

Prevalence of Sliding Inguinal Hernia in Females Infants and Children

Habeeb Ali Yaseen¹, Haitham Qaddoori Hussein², Adel Khdair Abbas³

Arabic Board of general surgery, M. B. Ch. B. C. A. B. S, Department of general surgery, Al-Kadhmain
Medical City, Baghdad, Iraq¹

Iraqi Board of general surgery, M. B. Ch. B. F. I. C. M. S, Department of general surgery, Al-Kadhmain
Medical City, Baghdad, Iraq^{2,3}



Keywords:

Inguinal hernia, incarceration,
strangulation, infants

ABSTRACT

Inguinal hernia is the commonest congenital defect found in infancy and child hood, which requires surgical treatment. Surgical literature contains little comment about sliding hernia in females infants and children, that containing the ovary with or without fallopian tube. A retrospective study, in an attempt to establish the real prevalence of the sliding inguinal hernia in female's infants and children, which contains the ovary with or without fallopian tube, in our experience in Iraq. 639 infants and children underwent surgery for inguinal hernia in the department of pediatric surgery of Al-Kadhmain pediatric hospital, from the first of January 2015 to the end of December 2017. Of those patients, 109 were female infants and girls with age ranging from 21 days to 12 years old. A total of 639 patients, infants and children (530 male 82.9% and 109 female 17.1%) were included in this study with female to male ratio was (1:4.8). For the (109) females, the age ranged from 21 days to 12 years. The incidence was higher in the right side than left (66% right, 24.8% left, 9.2% bilateral). The highest incidence was during infancy [32 females (29.3%)]. 6 out of 109 patients (5.5%) were underwent emergency surgery for incarceration, all were infants less than one year. About 20.2% (22 out of 109 patients) females were infants less than one year old and they had sliding inguinal hernia and the sac contains ovary with or without fallopian tube, and one of these cases had strangulated gangrenous ovary that need oophorectomy. Only one patient (0.9%) had hydrocele of canal of nuck. In 86 patients out of 109 patients (78.9%), the content of the sac were abdominal and pelvic viscera which reduced before or during anesthesia. All cases are treated surgically under GA by high ligation of the sac. Sliding inguinal hernia in female's infants and children is not a rare condition. About one fifth of inguinal hernia in female in this age group is sliding hernia containing ovary with high incidence in infants. It may be incarcerated and strangulated and early surgery is preferable to avoid serious complications. We suggest performing many other studies in different centers to validate these facts.



This work is licensed under a Creative Commons Attribution Non-Commercial 4.0 International License.

1. Introduction

Inguinal hernia is the commonest congenital defect found in infancy and child hood, which requires surgical treatment [1- 4]. Persistence of all or part of the embryonic processus vaginalis, in females called canal of nuck, which is a peritoneal fold that traverses the inguinal canal which cause indirect inguinal hernia or hydrocele. According to the most standard textbooks, the round ligament of the uterus terminates at the labium majorum, while the ligament did not end at the labium majorum, but terminated in the hernia sac and attached to the mid portion of the fallopian tube near the ovary. These findings suggest that the ligament which runs along the hernia sac is the suspensory ligament of the ovary [5].

The incidence of inguinal hernia varies with gestational age ranging from 9 – 11% in preterm infants to 3.5 – 5% in full term babies. It proposed that causes of increased abdominal pressure in healthy neonates are important causes of herniation during a critical period of inguinal development [6]. Inguinal hernia is more common in males than females [1], [7- 13] and has definite familial tendency and children who received ventriculoperitoneal shunts more likely to have Inguinal hernia [14]. It is more frequently on right side as result of delayed obliteration of the processus vaginalis [7].

Bilateral presentation was more common in the premature infants [10], [15], [16] and low birth weight infants [9]. The incidence of metachronous contralateral Inguinal hernia is more in female than male infants and children, and left sided Inguinal hernia had significantly higher risk of developing metachronous contralateral Inguinal hernia than those with right sided hernia, 10.2% versus 6.3% respectively [17].

The major risk factors are occurrence of incarceration which is preventable (18) and possible strangulation of the bowel or other viscera, therefore, the incarceration was the major management problem (19). The rate of incarceration is significantly higher in premature infants and babies in the first year of life (31%) compared with the general pediatric age group (12 – 15%) [7], [20- 22]. Bowel obstruction, intestinal gangrene and gonadal infarction which may requiring resection occur more commonly in the first 6 month of life as a result of incarceration [7], [22]. It is safely possible to reduce an incarcerated hernia by gentle taxis and was successful in 96% [23] and convert an emergent problem that requires an immediate operation to an elective procedure [2], [19], [20], then the patients have the operative repair within 5 days after reduction [24].

The post-operative complication rate is more than 20% of incarcerated cases as compared with 1-2% in elective procedures [20], [22], [25]. The recurrence rate is significantly high with incarceration [26]. The best time to repair an Inguinal hernia in infancy is shortly after making the diagnosis as semi elective within 7 to 14 days [27], [28] and the repair can be carried out safely in the first 2 months of life [23]. More than one approach may be effective in managing problems associated with inguinal hernia and that rigid policies are unwarranted [29]. Most infants can be successfully managed by high suture ligation of the indirect hernial sac at the level of the internal ring and we may need to reinforce the floor of the inguinal canal according to the weakness of the floor and enlargement of the internal ring [30]. Routine contralateral exploration is not indicated only under control circumstances and when an opposite side hernia developed [8], [31- 33].

Laparoscopic repair is safe and effective and reliable [11- 13], [34]. Female may have sliding hernia containing the ovary with or without fallopian tube, and reported cases with uterus [1], [35- 40] and those should be repaired promptly as there is a risk of ovarian torsion in the Inguinal canal [36], [38]. There is no standard procedure exists to correct sliding hernias containing the ovary or fallopian tube although as many as 20% of hernias in girls are of this type [35]. In females, the sac may present as hydrocele containing fluid

only with small communication with the peritoneal cavity (hydrocele of the canal of nuck) and present as irreducible swelling in the inguinal region. This condition needs high ligation of the sac.

2. Materials and Methods

A retrospective study on 639 infants and children, underwent surgery for inguinal hernia at the department of pediatric surgery of Al-Kadhmia pediatric hospital from the period of first of January 2015 to the end of December of the 2017, were included in this study. Of those patients, 109 were females aged from 21 days to 12 years old. All patients were operated on under general anesthesia with high suture ligation of the sac at the level of deep inguinal ring. All patients' case sheets and operative records were reviewed in details.

3. Results

The total number of the patients were 639 infants and children, 109 were females and 530 were males with sex ratio female to male is 1:4.8.

For the 109 female's patients, the age ranged from 21 days to 12 years, all with inguinal hernia. the incidence was higher in the right side than left with right to left ratio 2.6:1 [72 patients had right sided hernia (66%), 27 patients had left sided hernia left (24.8%) and 10 patients had bilateral hernia (9.2%). (Table 1)

Table 1: distribution of the 109 females infant and children with inguinal hernia according to the side of the hernia

Side of the hernia	Females No %	
Right side	72	66%
Left side	27	24.8%
Bilateral	10	9.2%
total	109	

The highest incidence of inguinal hernia was during first year of life [32 out of 109 females (29.3%)] with gradual decreasing incidence in the early and late childhood (table 2).

Table (2) distribution of the 109 females infant and children with inguinal hernia according to age of the patients

Age in year	Females No %	
1	32	29.3%
2	6	5.5%
3	17	15.5%
4	13	11.9%
5	13	11.9%
6	7	6.4%
7	7	6.4%
8	5	4.5%
9	2	1.8%
10	4	3.6%
11	1	0.9%
12	2	1.8%

Total	109
--------------	-----

6 out of 109 (5.5%) females underwent emergency surgery for incarceration, all were infants less than one year old. 22 out of 109 females (20.2%) had sliding hernia and the sac contains ovary with or without fallopian tube, all are infants less than one year old. Only one of the 22 cases (4.5%) had incarcerated hernia and the ovary was strangulated and gangrenous and oophorectomy was performed. only one of 109 patients (0.9%) had hydrocele of the canal of nuck and the sac containing fluid only with narrow communication to the peritoneal cavity. The remaining 86 out of 109 patients (78.9%) had inguinal hernias with sac containing abdominal and pelvic viscera that reduced spontaneously or manually before or during anesthesia and they were treated surgically under GA by high ligation of the sac (Table 3).

Table (3) distribution of the 109 females infant and children with inguinal hernia according to reducibility and contents of the sac

reducibility and contents	Patients No. %	
Hernia with reduced viscera	86	78.9%
Sliding hernia contain ovaries	22	20.2%
hydrocele of the canal of nuck contain fluid only	1	0.9%
Total	109	

4. Discussion

Inguinal hernia repair is the commonest operation performed by pediatric surgeons [17]. Inguinal hernia in infant and children is less common in female than male is a fact that documented in all the studies all over the world. One of these studies from Canada in which 35 years review of more than six thousands pediatric hernia show that female to male ratio 1: 5 [8] which is similar to the ratio in our study. The literature states that the incidence of the hernia is higher on the right side (59%) than left side (29%) with bilateral hernia 12% [8].

These results were comparable to those results in our study (66% right, 24.8% left and 9.2% bilateral). The reports on the age incidence states that 25% of the cases presented in the first 2 years of life [1] and in our study 29.3% were infants less than one year old, then the incidence decrease gradually in the early and late childhood. This difference is due to consultation of the general hospital by many poorly educated and low socioeconomic families in the late childhood and sometime even in the early childhood and forgetting the pediatric hospitals, therefore the general hospital received children with inguinal hernia which decreases the percentage of the early and late childhood patients.

Incarceration was the major management problem [19]. In various studies, incarceration have been reported in 85 of the 908 children (9.3%), and 85% of those patients with incarceration were infants less than one year age [18] and in other series 13% developed incarceration prior to elective repair [27]. In the current study, 6 out of 109 females patients (5.5%) underwent emergency surgery for incarceration due to failure of taxis, all were infants less than one year old. However, this low percentage of incarceration in our study was due to the fact that many cases were reduced by taxis in the outpatient clinic and incarcerated cases were only that underwent emergency surgery due to failure of taxis.

One of the literature states that as many as 20% of hernias in girls are sliding hernia [35], which similar to the current study. In other series, 32 out of 580 females with inguinal hernia presented with asymptomatic

palpable movable mass on the labium major, 26 from 32 had sliding hernia aged from one month to 18 months containing both the ovary and fallopian tube and 6 from 32 were hydrocele of the canal of nuck aged 2 years to 6 years [35]. These results go directly or indirectly with this study. In other series, less than 10% of irreducible hernia in females were more than 12 months old and 82% of irreducible hernia contained ovaries [36], while in our study we had no patient was more than 12 months. 27% of irreducible ovaries were twisted and infracted, while strangulated ovaries have been reported in 2% to 33% of other series [38] while in our study 4.5% had gangrenous ovary and only one out of 109 (0.9%) females infants and children with inguinal hernia were hydrocele of the canal of nuck aged 2 years.

5. Conclusions

Sliding inguinal hernia in female's infants and children is not a rare condition. About one fifth of inguinal hernia in female in this age group is sliding hernia containing ovary with high incidence in infants. It may be incarcerated and strangulated and early surgery is preferable to avoid serious complications. We suggest performing many other studies in different centers to validate these facts.

6. References

- [1] Atwell JD. Inguinal hernia in female infants and children. British journal of surgery volume 50. Issue 220. pages. 294-297. November 1962.
- [2] Grosfeld JL. Current concepts in inguinal hernia in infant and children : world . J. surg. 1989; 13(5): 506.
- [3] Kapur P, Caty MG, Glick PL. Pediatric hernia and hydrocele. Pediatric. Clin, north. AM. 1998: 45(4) : 773.
- [4] Skoog SJ, Conlin MJ : Pediatric hernia and hydroceles. the Urologist's perspective. UrolClin North Am. 1995; 22(1): 119.
- [5] Ando H, Kaneko K, Ito F, Seo T, Ito T. Anatomy of the round ligament in female infants and children with an inguinal hernia. Br J Surg. 1997; 84(3):404.
- [6] Powell TG, Hallows JA, Cooke RW, Pharoah PO. why do so many small infants develop an inguinal hernia, Arch Dis child 1986; (61): 991-995.
- [7] Rescorla FJ, Grosfeld JL. Inguinal hernia repair in the perinatal period and early infancy. J pediatr Surg. 1984; 19(6): 832.
- [8] Ein SH, Njere I, Ein A. Six thousand three hundred sixty –one pediatric inguinal hernias: a35-year review: J Pedia Surg. 2006; 41(5): 980-986.
- [9] Rajput A, Gauderer MW, Hack M. Inguinal hernias in very low birth weight infants: incidence and timing of repair. J Pediatr Surg. 1992 Oct;27(10):1322-4.
- [10] Misra D, Hewitt G, Potts SR, Brown S, Boston VE. Inguinal herniotomy in young infants, with emphasis on premature neonates. J Pediatr surg . 1994; 29(11): 1496.
- [11] Spurbeck WW, Prasad R, Lobe TE. Two-year experience with minimally invasive herniorrhaphy in

children. *Surg Endosc.* 2005; 19(4): 551.

[12] Schier F. Laparoscopic inguinal hernia repair-a prospective personal series of 542 children. *J Pediatr surg.* 2006; 41(6): 108.

[13] Takehara H, Yakabe S, Kameoka K. Laparoscopic percutaneous extraperitoneal closure for inguinal hernia in children: clinical outcome of 972 repairs done in 3 pediatric surgical institutions. *J Pediatr Surg.* 2006; 41(12): 1999.

[14] Chen YC, Wu JC, Liu L, Chen TJ, Huang WC, Cheng H. Correlation between ventriculoperitoneal shunts and inguinal hernias in children: an 8-year follow-up. *Pediatrics.* 2011; 128 (1): e 121.

[15] Peevy KJ, Speed FA, Hoff CJ. Epidemiology of inguinal hernia in preterm neonates. *Pediatrics.* 1986; 77(2): 246.

[16] Harper RG, Garcia A, Sia C. Inguinal hernia: a common problem of premature infants weighing 1,000 grams or less at birth. *Pediatrics.* 1975;56(1):112.

[17] Ron O, Eaton S, Pierro A. Systematic review of the risk of developing amechronous controlateral inguinal hernia in children. *Br J Surg.* 2007; 94(7): 804-811.

[18] Stylianos S, Jacir NN, Harris BH: incarceration of inguinal hernia in infants prior to elective repair. *J Pediatr Surg.* 1993; 28(4): 582.

[19] Tam PKH, Tsang TM, Saing H. Inguinal hernia in Chinese children: AUST. *N.Z.J.Surg.* 1988; 58(5): 403-406.

[20] Grosfeld JL. Groin hernia in infants and children. in gyhus,L.M, and Condon , R. E (eds):*hernia .philadelphia, J.B. Lippincott, 1989, p81.*

[21] Puri P, Guiney EJ, O Donnell B. Inguinal hernia in infants: the fate of the testes following incarceration. *J. pediatr. surg.* 1984; 19: 44.

[22] Rowe MI, Clatworthy HW. Incarcerated and strangulated hernias in children. *Arch. Surg.* 1970; 101: 136.

[23] Moos RL, Hatch El, Jr : inguinal hernia repair in early infancy .*Am J surg* 1991; 161(5): 596 -599.

[24] Gahukamble DB, Khamage AS. Early versus delayed repair of reduced incarcerated inguinal hernias in the pediatric population. *J Pediatr Surg.* 1996; 31(9): 1218.

[25] Davies N, Najmaldin A, Burge DM. Irreducible inguinal hernia in children below two years of age. *Br J Surg.* 1990; 77(11): 1291.

[26] Steinau G, Treutner KH, Feeken G, Schumpelick V. Recurrent inguinal hernias in infants and children. *World J Surg.* 1995 Mar-Apr; 19(2): 303-6.

- [27] Stephens BJ, Rice WT, Koucky CJ, Gruenberg JC: Optimal timing of elective indirect inguinal hernia repair in healthy children: clinical considerations for improved outcome. *World J Surg.* 1992; 16(5): 952.
- [28] Zamakhshary M, To T, Guan J, Langer JC. Risk of incarceration of inguinal hernia among infants and young children awaiting elective surgery. *CMAJ.* 2008; 179(10): 1001.
- [29] Rowe MI, Marchildon MB. Inguinal hernia and hydrocele in infants and children. *SurgClin North Am.* 1981; 61(5): 1137.
- [30] Othersen HB. The pediatric inguinal hernia. *SurgClin North Am.* 1993; 73(4): 853.
- [31] Rathausser F. Historical over view of the bilateral approach to pediatric inguinal hernias. *American.J Surgery.* 1985; 150(5): 527-532.
- [32] Kalantari M, Shirgir S, Ahmadi J, Zanjani T, Soltani AA. Inguinal hernia and occuranc on the other side: a prospective analysis in Iran. *Hernia.* 2009; 13: 41-43.
- [33] Erdogan D, Karaman I, Aslan MK, Karaman A,et al. Analysis of 3776 pediatric inguinal hernia and hydrocele in a tertiary center. *Journal of pediatric surgery.* 2013; 48(8): 1767-1772.
- [34] Kaya M, Hückstedt T, Schier F. Laparoscopic approach to incarcerated inguinal hernia in children. *J Pediatr Surg.* 2006; 41(3): 567.
- [35] Huang CS, Luo CC, Chao HC, Chu SM, Yu YJ, Yen JB. The presentation of asymptomatic palpable movable mass in female inguinal hernia. *Eur J Pediatr.* 2003 Jul;162(7-8):493-495
- [36] Merriman TE, Auldish AW. Springer-Verlag 2000: Ovarian torsion in inguinal hernias: *Pediatr Surg Int.* 2000; 16: 383-385.
- [37] Goldstein R, Potts WJ. Inguinal hernia in female infants and children. *ann.surg.*1958; 148(5): 819-822.
- [38] Boley SJ, Cahn D, Lauer T, Weinberg G, Kleinhaus S. The irreducible ovary: a true emergency. *J Pediatr Surg.* 1991 Sep;26(9):1035-8.
- [39] Oudesluys-Murphy AM, Teng HT, Boxma H. Spontaneous regression of clinical inguinal hernias in preterm female infants. *J Pediatr Surg.* 2000 Aug; 35(8):1220-1.
- [40] ARNHEIM EE, LINDER JM. Inguinal hernia of the pelvic viscera in female infants. *Am J Surg.* 1956 Sep;92(3):436-40.