

Neonatal Small Bowel Obstruction: Pattern, Symptoms and Diagnostic Evaluation: A Prospective Study

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Conflict of interest: Nil

Abstract

Background: Neonatal intestinal obstruction is a most common surgical emergency. Surgery in neonates is a challenging issue especially in developing countries. Early diagnosis and treatment lead to better outcome. It is observed that there are very few studies available on small bowel obstruction in neonate. **Aim:** To observe the pattern, Symptoms and diagnosis of neonatal small bowel obstruction. **Material and Method:** This observational prospective study conducted among 210 cases for the duration of two years, December 2014 to January 2017 at Department of Paediatric Surgery, Institute of Child Health, Niloufer Hospital, Hyderabad. All the neonates who presented with neonatal small bowel obstruction included in the study. Qualitative data was presented in percentage. **Results:** A total of 210 patients were admitted, average age of the patient was 2.3 Days (1-7 Days) and male to female ratio was 1.8: 1, it means that male newborn were more affected by small bowel obstruction. Intestinal Atresias observed among 52.38% of the patients, followed by malrotation, Meconium ileus, Bands and obstructed Hernia. We observed Vomiting and Abdominal Distension was most common symptoms among the patients, also alone vomiting was most common clinical presentation observed, most of the patients nearly 39% of the patients observed with multiple fluid level and thumb size loop **Conclusion:** Intestinal atresia was found one the most common cause small bowel obstruction among neonates with common symptoms of Vomiting and Abdominal distension. Immediate surgery and post operative care can be made by collaboration of pediatrician as well as pediatric surgeons to ensure better outcome in newborns with small bowel obstruction.

Keywords: Obstruction, Meconium Ileus, Intestinal Atresias, Pediatric, Hernia, Abdominal Distension.

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Introduction

Neonatal intestinal obstruction is a most common surgical emergency. The causes of obstruction are diverse with varied embryological origins, and some underlying etiologies are not yet well described. Depending on the type of bowel obstruction, neonates with small bowel obstruction present with various clinical profiles which include bilious vomiting,

distension of abdomen, failure to pass meconium and jaundice.

Surgery in neonates is a challenging issue especially in developing countries [1] because this is associated with high morbidity and mortality[2]. Emergency operation being defined as those types of surgeries that should be performed by necessity within 24 h of a patient's

admission, or within 24 h of the development of a specific complication [3]. The research community in both developed and developing countries has investigated this condition [4, 5]. Detailed clinical history, plain X-ray abdomen and contrast enema helps in diagnosis of condition. Some findings of neonatal bowel obstruction can be detected prenatally on ultrasound imaging. The obstruction is classified as “high” when the level of obstruction is proximal to the ileum, and “low” when the level of obstruction is at the ileum or colon.

Three or fewer dilated bowel loops are typically seen with high intestinal obstruction, more than three are generally seen with low intestinal obstruction in neonates. High intestinal obstructions are defined as occurring proximal to the ileum, resulting in various combinations of gastric, duodenal, and jejunal dilatation according to the level of obstruction. In contrast, low intestinal obstructions involve the distal ileum or colon and typically result in diffuse dilatation of multiple small-bowel loops.

The incidence of surgical emergency in a neonate ranges from 1 to 4 per 100 births [6]. Intestinal obstruction is the most common surgical emergency in neonatal period [6]. Neonatal intestinal obstruction occurs 1 in 1500 live births [7].

Early diagnosis and treatment lead to better outcome. Failure to recognize neonatal bowel obstruction can result in aspiration of vomit, sepsis, midgut infarction or enterocolitis [8]. Delay in carrying out surgery may result in the loss of large amounts of bowel.

Thus, present study has undertaken with an aim to observe the clinical presentation and diagnostic evaluation, of neonatal small bowel obstruction.

Aim: Study has undertaken with an aim to observe the pattern, Symptoms and

diagnosis of neonatal small bowel obstruction.

Material and Methods:

Study Design: It was an observational prospective study

Study Place: Department of Paediatric Surgery, Institute of Child Health, Niloufer Hospital, Hyderabad

Study Duration: For the period of Two years, December 2014 to January 2017

Sample Size: Total 210 cases has undertaken for the study.

Inclusion Criteria: All the neonates who presented with neonatal small bowel obstruction.

Exclusion Criteria: Who has not given the consent for the study.

Method:

All neonatal intestinal obstruction cases were evaluated by a preformed proforma containing the age, gender, weight and detailed history regarding the symptoms. After detailed history and complete physical examination, the neonate has been investigated for biochemical and hematological abnormalities, radiographic tests to confirm the diagnosis, and were taken up for surgery.

The neonates were admitted into the Neonatal Intensive care. Their hydration was assessed and corrected. Preoperative antibiotics (Cefotaxime and Metronidazole) were given. All patients had a nasogastric tube placed, which aspirated every 2 hours and kept on dependent drainage. Their acid-base balance was evaluated and corrected. Urine output was monitored, and body temperature was monitored and maintained.

All patients underwent abdominal x-ray examination, both erect and supine. If there was evidence of obstruction without intestinal perforation contrast enema was performed.

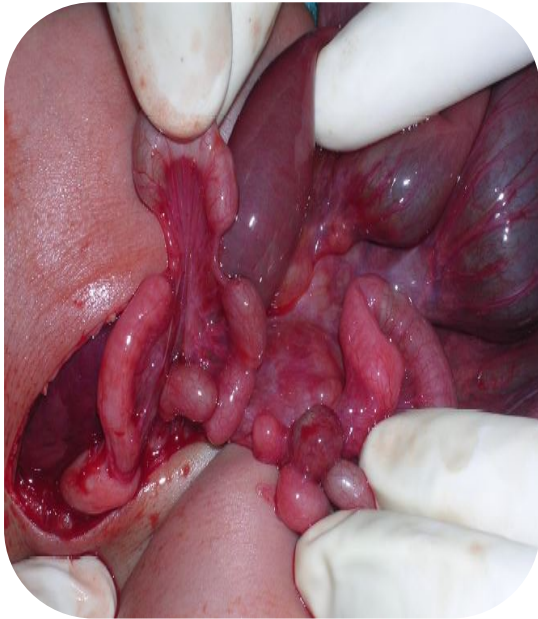


Figure1: Intestinal Obstruction



Figure2: X-Ray Findings

Results:

A total of 210 patients were admitted between November 2014 to October 2016. There were 135 males and 75 female neonates treated. The average age at presentation was 2.3 days (1-7 days). The

average weight of the neonate was 2.4 kgs (2-3 kgs). The duration of admission ranged from 1- 19 days with an average of 10.44 days.

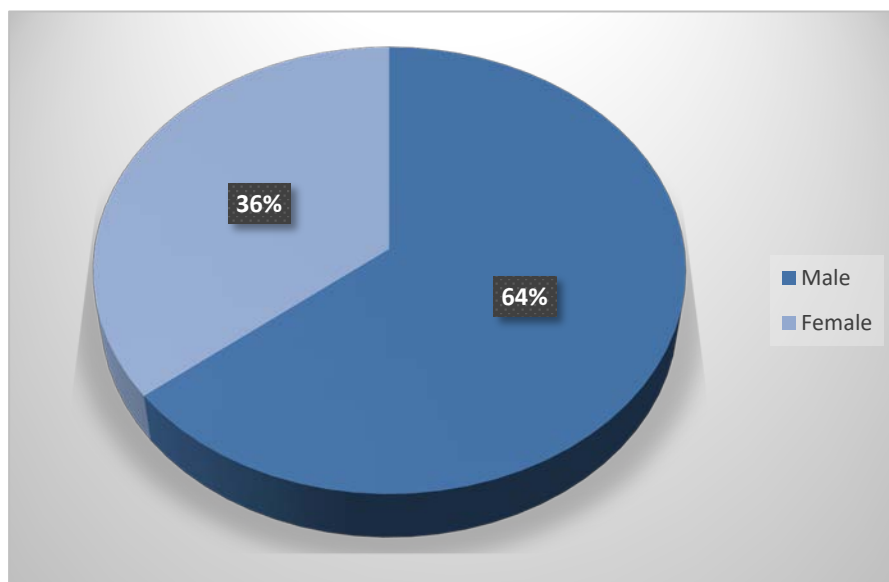


Figure 3: Distribution of gender among the patients

Table 1: Distribution of clinical presentation among the patients

Symptoms	Number of Patients	Percentage
Vomiting	52	24.76
Abdominal Distension	34	16.2
Vomiting + Abdominal Distension	104	49.52
Constipation	20	9.52

Above table shows the distribution of clinical presentation of the patients admitted for the small bowel obstruction, found that maximum 49.52% of the patients admitted with Vomiting and Abdominal Distension followed by Vomiting alone with 24.76%, 16.2% with Abdominal Distension and 20 patients with constipation.

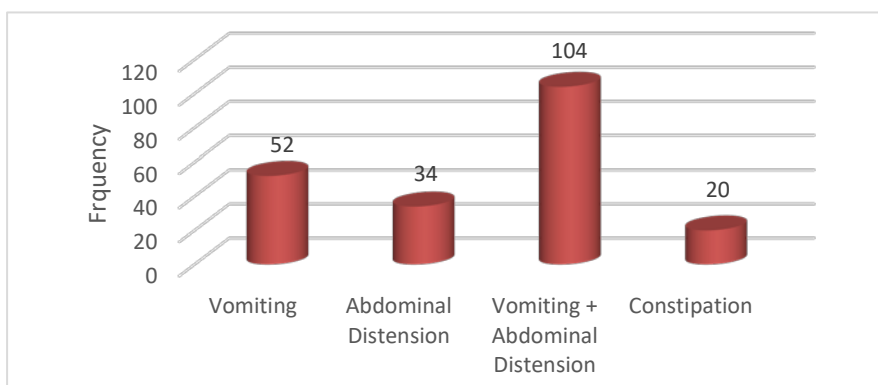


Figure 2: Distribution of Clinical Presentation among the patients

Table 2: Distribution of Types of obstruction among the patients.

Types of Obstruction	Number of Patients	Percentage
Malrotation	35	16.66
Intestinal Atresias	110	52.38
Meconium ileus	19	9.04
Obstructed Hernia	13	6.19
Bands	15	7.14
Others	15	7.14

Maximum patients admitted in the hospital with Intestinal Atresias followed by Malrotation, Meconium Ileus, Bands, Obstructed Hernia and others.

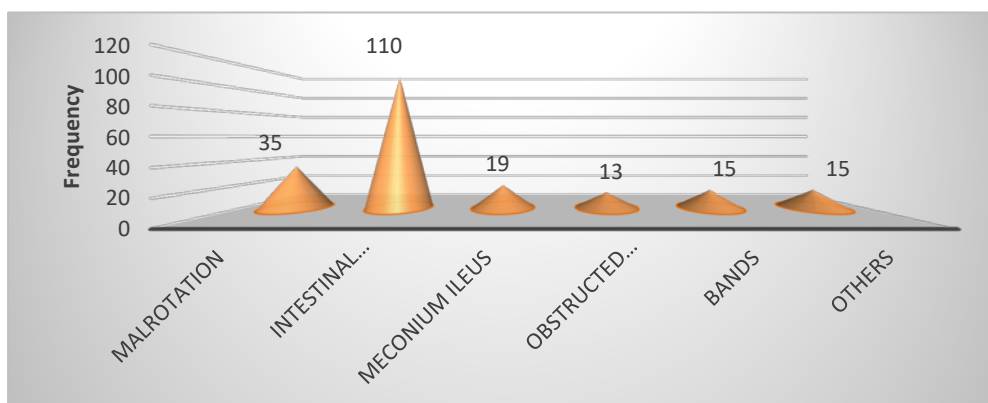


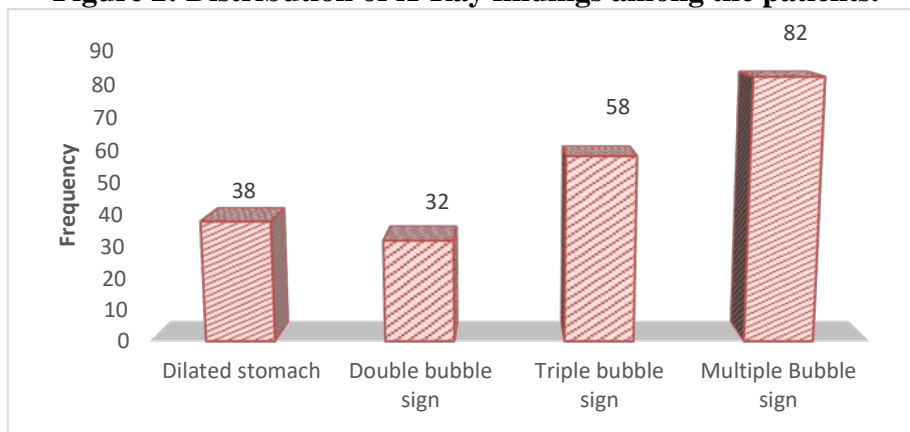
Figure 3: Distribution of Types of obstruction among the patients.

Table 3: Distribution of X-Ray findings among the patients.

X-Ray Findings	Number of Patients	Percentage
Dilated stomach	38	18
Double bubble sign	32	15
Triple bubble sign	58	28
Multiple Bubble sign	82	39

In X-ray finding most of the patients found with Multiple fluid level and thumb sized loop, followed by Triple bubble sign, Dilated Stomach and Double bubble sign.

Figure 2: Distribution of X-Ray findings among the patients.



Discussion:

A total of 210 patients were admitted between November 2014 to October 2016 for small bowel obstruction which is very common surgical emergency among neonates. In the present study average age of the patient was 2.3 Days (1-7 Days) and male to female ratio was 1.8: 1, it means that male newborn were more affected by small bowel obstruction in many studies this disease mostly occurred among male newborn. Study conducted by Tripathi PK et al [9] observed that male proportion in this small bowel obstruction was more compared to the female proportion, and also their average age was lying between 1-7 days. In present study average birth weight of the neonates was 2.4 Kg (2-4kg).

❖ Type of Obstruction:

In present study we found that Intestinal Atresias observed among 52.38% of the patients, followed by malrotation, Meconium ileus, Bands and obstructed Hernia. In a study conducted by Anjali

Verma et al[10] Intestinal Atresias was observed among 49.6% of the patients followed by Malrotation, and other types of obstruction nearly similar to our study but less than our study. In another study conducted by Tripathi PK et al found similar results to the present study in which Intestinal Atresias was more common obstruction than others. A study conducted in PGIMER Chandigarh[11] showed, a similar etiological prevalence with atresia comprising 22.4% of intestinal obstruction among neonates. Presentation of atresia is usually early i.e., within 7 days. Early onset of symptom and rapid deterioration of patient’s condition in intestinal atresia and meconium ileus was the probable cause of early presentation.

In the present study second type of obstruction found which was 16.66%, after Intestinal Atresias, as one of the causes of neonatal small bowel obstruction, which was somewhat higher than study conducted in Dhaka [12], Meconium ileus was third most common cause of small bowel obstruction in our study, it was

9.3% in our study which was somewhat more than other study conducted by Sha et al, in their study this incidence was nearly equal to 7.3%.

Hirschsprung disease was a major cause in other studies [13,12,14] whereas in our study we didn't find any incidence of Hirschsprung. Presentation was delayed in Hirschsprung disease and malrotation because of variability in onset of symptom and lack of specificity. Early presentation leading to early detection is an important determinant in better outcome of surgery but in Hirschsprung disease prognosis was good even in late presenters as decompression was done repeatedly by doing enema at peripheral centers.

❖ **Clinical Presentation:**

In present study we observed Vomiting and Abdominal Distension was most common symptoms among the patients, also alone vomiting was most common clinical presentation observed. In a study conducted by Anjali Verma et al observed vomiting was the most common symptoms among the patients which was 69% which was more than present study, this study followed by clinical presentation Abdominal distension which was nearly 65%, also more than present study. In present study constipation was observe among 9.2% of the patients nearly equal prevalence of constipation was observed among the patients in study conducted by Anjali Verma et al which was 11%. In our study combine symptoms vomiting and abdominal distension was more compared to their presentation alone.

❖ **Diagnosis of Small Bowel Obstruction:**

Small bowel obstruction we detected by using x-rays observation, we found that most of the patients nearly 39% of the patients observed with multiple fluid level and thumb size loop, 28% of the patients observed with triple fluid level this appearance of triple fluid level is due to a proximal obstruction caused by the atretic

jejunum and it seen because of proximal jejunal distention. 18% of the patients observed with dilated stomach and 15% of the patients observed with double level fluid, represents dilatation of the proximal duodenum and stomach.

Conclusion:

From the overall analysed data, we found that, and we can conclude that, intestinal atresia was found one the most common cause small bowel obstruction among neonates with common symptoms of Vomiting and Abdominal distension. We can also conclude that clinical examination and X-Ray of abdomen or contrast X-Ray are sufficient to diagnose intestinal obstruction. Male newborns were more affected by small bowel obstruction than the female newborn. Immediate surgery and post operative care can be made by collaboration of pediatrician as well as pediatric surgeons to ensure better outcome in newborns with small bowel obstruction.

Conflict of Interest: None to Declare

Acknowledgement: Nil

Ethical Clearance: It is approved by Institutional Ethical committee Institute of Child Health, Niloufer Hospital, Hyderabad

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