



## Etiological Spectrum of Neonates Presenting With Intestinal Obstruction at A Tertiary Care Centre

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### Abstract

**Introduction:** *Intestinal atresia is one of the most common cause of intestinal obstruction in neonates; with very few reported data from the developing countries.*

**Objective:** *To describe the epidemiological distribution of neonatal intestinal obstruction (NIO) presenting at a tertiary care centre.*

**Methods:** *Neonates admitted to our surgical NICU with a pre-operative diagnosis of NIO during a period from 1<sup>st</sup> august 2013 to 31<sup>st</sup> December 2015 presenting within 14 days of life were considered. All cases of NIO associated with trachea- esophageal atresia, hirschsprung disease and anorectal malformations were excluded. An analysis of their post operative diagnosis was done.*

**Results:** *A total of 271 neonates were included in our study. There were a total of 178 males and 93 females in our study. They presented at a mean age of 4.3 days and on an average weighed 1.9 kg. duodenal atresia was the most common cause of NIO (n= 82), followed by ileal atresia (n= 72). Other causes of NIO included jejuna ileal atresia, jejunal atresia, malrotation, colonic atresia, annular pancreas, duodenal webs, meconium ileus and band obstruction.*

**Conclusion:** *Duodenal atresia is the most common cause of NIO followed by ileal atresia in our study*

### Introduction

Intestinal obstruction is the most common surgical emergency in a new born requiring prompt intervention. It can occur at any age from new born period to infants or even adulthood. The reported frequency of NIO ranges from 0.4 to 3.1/10,000 live births <sup>(1-5)</sup>. the etiology of obstruction varies greatly; with common

aetiologies such as intestinal atresia, meconium ileus, hirschsprung disease and malrotation of gut with or without volvulus <sup>(6)</sup>. NIO manifests with cardinal signs such as bilious vomiting, abdominal distension and failure to pass meconium or stools <sup>(7, 8)</sup>. failure to recognise NIO can lead to aspiration of vomit sepsis, midgut infection or enterocolitis <sup>(9)</sup>.

With advances in medical care, such as improved surgical techniques and intensive care; survival of neonates with intestinal obstruction has improved dramatically<sup>(10)</sup>. though prematurity, late presentation, associated congenital anomalies and complications associated with surgeries still seem to be major causes of mortality in developing countries<sup>(9)</sup>.

Our centre being the referral paediatric surgical unit in the state of Rajasthan, India has a huge volume of neonates presenting with intestinal obstruction with time of presentation ranging from few hours to days. There are few studies identifying the various pattern of intestinal obstruction with immediate short term outcomes. Hence the study.

### Aim

To evaluate the epidemiological distribution of neonatal intestinal obstruction and their short term outcomes.

### Methods

This was a retrospective analysis was conducted at the paediatric surgery unit at the SPMCHI, SMS Medical College, Jaipur over a period of 28 months. All neonates admitted to the surgical NICU with a provisional diagnosis of neonatal intestinal obstruction, presenting within 14 days of life from 1<sup>st</sup> August 2013 to 31<sup>st</sup> December 2015 were included in the study. All neonates with

associated trachea- esophageal fistula, hirschsprung disease and ano rectal malformations were excluded from the study. Also neonates too sick and haemodynamically unstable for surgery were excluded. Data was analysed on the basis of hospital records available for sex, birth weight, age at presentation, diagnosis, surgical procedure performed and outcome.

A total of 271 neonates were included in our study. All neonates were taken for exploratory laparotomy after necessary blood and radiological investigations. Surgical interventions were done according to the cause e.g. Ladds procedure for malrotation. Post operatively the neonates were managed in the Surgical nursery with nasogastric aspiration, intravenous fluids and antibiotics. Children were followed up until discharge or death.

### Results

Out of 271 neonates presenting with intestinal atresia; 178 were males and 93 were females with a male: female ration of 1.9:1. Average gestational age of presentation was 36.2 weeks and average birth weight of 1.9 kg.

Most common cause of intestinal obstruction was duodenal atresia (30.2%), followed by ileal atresias (26.5%). The common causes of intestinal obstruction found during operative period is described in figure no. 1

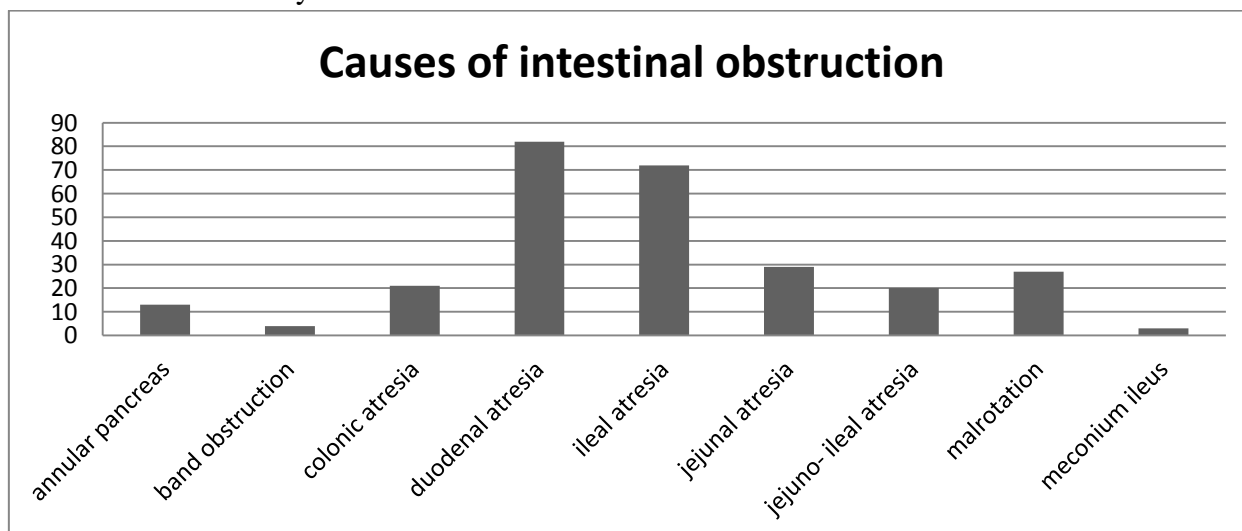
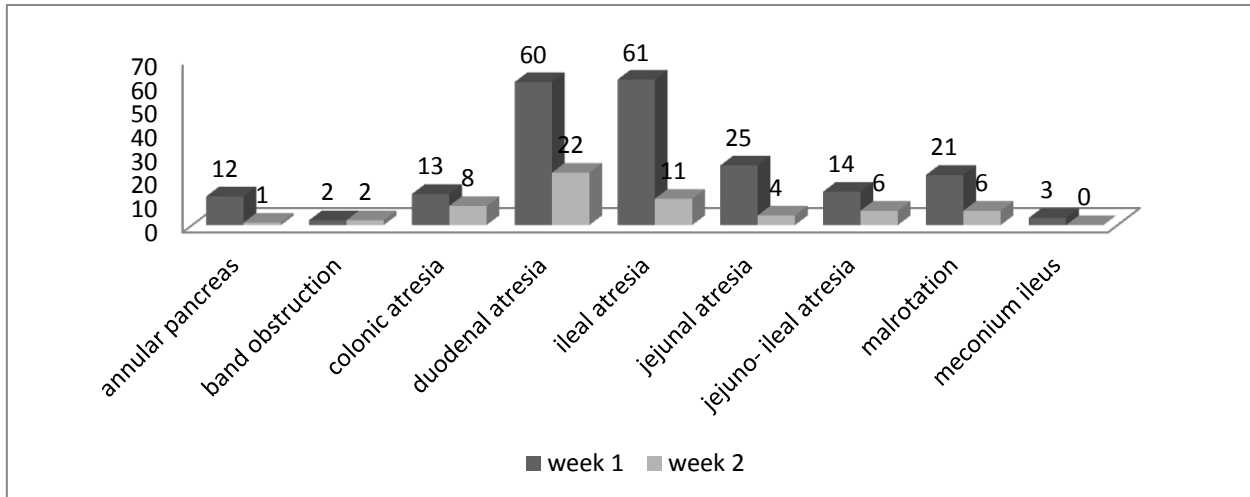


figure no 1 showing distribution of various causes of neonatal intestinal obstruction diagnosed intra operatively

Majority of the neonates presented within first week of life (n= 211) with average age of

presentation of 4.3 days (figure no 2).



**Figure 2:** distribution of causes of neonatal intestinal obstruction and age of presentation

Most common symptoms on presentation were abdominal distension (48.3 %) and vomiting (42.1%). Other symptoms included excessive

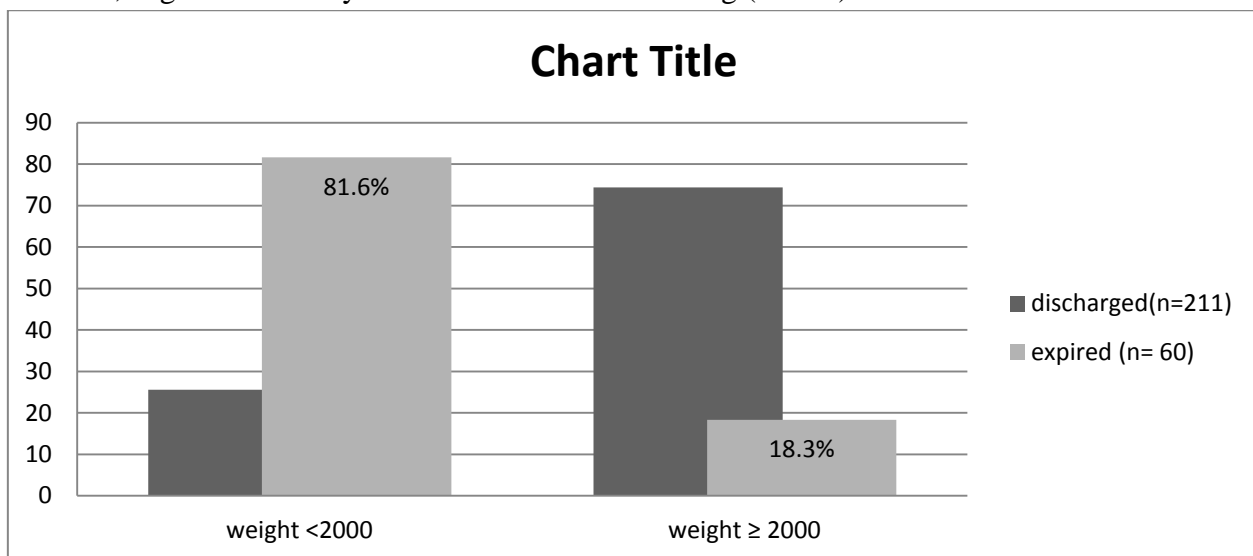
crying, refusal to feed and blood in stools (table no 1).

**Table no 1:** showing clinical presentation and their frequency

Symptoms	n	%
Abdominal Distension	131	48.3
Vomiting	114	42.1
Excessive Crying	15	5.53
Refusal To Feed	9	3.32
Blood In Stools	2	0.73

Out of 271 neonates included in the study 211 (77.8%) were successfully discharged. Among the 60 deaths, highest mortality was observed in

infants with birth weight less than 2kg (81.6%) as compared to neonates with birth weight more than 2 kg (18.3%).



**Figure:** 3associated mortality with birth weight

Duodenal atresia also was associated with a higher mortality rate (31.6%) as compared to other causes of intestinal obstruction which may be due to a larger number of neonates with the diagnosis. Most common causes of post-operative deaths were due to septicaemia (40.3%), anastomotic leak (36.1%) followed by aspiration pneumonia (8.6%). Other causes for post-operative deaths were wound dehiscence, electrolyte imbalance etc. Pre-operative features of sepsis, perforation or late age of presentation was also associated with high mortality.

### Discussion

Intestinal atresias are the most common cause of neonatal intestinal obstruction<sup>(7)</sup>. Atresias are due to failure of recanalization or due to intrauterine vascular catastrophe leading to volvulus, duplication and intrauterine intussusception resulting in atresia of different types. Duodenal atresias result from congenital failure of recanalization that normally occurs during 9-11 weeks of gestational age. It may be frequently associated with other congenital anomalies, such as additional intestinal atresias, congenital heart disease, or as a part of VACTERL association. Antenatally atresia can be diagnosed by polyhydramnios and ultrasonography. Atresia of the colon is much less frequent than of small bowel. The mortality from atresia of the ileum is much higher than from atresia of the duodenum, owing to greater incidence of early perforation<sup>(7)</sup>. Most common cause of NIO in our study was small bowel atresia (56.7%) which was higher as compared to studies conducted by Anjali Verma et al at PGIMS, Rohtak (49.6%)<sup>(6)</sup> and Seth et al in Bhopal (12%)<sup>(11)</sup>. A similar study was conducted at PGIMER in Chandigarh by V N Annigeri et al who also had an incidence of 22.4% for intestinal atresias<sup>(12)</sup>. We further found that amongst the various causes of intestinal atresia duodenal atresia (30.2%) was more common in our setup as compared to Anjali Verma et al study where they had a higher incidence of ileal atresia (21.4%).<sup>(6)</sup>

Male: female ratios are equal as per reported by literature<sup>(7, 13-15)</sup>; in our study the ratio of males was higher (1.9:1). This ratio was similar to the study by Anjali Verma et al (1.5:1)<sup>(6)</sup> and the study conducted by A K Saha et al (1.6:1)<sup>(16)</sup>. Most of the neonates presented to us within first week of life (77.8%) which was similar to the study conducted by A K Saha et al in Khulna (58.6%)<sup>(16)</sup>. The most common symptoms at presentation were abdominal distension (48.3%) and vomiting (42.1%). Anjali Verma et al also had similar presenting complaints with 69% presenting with vomiting and 65% with abdominal distension<sup>(6)</sup>.

Survival rate in our study was 77.8%; which was lower as compared to Anjali Verma et al (83.5%)<sup>(6)</sup>. Similar survival rates have been quoted by Seth et al (80%)<sup>(11)</sup> and A K Saha et al (84%)<sup>(16)</sup>. Mortality rate in our study was 22.2%. Mortality was higher in neonates weighing less than 2kg (81.6%) as compared to 1.3% mortality in neonates more than 2 kg. The mortality associated with neonatal intestinal obstruction ranges between 21% and 45% in developing countries, unlike less than 15% in Europe<sup>(8, 17)</sup>. Postoperative mortality in the study conducted by Anjali Verma et al was 16.4%<sup>(6)</sup> which was in between reported international publications. Most common cause for mortality in our study was septicaemia (40.3%) followed by anastomotic leak (30.1%); which was similar to the study conducted by Anjali Verma et al 36% followed by 11% of cases with anastomotic leak<sup>(6)</sup>. A K Saha in his study had only 22% mortality associated with septicaemia<sup>(16)</sup>. This higher rate of mortality in our study could be due to the fact that our hospital is the only referral centre for paediatric surgery in the state of Rajasthan, hence the delay in starting the initial treatment, transportation time and other undiagnosed metabolic derangements as shown by Narang M et al in his study done at a tertiary centre in Delhi<sup>(18)</sup>. He states that extreme low birth weight (<1kg) and transportation time more than 1hr were significant predictors of mortality. Babies delivered outside the hospital

need to travel several hours to get to a specialist hospital that offers neonatal surgical services during which time the baby's condition may deteriorate, leading to increased operative risk and mortality. Early recognition and immediate treatment of surgical conditions in the new-born infant is, therefore, very important<sup>(11)</sup>.

### Conclusion

Paediatric surgery is a rapidly evolving speciality. A multi-disciplinary approach is essential for a successful outcome of neonatal surgery. This approach begins from antenatal life of the neonate, where suspicious cases can be identified early and referred to a tertiary care centre for delivery. This will reduce the transportation time, incidence of hypothermia, identification of electrolyte imbalance and time to initiation of treatment. Setting up more referral centres in our state may help in improving the survival rate of neonates as well as educating primary physicians and gynaecologist regarding care and transportation may help. There is a definite need for more in depth studies in this part of neonatal surgery.

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