

Patterns and Outcome of Neonatal Intestinal Obstruction in Kanti Children's Hospital

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ABSTRACT

Introduction: Neonatal intestinal obstruction is the most common neonatal surgical emergency. More than 75% of neonatal surgeries are done for the correction of this problem. The outcome of this obstruction mainly depends upon the causes of obstruction, clinical condition of the patient, associated anomalies, expertise and centre where the patient is dealt. This study was undertaken to study the clinical features and outcome of neonatal intestinal obstruction presented in our centre.

Methods: The medical records of all neonates admitted in the surgical NICU were selected and cases with the diagnosis of neonatal intestinal obstruction and managed surgically during two years period from September 1, 2015 to September 1, 2017 were retrospectively reviewed and analysed in regard to age at presentation, sex, weight, gestation, postoperative diagnosis and their outcome.

Results: Out of 235 admitted neonates, 205 cases were treated surgically for intestinal obstruction. There were a total of 154 (75.2%) males and 51 (24.8%) females. Mean age at presentation was 4.5 days and average weight was 2.25 kg. Among them, anorectal malformation (ARM) 88 (42.92%), intestinal atresia 59 (28.78%), Hirschsprung's disease 38 (18.53%), malrotation of gut 10 (4.87%) and meconium ileus 10 (4.87%) were the etiology. Among intestinal atresia, duodenal atresia 27 (45.76%) was the commonest one followed by ileal atresia 24 (40.67%), six jejunal atresia (10.16%) and two colonic atresia (3.38%). Overall, 160 neonates survived (78.04%). Among the survival, Hirschsprung's disease was 34 (89.47%), ARM 78 (88.63%), seven malrotation of gut (70%), six meconium ileus (60%) and intestinal atresia 35 (59.32%).

Conclusion: Neonatal intestinal obstruction is the most common neonatal surgical emergency in Kanti Children's Hospital. Anorectal malformation was the commonest etiology followed by intestinal atresia and Hirschsprung's disease. Overall survival rate was 78%. Cases with Hirschsprung's disease and anorectal malformation had about 90% survival rate. Intestinal atresia was the major cause of mortality occupying 53.35% of total mortality of 21.95%. Mortality is mainly due to delayed diagnosis, referral and intervention which lead to higher complications of cases.

Key words: Anorectal malformation; Hirschsprung's disease; Intestinal obstruction; Meconium ileus



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INTRODUCTION

Neonatal intestinal obstruction constitutes a main bulk of neonatal surgical problems and occurs in approximately one in 2,000 live births.¹ The causes of obstruction are diverse with different embryological origins, and some etiologies are not yet well defined. Common causes of neonatal intestinal obstruction are intestinal atresia, anorectal malformation (ARM), Hirschsprung's disease (HD), meconium ileus, malrotation etc.^{2,3} It is associated with high mortality if not diagnosed promptly and treated adequately on time. They usually require management by dedicated paediatric surgical and anaesthesia expertise in medical centres equipped with specialised neonatal intensive care. Depending on the etiology and the level of obstruction, prompt surgery may be indicated for treatment. The outcome of these surgical problems postoperatively depend upon multiple factors like gestational age, birth weight, time taken to reach hospital and intervention, associated anomalies and the level of dedicated surgical centres.^{4,5}

METHODS

This was a retrospective study carried out over a period of during two years from September 1, 2015 to September 1, 2017 in the Department of Paediatric Surgery in the tertiary level central hospital, located in Kathmandu, Nepal. All neonates admitted in our SICU with the diagnosis of intestinal obstruction and managed surgically were included in this study. The age, sex, birth weight, clinical features, diagnosis, post-operative diagnosis, management and outcome was noted in proforma and analysed. Descriptive statistics were used for analysis.

RESULTS

During the study period a total of 235 neonatal cases were admitted in surgical ICU. 205 (87.23%) cases were diagnosed as intestinal obstruction and underwent surgical intervention. Among them, 154 (75.12%) were males and 51 (24.87%) were females. Male to female ratio was 3:1. Out of 205 cases 170 (82.92%) were preterm and 35 (17.07%) were term babies.

Most common cause of obstruction was anorectal malformation - 88 (42.9%), followed by intestinal atresia 59 (28.78%), Hirschsprung's disease 38 (18.53%), malrotation 10 (4.87%) and meconium ileus 10 (4.87%). Survival rate for Hirschsprung's disease was 89.4%, 88.6% for anorectal malformation, 70% for malrotation, 60% for meconium ileus and 59.32% for intestinal atresia (Table 1).

Most common cause of intestinal atresia was duodenal atresia with 45.76% followed by ileal atresia 40.67%, jejunal atresia 10.16% and colonic atresia 3.38%. Survival rate in duodenal atresia was 74.04%, jejunal atresia 66.66% and ileal atresia 37.5%. Both cases of colonic atresia, which was the rarest among intestinal atresia, survived (Table 2).

Mortality was found to be higher in full-term neonates in comparison to preterm. Mortality rate in preterm was only 14.7% whereas it was 57.14% in term babies (Table 3).

DISCUSSION

Neonatal intestinal obstruction is the most common surgical emergency requiring immediate surgical intervention in a new born period. Of the total admission in surgical ICU, 205 (87.23%) of total cases were operated for intestinal obstruction. Among 205 study population, 154 (75.12%) were males and 51 (24.87%) were females with a male-female ratio 3:1. Similar observations indicating male predominance were reported by other studies.^{2,3,6} But the study conducted by Shakya VC et al., Burjonrappa S et al. showed females outnumbered males.^{7,8}

The causes of obstruction in our series were ARM (42.92%), Hirschsprung's disease (18.53%), intestinal atresia (28.78%), meconium ileus (4.87%) and malrotation (4.87%) (Table 1). Nearly similar observation in the pattern of the etiology was reported by Shah AK et al. with 35.63% ARM, 23% Hirschsprung's disease, 14% intestinal atresia and 57.1% ARM, 19% Hirschsprung's disease, 12.7% intestinal atresia in Ademuyiwa et al. in Nigeria.^{3,5} All these studies showed anorectal malformation as the most common cause of neonatal intestinal obstruction.^{3,5,9} Intestinal atresia

Table 1. Causes of intestinal obstruction and surgical outcome

SN	Disease	Survival No of cases (%)	Mortality No of cases (%)	Total cases
1	Anorectal malformation	78 (88.6%)	10 (11.36%)	88 (42.92%)
2	Intestinal atresia	35 (59.32%)	24 (40.67%)	59 (28.78%)
3	Hirschsprung's disease	34 (89.47%)	4 (10.52%)	38 (18.53%)
4	Malrotation	7 (70%)	3 (30%)	10 (4.87%)
5	Meconium ileus	6 (60%)	4 (40%)	10 (4.87%)
	Total	160 (78.04%)	45 (21.95%)	205 (100%)

is the second most common cause of intestinal obstruction in our study. Verma A et al. got intestinal atresia as the most common cause. This may be because they did not include ARM cases in their study.²

Among the various causes of intestinal atresia in our series, duodenal atresia (45.76%) was the most common one followed by ileal atresia (40.67%), jejunal (10%) and colonic (3.3%) (Table 2). Similar to ours Burjonrappa S et al. had duodenal atresia as the commonest where as Verma A et al. showed the highest incidence of ileal atresia (43.24%) followed by jejunal atresia (31%) with duodenal atresia (20.9%). Colonic atresia was the least common in both of our studies.^{2,8}

The mortality associated with neonatal intestinal obstruction ranges between 20% and 45% in developing countries, unlike less than 15% in Europe.^{10,11} Overall postoperative mortality in our

Table 3. Comparison of mortality in preterm and full-term newborns

Newborn	Survival	Mortality	Total
Preterm	145	25 (14.7%)	170
Full-term	15	20 (57.14%)	35
Total	160	45	205

Table 2. Causes of different intestinal atresia and surgical outcome

SN	Disease	Survival No of cases (%)	Mortality No of cases (%)	Total cases
1	Duodenal atresia	20 (74.04%)	7 (25.9%)	27 (45.76%)
2	Jejunal atresia	4 (66.66%)	2 (33.33%)	6 (10.16%)
3	Ileal atresia	9 (37.5%)	15 (62.5%)	24 (40.67%)
4	Colonic atresia	2 (59.3%)	0 (0%)	2 (3.38%)
	Total	35 (59.3%)	24 (40.67%)	59 (100%)

study was 21.95% which was higher than reported in international publications. Our mortality is comparable with the studies reported by Seth et al (20%) and 22.2% by Amit et al.^{12,13,14}

Survival rate among anorectal malformation was 88.63%, Hirschsprung's disease 89.97%, meconium ileus 60%, intestinal atresia 59.32% and malrotation 70%. Highest survival was noted in Hirschsprung's disease and ARM and the lowest in intestinal atresia. Shah AK et al. and Talari V et al. in their study also had similar survival rates for anorectal malformation, Hirschsprung's disease and intestinal atresia. But Talari V et al. showed 88% survival rate for intestinal atresia. This might be because their sample size was low.^{3,15}

Out of total mortality 45(21.9%), intestinal atresia occupies 24 (53.33%) in our study. Among cases of intestinal atresia, mortality was highest in cases of duodenal atresia as was shown in Deshmukh SN et al. whereas we found ileal atresia with highest mortality and duodenal atresia as lowest mortality.¹⁶ The mortality rates in Nepal and developing countries tend to be very high because these infants are usually underweight and brought late to hospital as compared to western countries. The delay in postoperative oral feeding in atresia unlike other causes of obstruction and long-term need of total parenteral nutrition are the main predicting factors of higher mortality. This delay leads to neonatal sepsis which in a resource limited setting like ours, increases mortality.^{7,9,14,17}

Most common cause for mortality in our study was septicemia (40.3%) followed by anastomotic leak (30.1%) which was similar to the study conducted by Verma A et al.² This higher rate of mortality in our study could be due to the fact that our hospital is the only referral centre for paediatric surgical patients in the whole country. Patients have to waste time in reaching us which leads to delay in starting the initial treatment.^{1,4,5,18}

The high mortality is not directly related to neonatal preterm and low birth weight as seen in the study by Adenmyiwa et al.⁵ They have seen late presentation to the hospital after birth beyond two days of life as the main cause of mortality in their series. In our series mortality is seen more in neonates who were presented to us beyond average age of four days. Thus this high mortality could be prevented if they were diagnosed and managed early.⁴ Neonates delivered in remote areas need to travel several hours to get to a tertiary specialist hospital that offers neonatal surgical services during which time their condition may deteriorate, leading to higher operative risk and mortality. Early recognition and immediate treatment of surgical conditions in the new-born infant is, therefore, very important.^{4,6,18}

Therefore, early diagnosis and timely intervention in dedicated neonatal surgical intensive care are undoubtedly the crucial factors in improving outcome in neonatal intestinal obstruction. Paediatricians are usually the first attending physician for early diagnosis in most instances. So, both paediatricians and surgeons have a contributing role in reducing neonatal mortality

within existing facilities. Education and training to all birth attendants and village health workers in recognition of signs of obstruction (e.g. bilious vomiting, abdominal distension, failure to pass meconium, imperforate anus), primary management and early referral to paediatric surgical centres may further reduce mortality from neonatal intestinal obstruction in developing world like ours.^{1,3,10,19-21}

Our study provides a valid representation of pattern and outcome nationwide. There is a need for more studies in depth on this topic of neonatal intestinal obstruction. We hope in coming years further studies will be done on this topic with further analysis on correlation of different variables like birth weight, socioeconomic condition, etc.

CONCLUSIONS

Neonatal intestinal obstruction is the commonest neonatal surgical emergency in Kanti Children's Hospital. Anorectal malformation is a leading cause of obstruction followed by intestinal atresia. The incidence is higher in males than female with overall male to female ratio of 3:1. Overall survival rate is 78% with Hirschsprung's disease and 90% with anorectal malformation. Intestinal atresia is the major cause of mortality occupying 53.35% of total mortality. The mortality is more in neonates usually presenting late with severe complications and associated anomalies. Early diagnosis, early intervention, dedicated staff and well equipped neonatal intensive care units are the major factors in improving postoperative outcome.

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