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Incarcerated inguinal hernia in the first year of life

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Summary

Inguinal hernia repair is among the most frequently performed surgical procedures in childhood. While elective surgery provides excellent results in the hands of pediatric surgeons, incarcerated hernia carries complication risks. Incarceration is more prevalant in infants in the first year of life. In the last three years, the number of incarcerated hernia cases in our clinic was 52 out of 420 patients with inguinal hernia. The present report reviews problems related in incarcerations of inguinal hernia in children with thoughts on its prevention.

Key words: *Hernia, inguinal, complication*

Introduction

Inguinal hernia is the most common congenital surgical disorder in childhood, and its surgery carries a very low-risk. Unfortunately, some hernias can become life-threatening or may result in the loss of an ovary/testis or part of the bowel, if incarceration and strangulation occur [4]. The risks and complications of surgery are increased in the infants under first year of life. In this study, we have discussed the incidence of incarcerated inguinal hernia (IH), related complications, and its management under one year of age.

Materials and Methods

52 patients under one year of age were treated for IH at the Department of Pediatric Surgery, Faculty of Medicine, Trabzon between June 1992-June 1995. When a patient with incarcerated inguinal hernia was admitted, the patients was put on intravenous fluids and a nasogastric tube was introduced. The patient was sedated and was placed in trendelenburg position. If spontaneous reduction did not occur within 60 to 90 minutes the method was considered unsuccessful and we proceeded to surgery to avoid strangulation and necrosis.

We analyzed patients with IH according to sex, age, prior diagnosis, manual reduction, emergency operation, length of hospitalization and complications. The statistical analysis was performed using Chi-square and Mann-Whitney U tests.

Results

Incarceration had developed in 52 (12.4 %) of 420 patients with inguinal hernia under one year of age. In the same period, a total of sixty patients were treated for incarcerated hernia among children. The majority (86.6 %) of IH were under one year of age. Forty five (86.5 %) of 52 patients were boys and seven (13.5 %) were girls. Seven patients were newborn, 26 patients were 1-6 months age and 19 patients were between 6-12 months of age. Again most (80.8 %) incarcerated hernia were on the right side. Comparison of infants according to side of incarceration showed that right side involvement occured more oftenly ($p<0.05$). However there was no statistical difference between their sex ($p>0.05$) (Table I).

Fourteen (26.9 %) of 52 patients were seen previously and they were scheduled for elective repair. Among the other 38 (73.1 %) patients, twenty one (40.4 %) patients' hernias had been noted by theirs parents before incarceration, and 17 (32.7) patients were diagnosed with IH as the first sign of an inguinal hernia on admission to our clinic. While thirty for (65.4 %) of 52 patients responded successfully to manual reduction, 18 (34.6 %) patients needed an emergency operation where manual reduction was unsuccessful, or necrosis and/or bowel perforation were suspected.

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Table I. Sex and sites of our patients

	Male		Female		Total	
	Right	Left	Right	Left	Right	Left
Incarcerated	38	7	4	3	42	10
Inguinal hernia	195	102	41	30	236	132
Total	233	109	45	33	278	142

Table II. Clinical presentation and management of our patients

	OS n:14		FNP n:21		IPI n:17		Total
	Male	Female	Male	Female	Male	Female	
Manual reduction	11	1	14	1	6	1	34
Surgery	1	1	4	2	9	1	18
Total	12	2	18	3	15	2	52

OS: operation scheduled, FNP: first noticed by their parents, IPI: initially presented with incarceration.

The mean length of time to apply to the clinic for those patients who were seen previously was 9.6 hours, while for those patients noted by their parents it was 21.6 hours. Whereas in patients applied with presented incarceration it was 1.7 days ($p<0.05$). Two of fourteen patients were seen previously, six of 21 patients noted by their parents, and 10 of 17 patients with presented incarceration required surgical intervention. Emergency operations were needed much less frequently for those seen previously as compared to those with presented incarcerated cases ($p<0.05$). However there was no statistical difference between patients seen previously and patients noted by their parents ($p>0.05$) (Table II).

Four of seven girls and fourteen of 45 boys required emergency operation ($p>0.05$). Sixteen of 42 right-side and two of ten left-side hernias were surgically reduced ($p>0.05$). Infants younger than three months required surgical intervention more than infants older than three months ($p<0.05$) (Table III). The mean duration of hospitalization for those patients benefiting manual reductions was 2.5 days, whereas in patients requiring emergency operations it was 5.4 days ($p<0.01$).

Table III. Age and management of our patients

Age	0-3 months	3-12 months	Total
Manual reduction	5	29	34
Surgical reduction	8	10	18
Total	13	39	52

Complications occured in five (9.6 %) of 52 patients with IH. In two (3.89 %) cases testicular atrophy developed (one manual and one surgical reduction), in one (1.9 %) patient intestinal perforation and necrotizing fasciitis occured. In addition in one (1.9 %) case ovarial necrosis due to delayed submission, and in another case a wound infection were noted. There were no mortalities.

Discussion

Elective inguinal hernia repair is generally an acceptable and an uneventful procedure in children. However in the case of incarceration the condition calls for emergency procedures to prevent complications.

The incidence of incarceration has been reported to range between 14-31 %, most often in infants under a year of age [2-4]. Of all incarcerated inguinal hernias in children, 69-80 % occurs during the first year of life [4,6]. In our series, 86.6 % of all incarcerations occured before the first birth day and the incarceration rate in patients in the same age group was 12.4 %. Occasionally, incarceration is the first presentation of inguinal hernia in this period [4,6]. In our patients, 32.7 % had an initially incarcerated hernia. High risk of incarceration in infants under the first year of life can be related to a tight internal inguinal ring. The incarceration most commonly occurs on the right side than the left side because of higher incidence of inguinal hernia on the right side [4] 80.5 % of our patients had the right side incarcerated hernia.

The incarcerated inguinal hernias have various complications including intestinal necrosis and perforation, testicular necrosis and reccurrence of hernia [4,6].

The incidence of intestinal infarction is extremely rare and it has been reported only 0-1.4 % of all cases [4,6]. One of our patient had intestinal perforation and necrotizing fasciitis due to fecal contamination of perineal region.

Testicular infarction and subsequent atrophy is probably caused by compression of vasculature within the inguinal canal. Unrecognised damage to the vessels during the herniotomy dissection after incarceration may be another cause. In testicular ischemia following incarceration, primary injury appears to be tubular epithelial damage, which is reflected in reduced total germ cell counts [1]. Experimental studies indicate that unilateral incarcerated inguinal hernia during the prepubertal period adversely effects the histology of the testes and later exocrine function in rats [5]. In addition, it is our opinion that attempts at forceful manual reduction increases the likelihood of testicular damage. The risk of testicular infarction has been reported to be 2.5-5 % [4,6]. Two of our patients developed testicular atrophy.

Another complication of IH is recurrence, but the true incidence of recurrence is not known. Reccurrence may be direct or indirect and it probably results from tearing a friable sac, a slipped ligature and failure of ligation of the sac [4]. In early period, no recurrence of hernia was noted among our patients.

First approach for IH is manual reduction and it is successful in 70-80 % of patients [4,6]. Manual reduction was successfully applied in 65.4 % of our patients. Surgical reduction was more frequently performed in patients presenting with incarceration than those patients seen previously due to delayed admission to our clinic.

Female patients require surgical procedure more frequently than boys because an incarcerated hernia often involves the ovary and the fallopion tube in a sliding manner. Manual reduction of these contents are difficult [4]. However, there was no statistical difference for surgical reduction between female and males in our series. In addition no statistically significant difference was found with regard to the side of IH requiring emergency operation in our cases. Our results also indicated that manual reduction is much more successful in those patients admitted at an early stage of incarceration and for babies over three months of age.

Our experience suggest that IH is seen frequently in infants and that they should therefore be operated as soon as possible. More significantly, parents should be made aware the risk of the incarcerated hernia for their infants.

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