



## STUDY OF INTESTINAL OBSTRUCTION AMONG NEONATES

## Paediatric Surgery

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## ABSTRACT

Failure to pass meconium by a full-term neonate within the first 24 hours should raise a suspicion of bowel obstruction. The commonest reported causes of bowel obstruction in decreasing order includes anorectal malformations, duodenal atresia, jejunoileal atresia, Hirschsprung's disease, meconium ileus and meconium plug syndrome(1). Other neonatal medical conditions like hypothyroidism, hypokalemia, sepsis and congestive heart failure are also reported to cause bowel obstruction (2). The aim of this observational cross sectional study of 60 patients from Dec. 2016 to June. 2018 was to study the types and clinical features of neonatal intestinal obstruction, various modalities of intervention, to study the prognosis and causes of adverse outcome. The study showed that the most common cause of neonatal intestinal obstruction is seen to be anorectal anomalies, predominantly Anorectal Malformations. The diagnosis of these disorders is done with minimal investigations. These anorectal malformations require initial evaluation to rule out associated anomalies and surgical intervention in the form of either anal cut back or stoma creation.

## KEYWORDS

Anorectal Malformations, Duodenal atresia, Hirschsprung disease, Cholestasis

Failure to pass meconium by a full-term neonate within the first 24 hours should raise a suspicion of bowel obstruction. The commonest reported causes of bowel obstruction in decreasing order includes anorectal malformations, duodenal atresia, jejunoileal atresia, Hirschsprung's disease, meconium ileus and meconium plug syndrome (1). Other neonatal medical conditions like hypothyroidism, hypokalemia, sepsis and congestive heart failure are also reported to cause bowel obstruction (2). Some factors attributing to the high mortality in developing countries include prematurity, late presentation, associated severe congenital anomalies and complications of surgery as well as lack of intensive care facilities (Uba et al 2004; Adejuyigbe et al 1992) (7,8) Management of intestinal obstruction is almost always surgical, apart from some notable exceptions.

Despite the advances in neonatal surgery, the outcome of neonatal intestinal obstruction (NIO) in many developing countries has been reported to be poor. Most of the earlier reports from developing countries have concentrated on the outcome of treatment of NIO and paid scant attention to possible trends in pattern, management, and outcome (Ekenze et al 2007)(9) We hope that the information from this study highlights areas of need and provides an avenue for possible collaboration with centers in more developed countries that have better outcome.

## METHODS

This is an observational cross-sectional study of neonates with intestinal obstruction at a tertiary care hospital. It is a time bound study of 60 patients of neonatal intestinal obstruction at a tertiary health care center over a span of 2 years from Dec. 2016 to June. 2018.

## Study procedure:

In all babies, the diagnosis was made initially by careful clinical examination at birth to see for intestinal obstruction & presence of other anomalies. Abdominal USG was done to screen the abdomen for any anomalies. A nasogastric tube was inserted to exclude esophageal atresia and a piece of gauze was placed on the tip of the penis to check for presence of meconium particles, if not present urine examination is done. According to the level of intestinal obstruction patient were operated. The patients on follow up were re-examined treated accordingly.

## RESULTS

In our study 66.67% of the total cases of neonatal intestinal obstruction were those of Anorectal Malformations. It was also found that 85% of the cases of Anorectal Malformations were males. Male preponderance was seen in all cases except duodenal atresia where males were 13.33%

of all cases and females 62.5%. In total 73.33 % of all cases of intestinal obstruction were males.

Figure no 1. Sex incidence of different anomalies

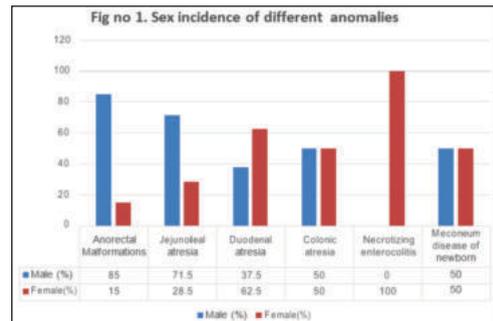
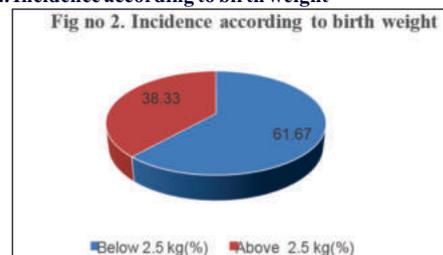


Table no 1. Age at presentation

Sr no	Disease	During 1st week (%)	After 1st week (%)	Total
1	Anorectal Malformations	39(97.5)	1(2.5)	40
2	Duodenal atresia	7(87.5)	1(12.5)	8
3	Jejunoileal atresia	5(71.4)	2(28.5)	7
4	Colonic atresia	2(100)	0	2
5	Hirschsprung's disease	0	0	0
6	Malrotation	0	0	0
7	Necrotizing enterocolitis	1(100)	0	1
8	Meconium disease of newborn	2(100)	0	2
	Total	56(93.33)	4(6.67)	60

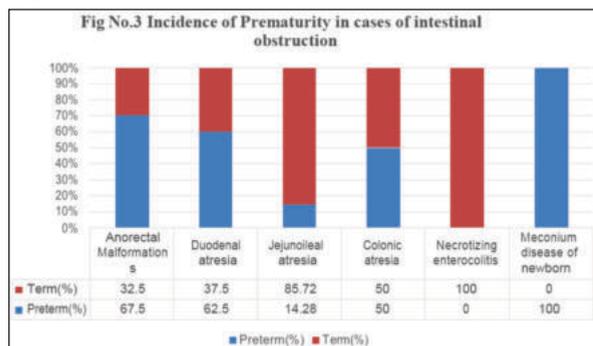
About 93.33% presented with low birth weight in our study.

Figure no 2. Incidence according to birth weight



Majority of cases presented with high incidence of low birth weight around 61.67%, most common association being duodenal atresia.

**Fig No.3 Incidence of Prematurity in cases of intestinal obstruction**



**Table no 2. Various clinical presentations in case of intestinal obstruction in neonates in at our institute**

CLINICAL PRESENTATION	n(%)
Distension of abdomen	48(80)
Vomiting	39(65)
Absent anal opening	40(66.66)
Frothing	3(5)
Refusal of feeds	36(60.00)
Lethargy	40(66.66)
Not passed meconium	33(55.00)

The most common clinical presentation seen in our study was distension of abdomen 80% followed by lethargy 66.66%, absent anal opening 66.66%, vomiting 65% and refusal of feeds 60%.

**Table no 3. Procedures performed for various presentations of neonatal intestinal obstruction**

Procedure	Number
Ileostomy	5
High Sigmoid Colostomy	19
Jejuno-jejunal Anastomosis	4
Duodeuno-duodenal Anastomosis	4
Duodenojejunal Anastomosis	1
Gastroduodenostomy	1
Transverse Colostomy	14
Jejuno-ascending Anastomosis	1
Strictureplasty	1
Meconium Cyst Excision	1
Cut Back Anoplasty	2
Gastrojejunostomy	1
Jejunoileal Anastomosis	4
Caecostomy	1
Ileo-ascending Anastomosis	1

The procedures performed as per our study included highest number of high sigmoid colostomy i/v/o high ARM, followed by transverse colostomy, ileostomy and jejunoileal anastomosis

**Table no 4. Various intra op findings in cases of intestinal obstruction in neonates**

Intra op findings	n(%)
colonic pouch	2(3.33)
dilated colon	30(50)
jejunal atresia	7(11.67)
duodenal atresia	8(13.33)
dilated small bowel	14(23.33)
stricture	2 (3.33)
meconium cyst	1(1.67)
necrotizing enterocolitis	2(3.33)

According to our study most common intra operative finding was that of dilated colon loops 50%, dilated small bowel 23.33%, duodenal atresia 13.33% and jejunal atresia 11.67%.

**Table no 5. Postsurgical and medical complications of neonates with intestinal obstruction**

Surgical complications	
Wound dehiscence	2
Woundinfection/excoriation	3
Leakage	0
Stenosis	0
Prolapse of stoma	1
Medical complications	
Neonatal sepsis	13
Cholestasis	0
Pneumonia	27
Sepsis	13
Cardiogenic shock	2
Pneumothorax	0
Pneumonia	27
Death	
	38

Our study showed wound dehiscence and excoriation to be the most common surgical complication and neonatal sepsis and pneumonia to be the most common medical complication associated

**Table no 6. Survival/ mortality at our institute**

Disease	Survival n(%)	Mortality n(%)	Total
Anorectal Malformations	18(45.00)	22(55.00)	40
Duodenal atresia	1(14.29)	6(85.71)	7
Jejunoileal atresia	2(25.00)	6(75.00)	8
Colonic atresia	1(50.00)	1(50.00)	2
Necrotizing enterocolitis	0	1(100)	1
Meconium disease of newborn	1(50.00)	1(50.00)	2
Total	23(38.33)	37(61.67)	60

In our study, it was seen that mortality rates were highest for duodenal atresia (85.71%) and jejunoileal atresia 75% and Anorectal Malformations 55% thus in total showing a mortality rate of 61.67%.

**DISCUSSION:**

**1. Etiology**

The commonest cause of neonatal intestinal obstruction is anorectal malformations as per this study (66.66%) followed by small intestinal obstruction due to atresia.

*Observation of incidence (%) of various disorders causing neonatal intestinal obstruction*

DISORDER	Rathore et al <sup>(10)</sup>	Nisar et al <sup>(13)</sup>	Petra et al <sup>(11)</sup>	Our study
ANORECTAL MALFORMATION	68.21	27.8	23.89	66.66
DUODENAL ATRESIA	6.2	13.9	25.66	13.33
JEJUNOILEAL ATRESIA	7.61	13.9	23.00	11.67
COLONIC ATRESIA	0.3	11.1	11.50	3.33
HIRSCHSPRUNG DISEASE	5.9	-	-	-
MECONIUM DISEASE	2.9	11.1	-	3.33
NECROTISING ENTEROCOLITIS	3.9	5.6	-	1.67

**2. Sex**

In total 73.33 % of all cases of intestinal obstruction were males in our study. Rathore-et<sup>(10)</sup> al also stated in his study a clear predominance of male incidences in all cases studied which is concurrent with our study except in cases of duodenal atresia where the incidence of female is more.

**3. Age at presentation**

Our study shows a predominance in the age at presentation being first week without any exceptions. Nisar et al<sup>(13)</sup> also suggested that most cases are males with 12hrs to 26 days being age at presentation.

**4. Birth weight**

Our study of birth weight shows predominance of low birth weight (<2.5kg) at presentation probably attributing to an increased mortality in post operative periods presentation shows a contrasting picture between our study and Rathore et al<sup>(10)</sup> showed presentation being predominantly above 2.5 kg (79.13%). This low birth weight is attributable to high mortality rates.

## 5. Associated anomalies

The presence of associated congenital anomalies in neonates treated surgically in a study by Maria Petra et al<sup>(11)</sup> shows highest presentation of Downs syndrome followed by malrotation ,meconial disease ,gastroschisis ,cardiopathies and high anorectal malformations in decreasing order of predominance .

Our study showed a wide range of associated congenital anomalies with high anorectal malformations being the most common; followed by tracheoesophageal fistula, meconium related disease, congenital heart disease, bifid scrotum and dysplasia of hip in decreasing order of presentation.

## 6. Clinical presentation

The various clinical presentations in our study were in accordance with Maria Petra et al. showing distension of abdomen to be the most common presenting feature followed by lethargy, vomiting, absent anal opening, refusal of feeds, not passing meconium and frothing of mouth in decreasing order of frequency.

## 7. Diagnosis

Vinocur et al<sup>12</sup> suggested that high intestinal obstruction patients can undergo direct surgery without additional imaging; Low intestinal obstruction can be treated with enema trial after radiological investigation. In our study, minimal investigations were used for diagnosis.

## 8. Intraoperative findings

Our study found that dilated colon is the most common finding followed by dilated small bowel, duodenal atresia, jejunal atresia, Anorectal Malformations, stricture, meconium cyst, colonic pouch and necrotizing enterocolitis. High sigmoid colostomy is the procedure of preference in the concerned institute followed by ileostomy

## 9. Morbidity and Mortality

In our study it was observed that morbidity associated with surgical complications included wound infection and excoriation, prolapse of stoma; while the medical complications recorded were cases of neonatal sepsis most commonly. In a study by Maria Petra et al<sup>(11)</sup> morbidity associated with surgical complications was most commonly due to wound dehiscence followed by wound infection, leakage at anastomotic site and stenosis in decreasing order of frequency; while the medical complications included neonatal sepsis as the most common followed by cholestasis, pneumonia, short intestinal syndrome. Nisar et al mention that aspiration pneumonia was the most common cause of mortality followed by hypothermia and cardiac arrest with a mortality rate of 66 %. It was noted by Nisar et al that a fully equipped pediatric surgical unit with trained surgeon, anesthetist and nursing staff can improve the prevalent mortality rates in these cases. Our study showed mortality associated most commonly with sepsis and pneumonia followed by cardiogenic shock and disseminated intravascular coagulation.

Present study shows poor survival in cases of small bowel atresia and necrotizing enterocolitis with exceptions of duodenal atresia showing higher mortality as compared to Rathore et al, the probable reasons attributable for the same being lack of dedicated neonatal care unit, lack of trained postoperative neonatal management staff in the concerned hospital the other reasons being most cases of delayed, low birth weight and preterm with congenital anomalies presenting to us.

## CONCLUSION:

This study describes intestinal obstruction as one of the most common emergency encountered in neonates with the most common cause being Anorectal Malformations. The diagnosis of these disorders is done with minimal investigations. These anorectal malformations require initial evaluation to rule out associated anomalies and surgical intervention in the form of either anal cut back or stoma creation. With minimal training general surgeons at district level hospitals should be able to do the initial surgical procedures in neonates thus preventing referral to far off places to get superspeciality pediatric surgery opinion and prevent neonatal mortality. The post operative complications can be improved by early diagnoses and prompt intervention. This study being time bound further study needs to be done to draw conclusions and make definite plans for management of neonatal intestinal obstruction at hospitals where specialized neonatal services are lacking.

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