

ORIGINAL ARTICLE

# One surgeon experiences in childhood inguinal hernias

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**Purpose:** In this manuscript we report one pediatric surgeon's experience in childhood inguinal hernia repair. **Methods:** From 2005 to 2008, 402 children with inguinal hernias were operated on by one surgeon. A retrospective survey of their charts was carried out to evaluate the demographics and clinical aspects of these patients. **Results:** The ages ranged from 20 days to 16 years with a male-to-female ratio of 2.5:1. 64.9% right, 27.1% left, and 7.9% bilateral hernias. Hydroceles were present in 6.2% associated hernias. Incarceration occurred in 8.7% of children. An opposite-side hernia developed in 5.7%. 5.3 percent of patients with a hernia repair on the right side later developed a hernia on the left side, and 8.2% of patients with a hernia repair on the left side later developed one on the right side. 4.5 percent of all male patients in this series and 8.6% of female patients developed an opposite-side hernia. While overall recurrence rate was 1.2%, our recurrence rate was 0.25%. There was a 0.24% wound infection rate, and 1 (0.24%) testicle was atrophic at follow-up. **Conclusion:** In this study, in the recurrence of childhood hernia, the general surgeon's intervention was the prominent cause. It is suggested by the study that inguinal hernias on the contralateral side becomes symptomatic within the first six months following initial operation. Therefore, close observation is needed in that time.

**Key Words:** Pediatric inguinal hernia

## INTRODUCTION

Inguinal hernia is the most common indication for surgery in the paediatric age group and the incidence of inguinal hernia in those younger than 18 years old varies from 0.8 to 4.4% [1]. It is believed that these hernias rarely go away, and therefore, virtually all should be repaired. Much has been written about this condition, but controversy on its different aspects still exist [2]. The present study was done to convey the experiences of a pediatric surgeon on childhood inguinal hernia.

## METHODS

From January 2005 to August 2008, 402 infants and children with inguinal hernias were seen, examined, and operated on by one pediatric surgeon. The hernias in this series did not include ones usually found with undescended testes, although some boys did require an orchidopexy with their hernia repair. The operative repair (all under general anesthesia) was the same throughout the series: skin crease incision, modified Ferguson repair, absorbable sutures, external oblique and ring opening, high suture ligation of twisted sac doubly tied, and as much of the distal

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sac/hydrocele as safely possible removed [3]. Almost all hernia repairs were done as outpatient. All of the patients were followed postoperatively by the same author at postoperative month 1 and 6.

A retrospective review of their records was done. The variables evaluated were age, sex, type of inguinal hernia, presence of an associated hydrocele and/or cord lipoma, side of hernia, incarceration, obstruction, strangulation, occurrence of opposite-side hernia, recurrence, and other associated complications and conditions.

## RESULTS

The ages of the infants and children at the time of operation ranged from 20 days to 16 years. There were 287 (71.4%) males and 115 (28.6%) females (ratio, 2.5:1) with 64.9% right, 27.1% left, and 7.9% bilateral inguinal hernias. Premature (<36 weeks) with hernias totaled 17 (4.28%); 12 were males and 5 were females; 64.7% had hernias on the right side, 23.5% on the left, and 11.7% had bilateral hernias. The hernias were on the left side in 31% of boys and 17% of girls, whereas bilaterality was present in 6.9% of boys as opposed to 10.4% of girls.

Preterm baby hernias were operated on after the 48th to 50th post conceptual week and incarceration did not occur in any during the waiting periods. There were 12 (3%) teenagers from 13 to 18 years, 8 boys and 4 girls; 66.6% of the hernias were on the right, 25% on the left, and 8.4% were bilateral. Indirect inguinal hernias totaled 99.75%, whereas only one case was direct inguinal hernia, which was repaired by Bassini procedure.

Incarceration occurred in 8.7% of infants and children (71.4% boys, 28.6% girls, with 80% right, 17% left, and 3% bilateral). The incarceration rate was 8.7% for boys and 8.6% for girls. Mean age at incarceration was 14 months compared with the overall mean of 4.6 years.

No emergency surgical intervention was required in incarcerated cases, all of which were operated on electively after 3 to 5 days following manual reduction.

There were 5 (1.2%) recurrences, of which 100% were males. The initial hernia operation of 4 of these recurrences were done by a general surgeon. However, she re-

paired all of the recurrences. The mean age of the recurrence was 8 years compared with the overall mean, 3.6 years. Of these recurrences, 4 were on the right, 1 on the left. The recurrences occurred in 1.5% of all right-sided hernias and in 0.96% of all the left-sided hernias. Only one recurrent case was operated on in a patient younger than 1 year of age, whereas the remaining 4 cases were older than 10 years. The common feature of 4 of the recurrent cases were operated on by general surgeons. In this series of patients, the recurrence rate of 1.2% decreased to 0.25% (1 patient) when only the cases initially operated on by the pediatric surgeon is considered. In four cases (80%) the recurrences occurred within 1 year of the original hernia repair and in the remaining 1 case within 1 month.

Opposite-side repair is needed in 23 patients after initial operations done on the right side in 14 and on the left side in 9 patients between 1 to 6 months. 5.3 percent of patients with a hernia repair on the right side later developed a hernia on the left side, and 8.2% of patients with a hernia repair on the left side later developed one on the right side. 4.5 percent of all male patients in this series and 8.6% of female patients developed an opposite-side hernia within six months.

Hydroceles were present in 6.2% (n = 25) associated hernias. Most (72%) of the hydroceles were right-sided, 20% left-sided, and 8% bilateral. Only 1 boy required reoperation for a nonresolving scrotal hydrocele after inguinal hernia repair 1 year prior. At reoperation, they did not discover a recurrent inguinal hernia as was suspected. 4.5 percent of patients had cord lipoma (69% right, 31% left).

An orchidopexy was also needed in 6 (2%) of the boys having their hernia repaired, 83.3% on the right. One (0.2%) child (male; age, 3 years) also had his umbilical hernia concomitantly repaired. One vasa (0.03%) was accidentally injured. During the same 3-year period, 1 (male) had a femoral hernia.

There were 4 (1.3%) sliding hernias (cecum, appendix, and bladder) in boys, 20 (17.3%) (ovary) in girls. Sixty-five percent of the ovaries found at hernia repair were in females younger than 1 year. 3 hernias had omentum in the sac at operation (almost all were boys and right-sided) and 1 hernia had appendices in the hernia sac.

During this 3-year period, in 1 boy's hernia sac could not

be found during operation, despite being seen and examined preoperatively by the same surgeon. There was a 0.24% wound infection rate and 1 (0.24%) testicle was atrophic at follow-up. No deaths related to the hernia repair occurred during this series.

## DISCUSSION

The incidence of pediatric inguinal hernias reported throughout the literature has ranged between 0.8% and 4.4% with 30% in premies. The male-to-female ratio of 2.5:1 noted in this article ranges from 3:1 to 10:1 in the related literature [1,4,5]. All of the patients except one had indirect hernias.

The finding of 64.7% hernias on the right, 23.5% on the left, and 11.7% bilateral in our 17 preemies was similar with the common belief that preemies have a higher incidence of bilateral inguinal hernias than non-premature patients. All premature hernias were electively repaired after 48 to 50 weeks of gestation (as an outpatient procedure), unless there was a history of persistent symptoms or incarceration. Occurrence of non-incarceration in the preterm babies during the waiting period could be related to relatively larger size of the internal inguinal ring and to the weakness of the abdominal musculature.

Incarceration occurred in 8.7% in this study, a mean age of 1.5 years, 71.4% in boys and 80% on the right side. Although most of these symptomatic patients with incarcerated hernia match the demographics of the overall series, the mean age of the patient with incarcerated hernia (14 months) was younger than the series mean age of 4.6 years. Moreover, the 8.6% incarceration rate of females in our series was less than the 17% reported by Rowe and Clatworthy [6] in their large review. Many of our premie hernias were of the large scrotal bowel variety.

The opposite-side hernia repair was requested in 23 cases (5.7%) after initial operations done on the right side in 14 and on the left side in 9 patients. 5.3 percent of patients with hernia repair on the right side later developed a hernia on the left side, and 8.2% of patients with a hernia repair on the left side later developed one on the right side within six months. 4.5 percent of all male patients in this

series and 8.6% of female patients developed an opposite-side hernia. These results were similar for Park et al. [7]. But they were found to be slightly higher in contralateral hernia after initial operation in male. Rowe et al. [8] concluded that the processus vaginalis obliterates in the perinatal period up to a few months in about 40%, and by 2 years of age in 60%, after which age, its closure, or obliteration is unlikely to occur. Others have said that about half of the residual 40% patent processus vaginalis may become clinically evident during its lifetime. That means that 20% of children older than 2 years will develop an inguinal hernia sometime in their lives, but the remaining 20% will live with a patent processus vaginalis that never becomes clinically evident [2,9]. Gray and Skandalakis [9] reported that at autopsy, only 5% of adults have a patent processus vaginalis, which was never clinically apparent. Kalantari et al. [10] found 28 new contralateral herniorrhaphy in 301 inguinal hernia patients. In the present series, contralateral hernia was more frequent in girls and in those with operated left sided hernias. In addition, most (78.2%) of the contralateral hernias occurred in the first six months whereas 39.1% of them occurred in the first month after initial operation. Lloyd and Rintala [11] reviewed 8 reports with a contralateral hernia incidence from 1 to 34% with an overall average risk of 10 to 15%, still 2 to 3 times more than in our series that totaled more hernia repairs than all the previously mentioned series combined.

The recurrence rate in our series (1.2%) falls between other reports of 0% and 3.8% [2,11,12]. In this series of patients, the recurrence rate of 1.2% decreases to 0.25% (1 patient) when only the cases initially operated on by the pediatric surgeon is considered. The recurrence is usually due to two wrong operational approaches in childhood hernia repaired by a general surgeon in Turkey. First, it is quite difficult to dissect tiny hernia sacs from the spermatic cord structure for a general surgeon. Second, the spermatic cord and hernia sac are separated and lifted up from the underlying transversalis fascia, weakening the posterior wall of the inguinal canal. In four cases (80%) the recurrences occurred within 1 year of the original hernia repair and in another 1 case within 1 month.

Recurrence rates in childhood inguinal hernias decrease significantly when repaired by a pediatric surgeon.

It is suggested by the study that inguinal hernias on the contralateral side becomes symptomatic within the first six months following initial operation justifying meticulous and frequent controls in that time. One other conclusion to be drawn from the study is that it is not inconvenient to delay the operation until the 50th post-conceptual age in preterm babies. The original Ferguson hernia repair, much used contemporarily, is an indispensable operative method for childhood inguinal hernias with low infection and recurrence rates.

## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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