

# An Insight into the Incidence of Obstructed Inguinal Hernia in Infants: Experience at a Tertiary Care Hospital

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## ABSTRACT

### Background:

Inguinal hernia (IH) is one of the most frequently seen conditions in pediatric surgical units. The reported frequency of IH ranges from 0.8-5% in full term infants and up to 30% in preterm infants. It has an obvious male predominance ratio of boys to girls of 6:1. There is an increased risk of incarceration and obstruction of an IH during first year of life which decreases with increasing age but does not go away completely. There is disagreement concerning the management of inguinal hernia in infants worldwide. This study was directed to define the incidence of incarceration of IH leading to intestinal obstruction in infants.

### Methodology:

In this cross sectional study, done in Khyber Teaching Hospital, Peshawar, a total of 112 patients less than one year age were observed. Presence of hernia was confirmed clinically and by performing ultrasound. If intestinal obstruction was suspected, digital X-ray erect abdomen was performed which showed air fluid levels in case of intestinal obstruction. All the important data was recorded on a pro forma.

### Results:

73% children were 1-6 months of age and 27% children were 7-12 months of age. Mean age was 5 months  $\pm$  5.87. Male children were 86% and female children were 14%. Obstructed inguinal hernia was observed in 11% children with higher incidence in female.

### Conclusion:

We conclude that the frequency of incarcerated inguinal hernia was 11% in infants mostly occurring at a younger age and in female children.

### Key words:

incarcerated inguinal hernia, infants, intestinal obstruction.

## INTRODUCTION

Inguinal hernia (IH) is an abnormal swelling or bulge seen in the groin area. It is the result of failure of obliteration of processus vaginalis or weakness of the abdominal wall. It is one of the most frequently seen conditions in pediatric surgical units.<sup>1</sup> The reported frequency of IH ranges from 0.8-5% in full term infants.<sup>2</sup> It is more common in preterm babies with the incidence of up to 30%.<sup>3</sup> It has an obvious male predominance ratio of boys to girls of 6:1 because of the wide inguinal canal in males secondary to testicular descent.<sup>4</sup>

Early years of life are associated with an increased risk of

obstruction and incarceration of an IH.<sup>5</sup> Although there is a slight decrease in the percentage of hernia resulting in incarceration with age, but the risk of incarceration does not go away completely.<sup>4</sup> Incarceration of inguinal hernia can have dreadful consequences like testicular atrophy/gangrene, intestinal obstruction, gut gangrene, sepsis and death.

As stated earlier, the risk of incarceration is more in younger age group which is evidenced by several studies from different parts of the world. In literature the rate of obstruction of inguinal hernias has been variably reported between 3% and 18% with higher incidence among

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infants.<sup>6,7</sup> In another study the risk of obstruction, strangulation and incarceration is reported up to 11.9% in infants.<sup>8</sup> Another study reported up to 13.9% of patients managed for inguinal hernia presented with complicated hernias and about two-thirds (68.3%) were infants.<sup>9</sup> In a study conducted in Iran the rate of obstruction was 3.4% with half of the patients below the age of one year.<sup>10</sup> The reason of this age based variation in incarceration is due to changes in inguinal canal anatomy with increasing age. Inguinal canal and internal inguinal ring are smaller and tighter in early age so there are high chances of bowel entrapment. As the child grows, the inguinal canal becomes more oblique.

There is disagreement concerning the management of inguinal hernia in infants worldwide with a few in favor of early repair of the hernia due to fear of incarceration<sup>8</sup> while some are against it, because of long waiting time for elective surgical procedures, large patient-doctor ratio and anesthesia risks particularly in underdeveloped countries.<sup>5</sup>

Incarceration is a preventable complication however unfortunately we are seeing it quite often because of our long waiting lists. No study has determined the incidence of incarceration and intestinal obstruction in infants with IH in Pakistan. We decided to conduct this study so that a proper insight into the incidence of incarceration is obtained and the patients with increased risk of incarceration are identified. This can be further used to develop protocol for the early management of inguinal hernia so that this dreadful complication is prevented.

## METHODOLOGY

This study of cross-sectional design was under taken in 2019, for a duration of 7 months, after ethical committee approval, in the department of Pediatric Surgery, Khyber Teaching Hospital, Peshawar. Total sample size calculated was 112 using WHO calculator with confidence interval of 95% and absolute precision 6%. Non-probability consecutive sampling technique was used. Strict inclusion and exclusion criteria were followed to recruit patients.

### Inclusion Criteria:

1. All children below 01 year of age
2. Both genders, male and female
3. Clinical (inguinal bulge) and Ultrasound Confirmation of Inguinal hernia (detection of abdominal contents in hernia sac and internal inguinal ring diameter more than 4mm)

### Exclusion Criteria:

1. Bladder Extrophy
2. Cases of intersex
3. Children more than 1 year of age

All cases were evaluated clinically for above mentioned exclusion criteria.

All patients meeting the inclusion criteria were included and admitted in the ward. Written informed consent was obtained from parent/attendant. The patient's sex and age was recorded. Presence of hernia was confirmed clinically and by performing ultrasound.

If intestinal obstruction was suspected i.e. presence of bilious vomiting, abdominal distension and constipation, a digital x-ray erect abdomen was performed which showed air fluid levels in case of intestinal obstruction. All the important data was reported on a predesigned pro forma.

For analysis of data SPSS 20.0 was used. For quantitative variables such as age, Mean  $\pm$  standard deviation was calculated. For categorical variables such as gender and presence of hernia, percentage and proportion were calculated. The incidence of obstructed IH was computed on the basis of age and gender to see effect modifications. Chi square test was used to analyze post stratification, keeping  $p$  value  $< 0.05$  was taken. Results were displayed in tables.

## RESULTS

In this study 112 children were observed in which age distribution was analyzed. Mean age was 5 months  $\pm 5.87$  (table 1).

AGE	FREQUENCY	PERCENTAGE
1-6 month	82	73%
7-12 months	30	27%
Total	112	100%

Table : Age distribution (n=112)

Male to female ratio was 4.3:1 (table 2).

GENDER	FREQUENCY	PERCENTAGE
Male	96	86%
Female	16	14%
Total	112	100%

Table : Gender distribution (n=112)

Moreover obstructed inguinal hernia was observed in n=12 (11%) patients while n=100 (89%) children didn't have obstructed inguinal hernia. Out of these 12 patients 2 were females and 10 were males. The results show that the frequency of incarceration in females (12.5%) n=2/16 is more than in males (10.4%) n=10/96. The data analysis also showed that the risk of incarceration is more at age less than 6 months. Although the incidence of IH varied among the 2 groups still this difference was statistically insignificant. Stratification of obstructed inguinal hernia with respect to age and gender is given in Table 3 and 4.

Obstructed inguinal hernia	1-6 month	7-12 months	Total	P value
Yes	9	3	12	0.8824
No	73	27	100	
Total	82	30	112	

Table : stratification of obstructed inguinal hernia with respect to age (n=112)

Obstructed inguinal hernia	Male	Female	Total	P value
Yes	10	2	12	0.8030
No	86	14	100	
Total	96	16	112	

Table : stratification of obstructed inguinal hernia with respect to gender (n=112)

## DISCUSSION

IH is the most common presenting condition in pediatric surgical units. The frequency of inguinal hernia in full term infants is stated to be from 0.8% to 5% however the incidence in premature and low birth weight (less than 1kg) neonates is extremely high with reported incidence of up to 30% in some studies. Our study shows that among 112 children observed, 73% children were of age between 1-6

months and 27% children were of age between 7-12 months. Mean age was 5 months ±5.87. Male children were 86% and female children were 14%. Obstructed inguinal hernia was observed in 11% children while 89% children didn't have obstructed inguinal hernia.

In a study conducted by Zamakhshary *et al.* about 126 patients out of 1065 patients had an episode of incarceration of IH within 30 days of diagnosis. The overall rate of hernia incarceration was 11.9%. Female gender and age <1 year are among important factors which have been observed to be associated with amplified risk of obstruction and incarceration. The risk of incarceration doubled in infants who waited more than 2 weeks for surgery after the diagnosis.<sup>8</sup>

The results of our study are comparable to the study conducted by Ein SH *et al.* in which 12% of children, managed for inguinal hernia, presented with incarcerated hernias and about two-thirds (68.3%) were infants.<sup>9</sup> About 1/3<sup>rd</sup> of the infant below 6 months presented with incarceration in our study. Similar observations have been noted by the study conducted by Gawad N *et al.* These observations point to the fact that the incidence of incarceration is more in younger age group.<sup>10</sup>

Abdulhai SA *et al.* had reported that the risk of incarceration varies with age and gender. The overall incidence of incarceration is reported to be 3% to 16% however the risk of incarceration approaches to 31% in premature infants in some studies and most of them presented during the early months of their life. As shown by our study, the incidence of inguinal hernia is 5 times more prevalent in males. However, the incidence of bilateral hernia is reported more in girls (25.4% in females vs 12.9% in males).<sup>11</sup>

In another study Ksia A. had reported that among 922 children, 143 (16%) were females and 779 (84%) males.<sup>12</sup> About 16% cases were found to have incarcerated hernia and among those, 1/3 presented during the first month of life. However in contradiction to our study, the incarceration occurrence was 15.5% in males versus 2.09% in females.<sup>512</sup> This observation shows that the risk of incarceration might be related to demography as well along with other factors like age and gender.

## CONCLUSION

Our study concludes that the frequency of obstructed inguinal hernia was 11% in infants mostly occurring at a younger age (below 6 months). Although the incidence of IH is more in males, the possibility of incarceration is more in female children.

## RECOMMENDATION

We recommend that the children with inguinal hernia should be operated within one month of diagnosis to avoid incarceration. We further suggest that incarceration of inguinal hernia can be related to several other factors which need to be evaluated. Also, to determine the proper waiting time for surgery, we recommend further studies with large sample size and multicenter studies.

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