

# Incarcerated inguinal hernia in children: A retrospective study of clinical outcome

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## Abstract

**Background:** Inguinal hernia is the most common surgical problem in pediatric age group developed due to patent processus vaginalis that is outpouching of peritoneum forms with testicular decent into the scrotum in boys or in the formation of labia majora in girls which started at 12 to 14 weeks of fetal development. Among all inguinal hernias 99% are indirect inguinal hernia. The incidence in full term baby is 1-5% and it is six time more common in boys. In premature infants this incidence rate is 2% in female and 7-30% in male. Right sided inguinal hernia are three times more common than left. Bilateral inguinal hernias are more common in premature infants. An incarcerated inguinal hernia presents as an irreducible nonfluctuant swelling that is tender and may be erythematous. **Materials and methods:** This is a retrospective study conducted at the division of pediatric surgery in Bangladesh Shishu hospital and institute, Dhaka, Bangladesh. The study period was 5 years from January 17 to December 21. Inoperable conditions due to severe pneumonia, septic shock, extreme prematurity, and very low birth weight were excluded from this study. Data were collected from our hospital record and analyzed for demographic data, clinical presentation, side, management and their outcome. **Results:** Our surgical department operated on a total of 82 patients with incarcerated inguinal hernia during this study period. Out of 82 patients, 67 (81.70%) were male and 15(18.30%) were female. The male-female ratio is 4.4:1. Among them neonate 8(9.76%), one month to 3 months 14(17.07%), 3 months to 6 months 15(18.29%),6 months to 1 year 11(13.41%), 1 year to 4 years 18(21.95%),4 years to 10 years 14(17.07%), more than 10 years 2(2.44%). Right sided inguinal hernia 46(56.1%), Left sided 33(40.24%) and bilateral 3(3.66%). Complications found in 18 patients like strangulations 5(27.78%), feature of intestinal obstruction 8(44.45%), gangrenous bowel loops 2(11.11%), gangrenous ovaries 1(5.56%), recurrences 2(11.11%). In our study 2(2.44%) patients expired. These complicated patients were managed accordingly. **Conclusion:** Incarcerated inguinal hernia patient should be admitted in hospital earlier and manage accordingly to prevent the complications and reduce mortality.

**Key Words:** Inguinal hernia, Incarcerated inguinal hernia.

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## INTRODUCTION

Inguinal hernia is the most common surgical problem in pediatric age group needs operative treatment. Among all inguinal hernias 99% are indirect in children.<sup>1</sup> Inguinal hernia developed due to patent processus vaginalis that is outpouching of peritoneum forms with testicular decent into the scrotum in boys or in the formation of labia majora in girls which started at 12 to 14 weeks of fetal development. This processus vaginalis lies within the inguinal canal, together with spermatic cord in male and

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round ligaments in female.<sup>2</sup> As an indirect hernia content enter the canal through the deep ring, it arises lateral to the inferior epigastric vessels. The incidence in full term baby is 1-5% and it is six time more common in boys.<sup>3,4</sup> In premature infants this incidence rate is 2% in female and 7-30% in male. Approximately 5% of all males develop a hernia during their life time.<sup>5</sup> Right sided inguinal hernia are three times more common than left.<sup>3,4</sup> Bilateral inguinal hernias are more common in premature infants.<sup>4,7</sup> The small intestine is the most common structure which herniate from abdomen to sac in boys.<sup>7</sup> In female, the ovaries are the most commonly herniated content; however, after one year of age, intestine becomes more common. In adolescent ovary is herniated extremely unlikely.<sup>7</sup> A direct inguinal hernia is extremely rare in children. The etiology of failure to close in some individuals is largely unknown.<sup>8</sup> Some author says that smooth muscle cells involved in the descent of the testis may abnormally fail to undergo apoptosis in inguinal hernias.<sup>4</sup> Most of the inguinal hernias are asymptomatic. Patient usually present with a lump or swelling in the groin which notice by parents or during physical examination. The swelling may change in size with coughing or crying and it may present as intermittent bulging in the groin, scrotum or labia. Careful history and examination can usually differentiate other cause of groin lump, such as undescended testis, hydrocele and lymphadenopathy.<sup>9</sup> Idiopathic scrotal edemas may be recognized by a subacute redness and swelling that is not usually painful. An abscess in the inguinal region may also be confused with an incarcerated hernia. Less commonly varicoceles and testicular tumor are differentials. If a very short history, it could be important to consider testicular torsion. Hernia can be classified as reducible or irreducible. An incarcerated inguinal hernia presents as an irreducible nonfluctuant swelling that is tender and may be erythematous. The patient is usually inconsolable. They may develop obstructive symptoms like vomiting or constipation and gradual abdominal distension. If incarceration progress to strangulation, the child may have features of peritonitis, hemodynamically instable and passes of blood mixed stool.

This aim of the study is to evaluate the type of clinical outcome of incarcerated inguinal hernia in our hospital.

## METHODOLOGY

This is a retrospective study conducted at the division of pediatric surgery in Bangladesh Shishu hospital and institute, Dhaka, Bangladesh. This is a tertiary care hospital in Bangladesh previously named as Dhaka Shishu (Children) hospital. The study period was 5 years from January 17 to December 21. Inoperable conditions due to severe pneumonia, septic shock, extreme prematurity, and

very low birth weight were excluded from this study. Data were collected from our hospital record and analyzed for demographic data, clinical presentation, side, management and their outcome. Total 82 patients with incarcerated inguinal hernia were operated in our surgical department during this period. After clinical examination and admission of all patients were treated with intravenous fluid, antibiotics, and nasogastric tube suction with free drainage ensure if needed. After correction of dehydration and electrolyte imbalance. In the postoperative period, patients were managed with intravenous fluid, antibiotics and if needed nutritional support was also given. In this study only initial diagnosis, management, complications and their outcome were included.

## RESULTS

Out of 82 patients, 67 (81.70%) were male and 15(18.29%) were female. The male-female ratio is 4.4:1. Among them neonate 8(9.76%), one month to 3 months 14(17.07%), 3 months to 6 months 15(18.29%), 6 months to 1 year 11(13.41%), 1year to 4years 18(21.95%), 4 years to 10 years 14(17.07%), more than 10 years 2(2.44%). Right sided inguinal hernia 46(56.1%), Left sided 33(40.24%) and bilateral 3(3.66%). Complications found in 18 patients like strangulations 5(27.78%), feature of intestinal obstruction 8(44.45%), gangrenous bowel loops 2(11.11%), gangrenous ovaries 1(5.56%), recurrences 2(11.11%). In our study 2(2.44%) patients expired. These complicated patients were managed accordingly. One patient with gangrenous bowel loop was needed temporary ileostomy. The patient who developed gangrenous ovary need oophorectomy. The recurrence patients were need redo herniotomy with hernioplasty after 4 to 6 weeks.

**Table 1: Gender distribution**

Gender	Frequency	Percentage
Male	67	81.70
Female	15	18.29

**Table 2: Age distribution of incarcerated inguinal hernia**

Age	Frequency	Percentage
Neonate	8	9.76
1 month to 3 month	14	17.07
>3 months to 6 month	15	18.29
>6 month to 1 year	11	13.41
>1 year to 4 year	18	21.95
>4 year to 10 year	14	17.07
>10 year	2	2.44

**Table 3: Distribution of side of hernia**

Side	Frequency	Percentage
Right	46	56.1
Left	33	40.24
Bilateral	3	3.66

**Table 4:** Complications found in 18(21.95%) patients

Name of Complication	Frequency	Percentage
Strangulation	5	27.78
Features of intestinal obstruction	8	44.45
Gangrenous bowel	2	11.11
Gangrenous ovaries	1	5.56
Recurrences	2	11.11
<b>Total</b>	<b>18</b>	<b>100</b>

## DISCUSSION

Obstructed or incarcerated inguinal hernia can increase the rate of morbidity or mortality in children. It may result in significant sequelae depending on which visceral structure is involved in the hernia sac. These sequelae may range from life-threatening complications, such as intestinal obstruction, intestinal necrosis, intestinal perforation, gonadal dysfunction, testicular necrosis, testicular atrophy, ovarian necrosis, ovarian atrophy and tubal stricture. Our study shows some of these complications. Many children presenting with incarcerated inguinal hernias have a previously diagnosed inguinal hernia. Some author found the rate is about 35%.<sup>12</sup> After hospitalization of incarcerated inguinal hernia patient had been operated 24 hours to 5 days later to allow edema to resolve. Some clinicians prefer to discharge home with a reliable family with plans for hernia repair in the very near future. Some author described the rate of incarceration of reducible indirect inguinal hernia reduce up to 83% by operation.<sup>10</sup> They recommended that for healthy children less than 10 years of age, indirect inguinal repair should be performed on a semi elective basis within 7 days of diagnosis.<sup>11</sup> Unless there is evidence of bowel compromise, peritonitis, or hemodynamic instability, non-operative reduction should be attempted because 70% to 95% of incarcerated inguinal hernias are successfully reduced.<sup>12,13,14</sup> Reduction attempts are usually performed by using sedation and analgesics, although there is no standard protocol, and pharmacotherapy should be at the discretion of the provider.<sup>15</sup> The following is the preferred technique of the authors for nonoperative reduction. The patient is placed in the supine position. One hand should be placed above the external ring, with fingers around the hernia neck to keep it fixed in place and prevent the hernia contents from sliding over the external ring. The other hand should provide simultaneous moderate and steady pressure on the hernia contents toward the abdominal cavity along the axis of the inguinal canal and internal ring. Continuous pressure may help push out some of the bowel edema and regular, delicate movement of the fingers on the hernia sac may move the hernia contents, both aiding in reduction.<sup>16</sup> It may take several minutes to successfully reduce the hernia. If the inguinal hernia is unable to be reduced, or there is concern for an incomplete reduction, then operative reduction should be performed emergently. Although it is

unlikely to reduce gangrenous bowel successfully, it has been reported to be possible in the literature, so there should be close observation of the patient afterward.<sup>17</sup> The premature and low birth weight baby with inguinal hernia have the high risk of incarcerated. But they also have the high risk of anesthesia related post-operative complications like apnea, bradycardia, and even cardiopulmonary arrest. This risk was initially reported to be as high as 49% but more recent data show the risk is closer to 5%, with these complications mainly occurring in patients with persisting apnea.<sup>18</sup> In case of incarcerated inguinal hernia both laparoscopic and open techniques have been compared and have similar outcomes, however, laparoscopy may have advantages compared with the conventional open repair. These advantages include easier reduction because of mechanical widening of the internal ring from pneumoperitoneum, direct visualization of the bowel to ensure complete reduction and viability, and easier visualization of the contralateral groin.<sup>19,20</sup> If the hernia contents are unable to be reduced after opening the sac, consider placing the patient in Trendelenburg position and using gentle, steady pressure to again attempt to reduce the hernia. If the hernia contents are still irreducible, this may be secondary to a constricting internal ring, which needs to be divided. The ring should be divided sharply on the lateral edge to avoid injury in the inferior epigastric vessels and cord structures. Consider placement of your finger or an instrument through the internal ring to help dilate the ring, protect the hernia sac contents, and also guide the ligating instrument. The internal ring requires repair before the completion of the procedure.<sup>20</sup>

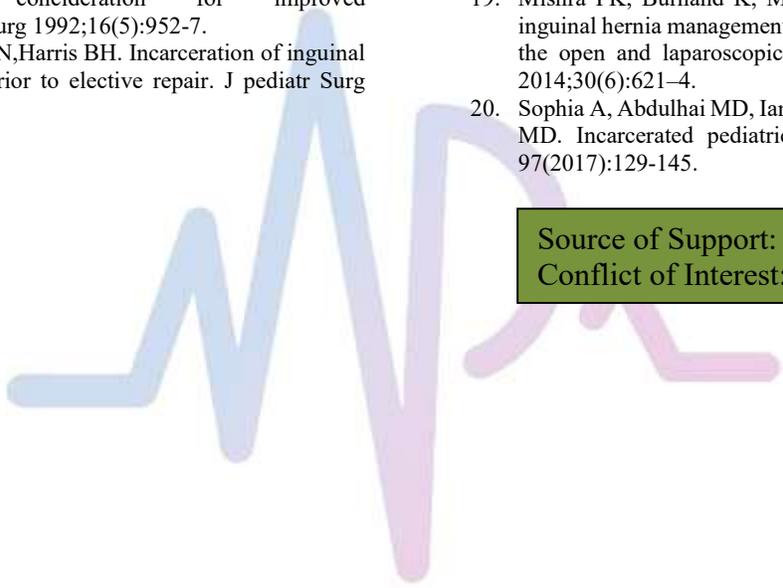
## CONCLUSIONS AND RECOMMENDATION

Incarcerated inguinal hernia patient should be admitted in hospital earlier and manage accordingly to prevent the complications and reduce mortality.

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