominal pressure was done by placing a hand on the abdomen. Bulow et al (1974)[24] carried out pneumoperitoneum insufflation test with 500 to 3000ml of air in children between 1-14 years of age. More than 8 out of 10 of his results were positive when air of around 1500ml was introduced. Although he had to use more than 3 litre of air in one patient.

As already stated we did pneumoperitoneum insufflation test in 47 patients out of which 21 patients had a positive result (44.1%) and the result was negative in 65.9% of patients. We have had somewhat similar positive results in studies done by Downey et al. (1995)[25], Singh et al. (1981)[26] and Keskin et al (1990)[27] of 39%, 29%, 37.6% and 25% respectively.

Out of the pneumoperitoneum insufflation tests done, 42 were males and 5 were females. The test was positive in 39.1% (17/43 males) and 100% positive females. Downey et al (1995)[25] had positive results in 36% males and 50% females. Powel (1985)[28] had positive results in 21% males and 32% females.

We did pneumoperitoneum insufflation test in 47 of right sided cases (left side was included in bilateral explorations as that belonged to high risk group for development of metachronous inguinal hernias). We found that a positive test result was confirmed on contralateral side in 21 cases (44.73%) and negative result on the contralateal side was found in 26 patients (55.38%). Similar results have been noted by Timberlake et al (1989)[29] as they reported a positive result in 25% of right sided hernias and 31% of left sided hernias. In 8 right sided unilaterally presenting hernias we did bilateral groin exploration as they were included under high risk for developing contralateral hernia.

We performed bilateral explorations in 53 patients. Out of them 12 had bilateral presentations at the onset, 8 had right sided hernias and the rest i.e. 33 had left sided unilaterally presenting hernias. The above

mentioned 8 right sided unilaterally presenting inguinal hernias were included in bilateral exploration group owing to the fact that ventriculo-peritoneal shunts, prematurity, intra-abdominal tumours, hydrocephalus and congenital anomalies are included in high risk group for patients developing contralateral hernias.

Excluding 12 bilaterally presenting hernia right from the time of onset, we have 41 bilateral explorations done with unilateral inguinal hernias, 8 for right sided inguinal hernias and 33 for left sided inguinal hernias. Among these 8 right sided inguinal hernias patent processus vaginalis on contralateral side were found in 5 (62.5%) of the 8 cases. In the remaining 33 cases of left sided inguinal hernias, patent processus vaginalis on the contralateral side was found to be present in 17 cases. The rest i.e. 16 cases had no patent processus vaginalis on the contralateral side.

Pneumoperitoneum insufflation test was positive on contralateral side i.e. left side in 21 patients and negative on contralateral side i.e. left side again in 26 patients. One thing is worth mentioning here, that left sided patients were not included as all left sided groin hernias were made to undergo bilateral groin exploration. Out of these 21 who were tested positive, all of them were converted into bilateral explorations, 5 were females and 16 were males. Out of the negatively tested patients, 26 were males and none was female.

In bilateral groin exploration done in 41 patients, 57% (among them 8 were right sided and the rest left sided) had bilateral groin hernias, 43% had only unilateral hernias.

Cases of bilateral inguinal hernias with unilateral presentation - 43, out of these 37 were males and 6 were females.

Cases of unilateral inguinal hernias with unilateral presentation 45, out of them 43 were males and 2 females. Cases of bilateral inguinal hernias with bilateral presentation was 12, out of them 7 were males and 5 were females.

Our study finally showed us, that among the 100 cases of paediatric age group herniae, that we studied 43 cases were true bilateral inguinal herniae with unilateral clinical presentation that accounts for 43%.

Similar results have been obtained by a study conducted by Taufique Ehsam M, Ng AT, Chung PH et al in 2009[30] were they studied 363 children with unilateral inguinal herniae. The result that they obtained was approximately 40% of the children had true unilateral inguinal herniae.

A study conducted in the year 1998 by D. M. Miltenburg, JG Nuchtern, Jaksic et al.[31] included 964 children. A true unilateral inguinal hernia was found in 60.8% of patients.

In our study 45% patients had true bilateral inguinal herniae with unilateral clinical presentation. A similar results were obtained by Toufique Ehsam et al. in the year 2009[30] were 60.3% of patients had true bilateral inguinal herniae with unilateral presentation. DM Miltenburg et al. in 1998[31] also concluded in his study a presentation of 38.9% true bilateral inguinal herniae with unilateral presentation.

In our study group, out of 100 paediatric patients 12% consisted of bilateral inguinal herniae at the onset, i.e. at the time of initial visit to the surgeon. Similar studied and results were obtained in studies conducted by Ein SH, Njere I, Ein A et al.[32] and JD Atwell (1962)[21]. Percentage of bilateral inguinal herniae with bilateral presentation in the two studies was 12% and 15% respectively.

In our study, we finally concluded that among the 100 cases studied, we had 3 (3%) recurrence in a follow up period of one year. Similar results were obtained in one study conducted by S. Javad, Nassiri et al in the year 2002[33] were patients were operated (6 year period) for unilateral inguinal herniae, they were then followed up for 4-10 years annually (annually evaluated). 3.6% developed recurrences on the contralateral side.

In the study that we undertook, among 100 paediatric patients we had a total of 12 patients with congenital anomalies (omphalocele, hypospadias, intra-abdominal tumours, hydrocephalus etc.), 7 had bilateral inguinal herniae at the onset. A study done by Chamberlain SA, Kirsh AJ, Thall EH et al. in the year 1995[34] concluded that the recurrence of inguinal hernie is

increased in premature infants. Another study done by Lau S, Lee Y, Caty M (2007)[35] and Brisson P, Patel H, Feins NJ (999)[36] concluded that likelihood of developing contralateral hernia in unilateral cases is 8-15%, somewhat similar to the results obtained in the present study.

In the presents study conducted in 100 paediatric patients the complications that we encountered were, one male patients had potoperative bleeding, 6 male and one female patient had generalized sepsis. In a study conducted by Thomas E. Simpson, Gunnar H Gunnlaugsson et al.[37] the complication rate of inguinal surgeries in children was evaluated. One staphylococcal wound infection and reoperation through scrotum to remove large amounts of oedematous fibrous tissue was encountered. .

CONCLUSION :

We conclude, that the maximum number of patients are diagnosted in the age group of <3 years. Children with bilateral inguinal herniae are associated with an increased percentage of congenital anomalies, like intra-abdominal tumours, ventriculoperitoneal shunts, hydrocephalus, prematurity etc. Right sided inguinal herniae are more common overall, but left sided herniae should be considered as a high risk for bilateral exploration of the groin. In right sided herniae with congenital anomalies, a high suspicion of occult contralateral hernia should always be kept in mind. Silk glove sign and diagnostic pneumoperitoneum insufflations test are good predictors for detecting pre and per-operative contralateral occult groin herniae. Laparoscopy is a very useful diagnostic as well as therapeutic tool for managing bilateral inguinal herniae with unilateral presentation. Weighing the complications with respect to its advantages or rather pros and cons of bilateral versus unilateral exploration, definitely bilateral exploration should be considered in high risk groups. left sided hernie, children with intra-abdominal tumours, ventriculo-peritnoneal shunts, hydrocephalus, premature babies should be considered for a bilateral exploration. The point worth noting is that, the earlier the surgical repair the better it is. It will definitely spare the parents to undergo the same exhaustion of the surgery again and it will spare the child to undergo the same physical and mental trauma repeatedly – for no fault of his. As for the surgeon – it will definitely save him from being embarrassed again and again.

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