

Pediatric Intestinal Obstruction in Children Less Than 12 Years – Observational Study in a Tertiary Care Hospital and Review of Literature**L Dasaradha Rao¹, S Rohit², V L Sravanthi³, Sasidhar Thorlikonda⁴**¹Associate Professor, Department of Pediatric Surgery, Siddhartha Medical College, Vijayawada, Andhra Pradesh²Assistant Professor, Department of Pediatric of Pediatric Surgery, Siddhartha Medical College, Vijayawada, Andhra Pradesh³Assistant Professor, Department of Pediatric of Pediatric Surgery, Siddhartha Medical College, Vijayawada, Andhra Pradesh⁴Assistant Professor, Department of Pediatric of Pediatric Surgery, Siddhartha Medical College, Vijayawada, Andhra Pradesh

Received: 25-11-2023 / Revised: 23-12-2023 / Accepted: 26-01-2024

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Conflict of interest: Nil

Abstract:**Aim:** To study the clinical presentation, the demography, etiology, presenting features, management and outcome of intestinal obstruction in pediatric population of age less than 12 years over a period of 1.5 years in a tertiary care institute.**Materials and Methods:** It is a retrospective observational study of children presented with intestinal obstruction managed over a period of 1.5 years from June 2022 to December 2023 at Department of pediatric surgery Siddhartha medical college and hospital, Vijayawada. All children admitted into the department of pediatric surgery with a diagnosis of acute intestinal obstruction were studied. Neonatal cases (children age less than one month), Children with age more than 12 years and cases with paralytic ileus were excluded from current study. Cases were diagnosed by clinical features, x-ray erect abdomen. All children were subjected for serological examination for dys-electrolytemia. Contrast enhanced computed tomogram (CECT) was demanded for cases in suspicion. Hospital records were verified and analysed using MS office professional 2013 and SPSS software version 29.**Results:** a total of 67 cases were managed for intestinal obstruction during the period of study. Male children (n=41) are effected most commonly. Pain abdomen was the most common presenting complaint followed by bilious vomiting and distension of the abdomen. Shock and dys-electrolytemia were among the complaints in 6 and 12 cases respectively. The commonest etiology identified was adhesions and congenital bands (n=23) in the present study followed by Intussusception. Trichobezor was the least common cause seen in only one child. All children were managed surgically. 2 cases succumbed to death due to continued dyselectrolytemia and shock in the present study.**Conclusions:** Intestinal obstruction is one of the common Pediatric Surgical emergency accounting for nearly 15% of the admissions at our center. The incidence is higher in males than in females. Abdominal pain, vomiting, abdominal distention and constipation are the predominant presenting symptoms. Adhesions and Congenital bands are the commonest type of intestinal obstruction 34.3%. Intussusception 28.3% and Malrotation 8.9% are the next common types in our study. Mortality is significantly higher in those who present late (>72hrs) than in those presenting between 24 to 72hrs. Mortality was noted in patients presenting late with signs of peritonitis, septicemic shock, gangrene of the bowel and perforation. Early diagnosis, correction of dyselectrolytemia and shock and timely surgical management can prevent gangrene of bowel and reduce mortality.**Keywords:** Acute Intestinal Obstruction (AIO), Non-neonatal, Pediatric Age.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Acute intestinal obstruction represents one of the most common emergencies in paediatric surgery. Children with intestinal obstruction can be broadly divided in two groups congenital and non-

congenital depending on the causes that lead to symptoms. They can also be divided on the basis of age of presentation into neonatal and non-neonatal as the etiology differs in both [1]. Most commonly

the causes for neonatal intestinal obstruction are congenital lesions like intestinal atresia, anorectal malformation, Hirschsprung's disease, meconium ileus. Intestinal obstruction should be suspected in any child with persistent vomiting, distention of abdomen and abdominal pain [2]. The various causes of intestinal obstruction in children include intussusception, post-operative adhesions, volvulus, hernias, abdominal tuberculosis and obstruction due to ascaris lumbricoidis infestation [3,4,5]. Delayed presentation of hirschsprung's disease can be other cause. Condition like paralytic ileus can mimic features of intestinal obstruction which can be managed conservatively.

Trichobezor is relatively a rare cause of the pediatric intestinal obstruction. Intestinal obstruction is a potentially life threatening condition. If diagnose is delayed or improperly managed, the condition can progress to vascular compromise of the intestine which causes bowel necrosis, perforation, sepsis and death. Hence early recognition and prompt treatment is mandated [2]. This study was conducted to document various etiologies and outcome of intestinal obstruction in children older than 1month of age upto 12 years presenting to a tertiary care hospital.

Materials and Methods

This is an observational study of cases presented with features of intestinal obstruction to the department of pediatric surgery, Siddhartha medical college, Vijayawada (both elective and emergency) during the period of June 2022 to December 2023 i.e over a period of one and half years. Cases that are in the neonatal age group i.e babies with age less than 1 month, children belonging to age more than 12 years and cases of paralytic ileus were excluded from the study. Every patient underwent a

plain x-ray of the abdomen in erect posture, ultrasound abdomen, complete blood picture, serum electrolytes and serum creatinine. In few cases upper gastrointestinal series or barium enema was done. Contrast enhanced CT was ordered for selective cases especially cases with doubtful Malrotation with features of intestinal obstruction. All patients were admitted. Patients with dehydration and electrolyte imbalance was corrected by administration of intravenous fluids and nasogastric tube aspiration, prophylactic broad spectrum antibiotics were given and blood was cross matched prior to surgery. All of the patients underwent laparotomy and etiology confirmed on the operative table. Postoperatively the management consisted of nasogastric aspiration, iv fluid, iv antibiotics and iv paracetamol as analgesic. Orals were allowed depending on the clinical improvement by day 2 to 3 and discharged home eventually.

Observations

A total of 3642 outpatients were examined at the department of pediatric surgery during a period of one and half years from June 2022 to December 2023 among which 2266 were male children and 1376 were female children. Total inpatients were 926 among which male children were 532 and female children were 394.

Total no of cases presented with features in suspicion of acute intestinal obstruction were 121 cases. 9 cases among them were diagnosed as paralytic ileus, 36 cases belong to babies less than one month (neonatal) and 9 cases belong to the age group of more than 12 years. 67 cases presented with in the age range of 1 month and 12 years which were included in the present study were (n=67).

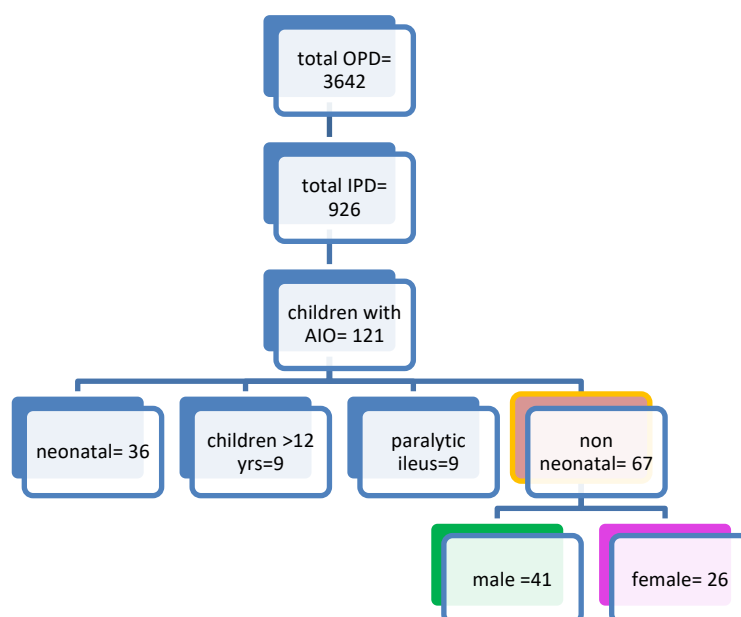


Figure 1:

Age incidence: Majority of the cases presented during 1 month to 1 year of age (n=33). 14 cases presented between 1-3 years. 10 cases presented between 3-6 years. 7 cases presented between 6-9 years and 3 cases presented between 9-12 years.

Table 1:

Age	1m-1yr	1- 3 yrs	3-6 yrs	6-9 yrs	9-12 yrs	total
TOTAL	33	14	10	7	3	67

Sex incidence: Male children were more commonly effected (n=41) than female children in the present study. The ratio is 1.57:1.

Table 2:

Age	1m-1yr	1- 3 Yrs	3-6 Yrs	6-9 Yrs	9-12 Yrs	Total
female	12	7	4	2	1	26
male	19	7	6	5	2	41
Total	33	14	10	7	3	67

Etiology:

Adhesive intestinal obstruction due to congenital bands had been the leading cause in the present study. A total of 23 cases have been recorded with the said cause. Among these infantile age is commonly effected followed by toddlers. Intussusception was found to be the cause among 19 cases. Malrotation was noted in 6 cases. Meckel’s diverticulum acted as lead point for obstruction among 3 cases. Mesenteric /omental cysts were noted in 5 cases. Some of the cases also presented with com-

plication like rupture of the cyst, hemorrhage into the cyst. 2 of the cases presented with features of shock. Most of these cases were diagnosed antenatally. Post appendicectomy adhesions and obstructed hernia were found to be causing features of intestinal obstruction in 4 and 3 cases respectively.

Delayed presentation of Hirschsprung’s disease was noted among 3 cases. Intestinal obstruction due to Trichobezor was found to be rare cause among the children. It was noted in a single case in present study.

Table 3:

Causes Of Obstruction	1m-1yr	1- 3 yrs	3-6 yrs	6-9 yrs	9-12 yrs	total
Adhesions and Bands	14	8	1	0	0	23
Intussusception	16	2	1	0	0	19
Malrotation	1	1	3	0	1	6
Meckel’s diverticulum	0	0	1	1	1	3
Obstructed Hernia	1	2	0	0	0	3
P.O.Appendicectomy adhesions	0	0	2	2	0	4
Delayed Hirschsprung's	0	0	1	2	0	3
Mesenteric/ omental cysts	1	1	1	2	0	5
Ileocaecal Trichobezoar	0	0	0	0	1	1
Total	33	14	10	7	3	67

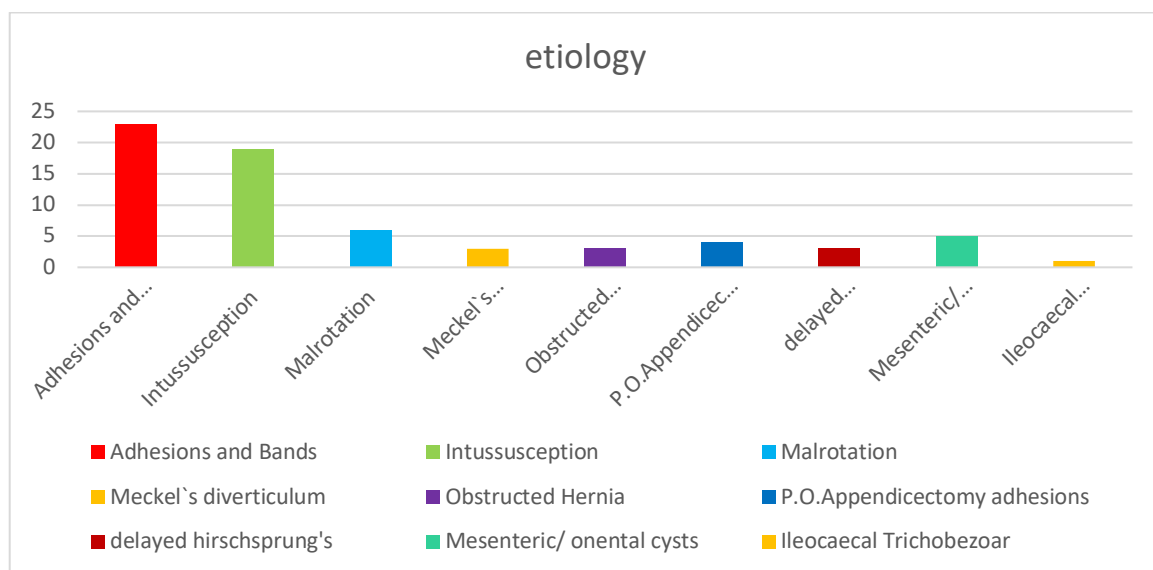


Figure 2:

Time of presentation: Most of the children were presented between 24 – 72 hours. Delayed presentation of >72 hours was noted in 3 children. 8 cases presented early (<24 hrs).

Table 4:

Time of Presentation	No: of Patients
Less than 24hrs	8
24 to 48hrs	34
48 to 72hrs	22
> 72hrs	3

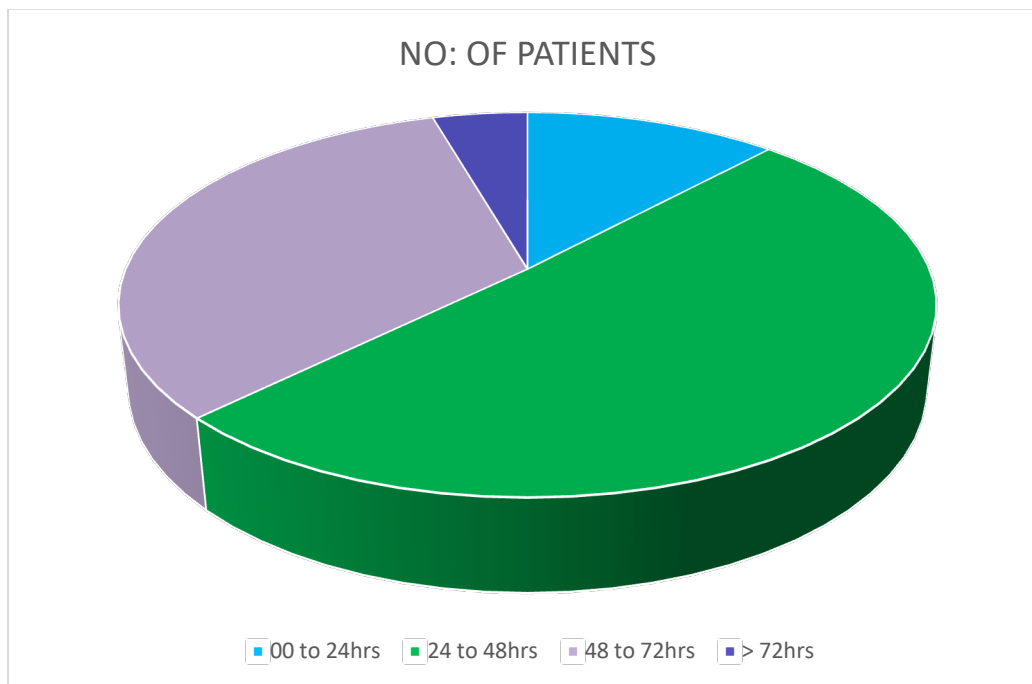


Figure 3:

Clinical features:

Cases were presented with multiple complaints in combinations. Pain in the abdomen and vomiting were the leading presenting complaints among the study children. These were noted in 65 and 62 cases respectively which account for 97% and 92.5%

of the total cases. Next common presenting symptoms were abdominal distension, constipation and blood in stools. Mass per abdomen was noted in 16 cases. 7 cases presented with fever.

Dyselectrolytemia was noted in 12 cases. Features of shock and peritonitis were noted in 4 cases.

Table 5:

Clinical Feature	No. of Patients	Percentage
Pain abdomen	65	97
Vomiting	62	92.5
Abdominal Distention	38	56.7
Constipation	46	68.6
Peritonitis & shock	4	6
Bloody stools	32	47.7
Mass abdomen	16	23.88
fever	7	10.4
dyselectrolytemia	12	17.9

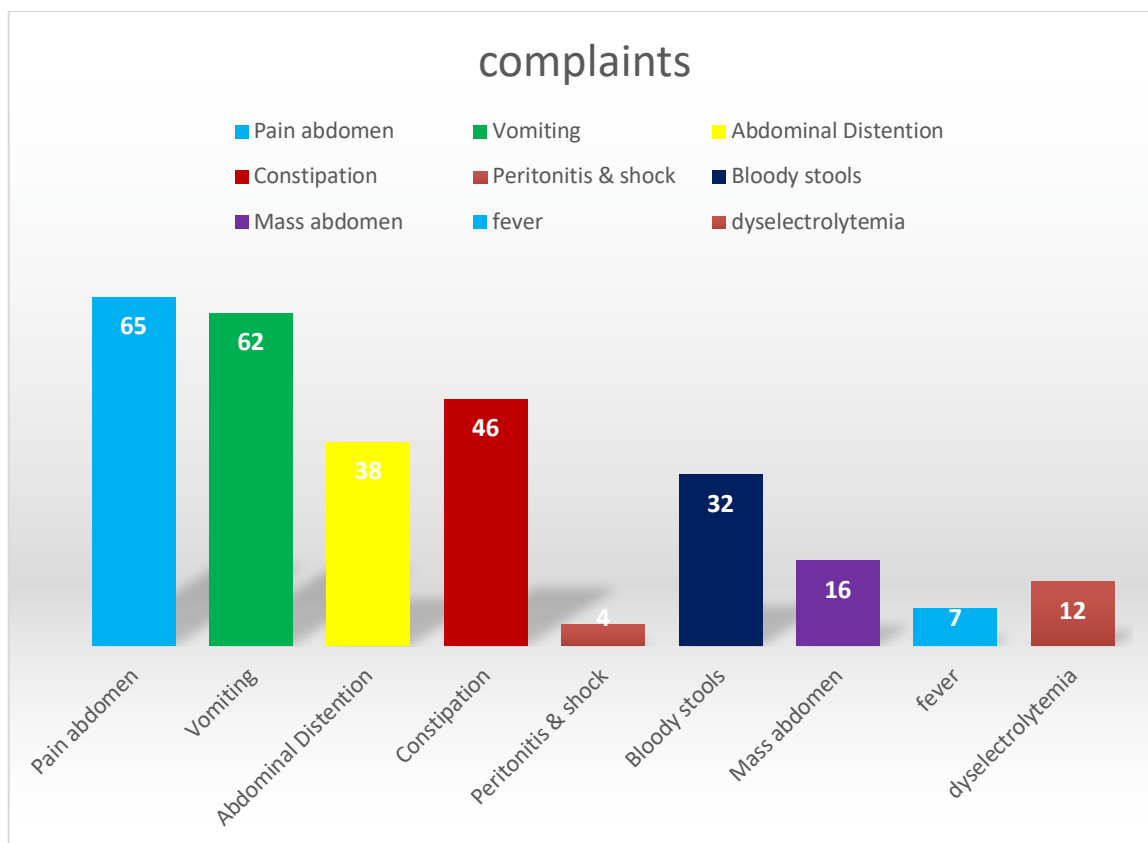


Figure 4:

Management:

All of the cases were examined for dyselectrolytemia and dehydration status before taken-up for surgery. All cases underwent laparotomy. Appropriate surgical measure was taken intraoperatively depending on the etiological factor.

Adhesive bands were released for 24 cases (22 cases of congenital bands and 2 cases of post-operative appendicitis) and 2 cases underwent resection and

anastomosis (R+EEA). Among 19 cases of intussusception, 11 cases required reduction, 7 cases required reduction and appendectomy and one case required R+EEA. Ladd’s procedure was done in 4 cases. 2 cases of Malrotation underwent R+EEA. Stoma creation was done in 4 cases (one case of post appendectomy with adhesive obstruction and 3 cases of Hirschsprung’s disease). All omental/ mesenteric cysts were excised. Herniotomy was done in 3 cases.

Table 6:

Procedure Done	Number
Laparotomy and release of bands	24
Reduction of intussusception	11
Reduction of intussusception and appendectomy	7
Ladd’s procedure	4
Stoma creation	4
Excision of cystic lesion	5
Enterotomy	1
resection and end to end anastomosis (R+EEA)	8
herniotomy	3
total	67

Postoperatively all are managed with intravenous fluids, IV antibiotics and IV analgesics.

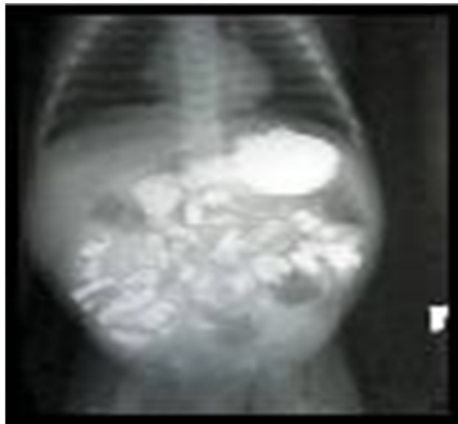
Mortality:

2 cases succumbed to death in this study. These cases are those who presented to us late and were in

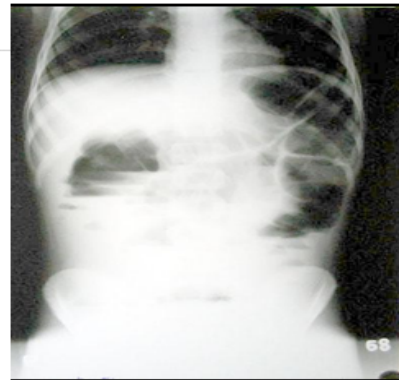
shock with peritonitis. Among the 2 cases, one case was due to malrotation with volvulus and another one is due to adhesions following appendectomy.

Both were presented late.

Images:



Malrotation



adhesive obstruction

Figure 5:



Figure 6: Trichobezor



Figure 7: Intussusception



Figure 8: Meckel's diverticulum

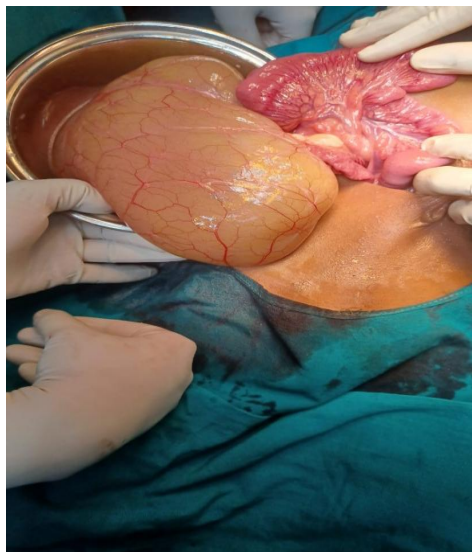


Figure 9: Omental cyst

Discussion

Pediatric intestinal obstruction is a critical condition frequently encountered in clinical practice, necessitating prompt recognition, accurate diagnosis, and timely intervention to prevent potentially life-threatening complications. This study offers valuable insights into the diverse etiologies, clinical presentations, management strategies, and outcomes associated with pediatric intestinal obstruction in a tertiary care setting. Herein, we provide an in-depth analysis and discussion of the findings, emphasizing the clinical implications and avenues for future research. The spectrum of etiologies contributing to pediatric intestinal obstruction encompasses a wide range of

congenital and acquired conditions [1], [3], [5], [6] [7] [8]. While congenital anomalies such as intestinal atresia, anorectal malformation, and Hirschsprung's disease predominate in neonates, non-congenital causes like adhesive bands, intussusception, and malrotation are more common in older children [8] [14]. In the present study there is male preponderance 1.57:1. Similar incidence was noted in the studies of Shiekh KA [3], Rajendra K. Ghritlaharey et al [5], sirajuddin et al [11], Talpade Y et al [12], Thakur et al [13]. Peak age of presentation happens during infancy and toddler age group. 47 cases out of 67 cases presented in this age bracket. This finding is also similar to different studies [8] [9] [10]. The most

common etiology in our study is adhesive obstruction followed by intussusception. Nearly 63% of cases account for these two conditions. Similar incidence was reported by Shiek KA et al [3] in their study. Intussusception was the commonest cause among some other studies [5] [6]. The most common presenting complaint in was pain abdomen seen in 97% cases followed by vomiting in 92.5% of cases. Other complaints were distension of abdomen, mass per abdomen, dehydration, blood in stools etc. Almost all the studies reported similar results in terms of complaints but differed in the percentage of the complaints and their combinations. Treatment of the condition depended on the cause. Laparotomy and release of bands/ excision of cysts / reduction of intussusception/ ladd's procedure were done commonly. Hernia cases underwent herniotomy. Stoma was done for 4 cases. 8 cases required resection and anastomosis of the bowel. This accounted for dnearly 12% of the cases presented with intestinal obstruction. The incidence of R+EEA was higher in study reported by Shiekh et al [3] which amounted to 24.6% in their series. The mortality in the current study was 2 cases accounted for 2.9% which was in contrast to the study reported by Bolekar et al [15]. Their mortality reported was 23.8%. The reason could be the availability of better investigations, awareness in the public that happened in time.

Conclusion

In conclusion, pediatric intestinal obstruction represents a complex and challenging clinical entity characterized by diverse etiologies, variable clinical presentations, and potentially life-threatening complications. Timely diagnosis, multidisciplinary management, and meticulous perioperative care are essential in optimizing outcomes and reducing morbidity and mortality in affected children. Continued research efforts are warranted to enhance our understanding of this condition and develop innovative strategies aimed at improving patient outcomes and reducing healthcare disparities on a global scale.

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