

PEDIATRIC INGUINAL HERNIA IN BASRAH**Sadik H Kadhem***, **Haithem H Ali[#]** & **Haider A Jassim[@]***[#].[@]MB,ChB, FICMS Pediatric Surgeons, Basrah Children Specialty Hospital, Basrah, IRAQ.**Abstract**

Inguinal hernia repair is one of the most frequently performed surgical procedure in pediatric patients. An inguinal hernia does not resolve spontaneously and must be repaired because of high risk of complications. The aim of this study is to determine epidemiologic index and complications of inguinal hernia in pediatric patients.

This retrospective study was carried out in the Basrah Children Hospital. All patients who underwent surgeries for inguinal hernia from 2012 to 2014 were included in this study. Their hospital records were reviewed for age, sex, side of the hernia, presentation, wound infection, recurrence, and other complications.

In this study, 877 children were included. 766 (87.3%) were boys and 111 (12.7%) were girls. Most common age of presentation is between 6 months to 6 years which compromise 54.6%. Right-side and left-side inguinal hernia was observed in 531 (60.5%) and 276 (31.5%) cases, respectively. Bilateral inguinal hernia was observed in 70 (8%) cases. One hundred forty eight (16.9%) children presented as emergencies with irreducible hernia. Emergency presentation was more in male gender and more in the first 6 months of life. Postoperative complication rate for elective was 3.2% and for emergency groups was 51.7%.

In conclusion, most of the hernias involved male patients. Postoperative complications were observed in 51.7% of the emergency cases, so inguinal hernia in children should be operated as early as possible to avoid incarceration and to decrease post-operative complications.

Introduction

Inguinal hernia repair represents one of the most common operations performed in children^{1,2}. The presence of an inguinal hernia in a child is an indication for surgical repair¹⁻⁴. Pediatric inguinal hernia is a result of a congenital patent processus vaginalis (PPV) as a direct consequence of normal events in fetal development.

Inguinal hernia is present in 0.8-4.4% of all children². In preterm infants, the incidence may be as high as 30%⁵. About one third of children with Inguinal Hernia are younger than 6 months, and males are affected about six times more often than females⁵, and even more often in premature baby⁶. The right side is involved in 60% and the left in 30% of patients; bilateral hernias are seen in 10%⁵. ultrasonography can be used routinely in the preoperative diagnosis of inguinal hernia in children, PPV values higher than 4mm, indicate hernia with high accuracy rate⁶.

Incarceration complicates 7-30% of inguinal hernias and occurs most often during the first six months of life, this is due to a smaller internal ring and inguinal canal which easily traps the herniating loops of bowel^{4,7-9}. The incidence of bowel infarction requiring resection is quite low, ranging from 0 to 1.4%¹⁰. In order to prevent strangulation of viscera trapped in the defect, management of inguinal hernias in pediatrics is straightforward and surgery is necessary and should not be postponed¹¹.

Conventional operation for pediatric inguinal hernia involves the use of a skin crease incision over the groin to dissect out the sac, taking care not to injure the adjacent important structures, namely the vas deferens and testicular vessels. The sac is then divided and the proximal end transfixed¹¹.

Laparoscopic inguinal hernia repair in pediatric patient is often considered

controversial but as surgeon gains experience it has been proved to be feasible, safe and reliable technique¹².

Recurrence, injury to the vas deferens, wound infection, and postoperative hydrocele are recognized complications associated with Inguinal Hernia repair but occur with a frequency of less than 1%.5 Most recurrences occur two years after the initial surgery¹³.

Aim of the study

1. The aim of this study was to determine epidemiologic indexes and complications of inguinal hernia in pediatric patients.
2. To know the role of early surgical repair of inguinal hernia in children in decreasing preoperative and postoperative complications.

Patients and method

All patients less than 15 years of age who were operated during 2012-2014 with a diagnosis of inguinal hernia were included in this study. The place of study was the Basrah Children Hospital, pediatric

surgery department: a referral center for pediatric surgery having seven pediatric surgeons. Their hospital records up to 2015 were reviewed for age, gender, side of hernia, mode of presentation, wound infection, recurrence, and other complications. After surgery, patients were visited in the first week. Parents were requested to visit the hospital if there were complications such as wound infection, pain and swelling.

Patients were divided into three groups according to their age: up to 6 months, 6 months to 6 years and 6 to 15 years.

Statistical data analysis was done using SPSS software version 20

Results

A total of 912 patients were recruited into the study. Thirty five patients including 30 male and 5 female patients missed some days in their follow-up were excluded from the final analysis, therefore total 877 patients were conducted in this study,

Of 877 patients, 766 (87.3%) were boys and 111 (12.7%) were girls. Table (I)

Table I: Gender distribution of inguinal hernia in children

Sex	Frequency	Percent
Male	766	87.3 %
Female	111	12.7 %
Total	877	100 %

Of these patients, 388 (38.5%) were less than 6-month old, 479 (54.6%) were 6-month to 6-year old, and 60 (6.8%) were 6-12 years old. Table (II).

Table II: Age distribution of inguinal hernia in children

Age	Frequency	Percent
up to 6 months	338	38.5%
6 months - 6 years	479	54.6%
6 - 15 years	60	6.8%
Total	877	100%

Regarding the side of the hernia; 531 (60.5%) have right sided inguinal hernias, 276 (31.5%) have left sided and 70 (8%) have bilateral inguinal hernia. Table (III)

Table III: Side of inguinal hernia

Side	Frequency	Percent
Right	531	60.5%
Left	276	31.5%
Bilateral	70	8.0%
Total	877	100%

Seven hundreds twenty nine (83.1%) children presented as an elective cases. One hundred forty eight (16.9%) children presented as emergencies with irreducible hernia, of which 52 (35.1%) patients underwent emergency herniotomies while the remaining 96 (64.9%) patients could be treated with conservative measures at the time of admission followed by operative repair as an elective operation as demonstrated in table IV.

Table IV: Presentation of inguinal hernia in children

Presentation	Frequency	Percent
Elective	729	83.1 %
Emergency	148	16.9 %
Total	877	100 %

Emergency presentation (incarceration) occurred in 145 (18.9%) boys and in 3 (2.7%) girls as in table V.

Table V: Presentation of inguinal hernia according to sex

Sex	Presentation		Total
	Elective	Emergency	
Male	621 (81.1%)	145 (18.9.5%)	766
Female	108 (97.3%)	3 (2.7%)	111
Total	729	148	877

Overall incidence of incarceration was 16.9%, and according to age group the incidence was as the following: in the 1st group (up to 6 months) 19.5%, second group (6 months-6 years) 16.1%, third group (6-15 years) 8.3% as in table VI.

Table VI: Presentation of inguinal hernia according to age group

Age	Presentation		Total
	Elective	Emergency	
up to 6 months	272 (80.5%)	66 (19.5%)	338
6 months - 6 years	402 (83.9%)	77 (16.1%)	479
6 - 15 years	55 (91.7%)	5 (8.3%)	60
Total	729 (83.1 %)	148 (16.9%)	877

In relation to patient's presentation, the rate of post-operative complications was 3.2% of elective cases (27 out of 825): hematoma 15 (1.8%), superficial infection 11 (1.3%); recurrence 1 (0.1%) within one year after surgery, while in emergency cases; the rate of postoperative complication was 51.7% (27 out of 52): hematoma 8 (15.3%), superficial infection 12 (23%); deep infection 3 (5.7%); testicular atrophy 2 (3.8%); recurrence 2 (3.8%) Table (VII)

Table VII: Postoperative complications in elective and emergency operations

Complications	Elective N=825		Emergency N=52	
	No.	%	No.	%
Hematoma	15	1.8%	8	15.3%
Superficial infection	11	1.3 %	12	23 %
Deep infection	00	00 %	3	5.7 %
Testicular atrophy	00	00%	2	3.8%
Recurrence	1	0.12 %	2	3.8 %
Total	27	3.2 %	27	51.7 % P value < 0.05

Discussion

The inguinal hernia is one of the most frequently performed surgical procedures in pediatric patients. An inguinal hernia does not resolved spontaneously and must be repaired because of high risk of strangulation or incarceration.

In our study, 87.3% of the patients were boys. In a study by Nassiri¹⁴ on 521 infants and children, 89.4% of the patients were boys.

In our study, 338 (38.5%) patient were up to 6 months old. In the Kalantari et al study¹⁵ in Iran, the percent of inguinal hernia cases in the (up to 6 months) age group is 40.9% which is nearly similar to our study. This percent is much higher than that mentioned by Snyder which is 15%, racial difference may be the cause.

The occurrence of inguinal hernia in early infancy should raise the attention of parents, pediatricians and surgeons about this common and easily managed condition if treated at earlier time i.e. before incarceration, obstruction or strangulation.

In this study, 531 patients (60.5%) had right-side and 276 (31.5%) had left-side

inguinal hernia. Bilateral inguinal hernia was observed in 70 (8%) cases. Omar and colleagues studied 827 children operated for inguinal hernia between 1998 and 2002 in Libya, of their cases, 60.1% had right-side involvement, (35.3%) had left-side involvement and (4.6%) had bilateral involvement¹⁶. The findings in both studies are nearly, similar but bilateral inguinal hernia is slightly higher in our study.

In our study, bilateral involvement was observed in 8.6% of the male patients and 3.6% of the female patients. In Askarpour et al study, bilateral involvement was observed in 12.2% of the male patients and 37.5% of the female patients¹⁷.

Most of the bilateral inguinal hernia was reported in infants less than 6 months old (13.6%), while in Tackett et al study, bilateral inguinal hernia was significantly more common in young children (33.8%) if <6 months¹⁸.

Overall incidence of incarceration was 16.9%, and it occurred more commonly in children (under 6 months old) (66 out of 272) (19.5%). In Puri p et al study¹⁹,

12% of all children (under 12 years old) with inguinal hernia had incarceration, and 30% of children (under one year old) with inguinal hernia had incarceration. The overall incarceration risk is higher in our study than in Puri *et al* study, may be because of long waiting list with the delay in surgery about 2 to 3 months after diagnosis. The study by Vogels and colleagues comprised 2471 herniotomies in 1786 boys; there were 17 recurrences, with an overall incidence of 0.69%²⁰. In the study by Yeung *et al*²¹ on 262 outpatients who underwent inguinal herniotomy, hernia recurrence occurred after eight herniotomies (3.1%). In our study, three (0.34%) patients showed recurrence two of them were after emergency herniotomies. The inguinal hernia recurrence rate in our study was lower than in other studies.

Post-operative complications occurred in 27 (1.5%) after 825 elective herniotomies and in 27 (32.4%) after 52 emergency herniotomies, *p* value is 0.02 (This result is significant at *p*<0.05); this means that the numbers of complications are increased highly in the emergency cases, which necessitates the early management of inguinal hernia.

Conclusion

Most of the cases involved male patients. Postoperative complications were observed in 51.7% of the emergency cases, so inguinal hernia in children should be operated as early as possible to avoid incarceration and to decrease post-operative complications. This needs an increase in population, pediatrician, parents, and surgeon awareness.

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