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Unveiling the unexpected: retrospective observational study on uncommon pediatric gastrointestinal obstructions.

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ABSTRACT

Background:
Intestinal obstruction is a common pediatric surgical emergency. Although most cases are attributed to well-recognised etiologies such as intussusception, congenital atresias, malrotation, and adhesions, rare causes may present significant diagnostic and therapeutic challenges. Delayed diagnosis can lead to bowel ischemia, perforation, and increased morbidity.

Objective:
To describe the clinical presentation, radiological findings, surgical management, and outcomes of uncommon causes of pediatric intestinal obstruction encountered at a tertiary care centre.

Methods:
A retrospective review was conducted on eleven pediatric patients who underwent surgery for acute intestinal obstruction between January 2022 and December 2024. Clinical records, imaging findings, operative notes, and histopathology reports were analyzed.

Results:
The patients ranged from neonates to 13 years of age. Rare etiologies identified included mesenteric lymphangioma with midgut volvulus, inflammatory band with internal herniation, congenital diaphragmatic hernia with gastric volvulus, vitellointestinal cyst, jejunal intussusception, duodenal web associated with Down syndrome, ileo-ileal knotting, ileocolic intussusception secondary to ileal tumor, bowel mucormycosis, idiopathic gastric obstruction, and left mesocolic hernia. Surgical intervention resulted in favorable outcomes in the majority of patients.

Conclusion:
Rare causes of intestinal obstruction should be considered in children presenting with atypical features. Early recognition and prompt surgical intervention are essential to reduce morbidity and improve outcomes.

Keywords: *Intestinal obstruction, Internal hernia, Mesenteric lymphangioma, Duodenal web, Intussusception, mucormycosis.*
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INTRODUCTION
Intestinal obstruction represents one of the most common pediatric surgical emergencies and accounts for a substantial proportion of hospital admissions in pediatric surgery units worldwide (1). The clinical manifestations include vomiting, abdominal distension, abdominal pain, constipation, feeding intolerance, and failure to thrive. The etiology varies according to age, with congenital anomalies predominating in neonates and acquired conditions occurring more frequently in older children (2).

Common causes include intestinal atresias, malrotation with volvulus, Hirschsprung disease, intussusception, incarcerated hernias, and postoperative adhesions (3). However, rare causes of intestinal obstruction remain diagnostically challenging because they often present with nonspecific symptoms and atypical radiological findings (4).

Advances in ultrasonography, contrast studies, and computed tomography have improved diagnostic accuracy, yet definitive diagnosis frequently requires surgical exploration (5). Conditions such as mesenteric lymphangioma, congenital internal hernias, vitellointestinal remnants, gastric volvulus, bowel knotting, and intestinal tumors are infrequently encountered but may rapidly progress to bowel ischemia if not recognized promptly (6,7).

This case series describes eleven unusual causes of pediatric intestinal obstruction managed at our institution and highlights the importance of maintaining a high index of suspicion in children presenting with acute abdomen.

MATERIALS AND METHODS

A retrospective observational study was conducted in the Department of Pediatric Surgery, SDM Medical College, Dharwad.

Study Period

January 2022 to December 2024.

Inclusion Criteria

- Pediatric patients (0–15 years)
- Rare or unusual etiology identified intraoperatively

Exclusion Criteria

- Common causes of obstruction such as uncomplicated ileocolic intussusception, postoperative adhesions, malrotation without unusual pathology, and routine congenital atresias.

Data Collection

Patient demographics, clinical presentation, imaging findings, operative findings, histopathological diagnosis, and postoperative outcomes were reviewed from medical records.

Setting of Study

This study was carried out at the Department of Pediatric Surgery, SDM Medical College and Hospital, Dharwad, Karnataka, India, which is a tertiary care teaching hospital that provides specialized surgical services to infants, children, and adolescents. This department specializes in surgical problems related to infants and children, such as congenital and acquired conditions of pediatric surgery, intestinal obstruction, neonatal emergencies, abdominal trauma, and urological cases.

Study Duration

The study was conducted retrospectively by reviewing the records of children undergoing treatment for various conditions in the Department of Pediatric Surgery of SDM Medical College and Hospital. The hospital records, surgical records, imaging reports, laboratory results, and discharge records were reviewed for cases of rare gastrointestinal obstructions and their management outcomes.

OBSERVATION AND RESULTS:

A total of 11 cases with unusual gastrointestinal obstructions were reviewed. The patients ranged from neonates to 13 years of age, with a mean age of 5.4 years. Among 11 cases 07(63.6%) were females and 04(36.4%) were males. Rare etiologies identified included mesenteric lymphangioma with midgut volvulus, inflammatory band with internal herniation, congenital diaphragmatic hernia with gastric volvulus, vitellointestinal cyst, jejunal intussusception, duodenal web associated with Down syndrome, ileo-ileal knotting, ileocolic intussusception secondary to ileal tumor, bowel mucormycosis, idiopathic gastric obstruction, and left mesocolic hernia. Surgical intervention resulted in favorable outcomes in the majority of patients.

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Table 1: Clinical and demographic details of the cases

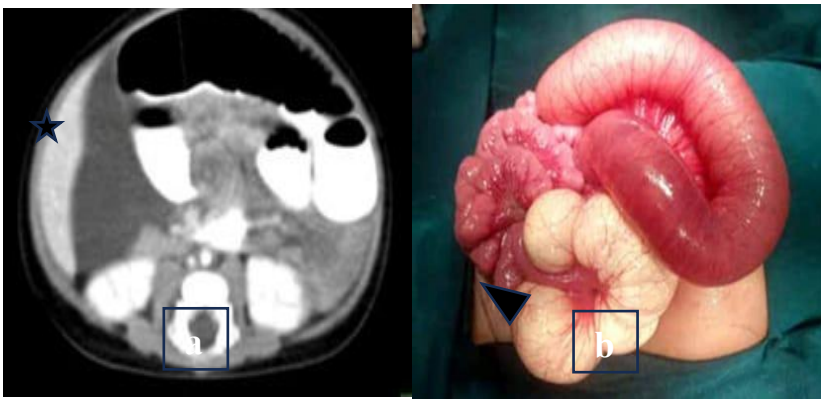
Case	Age/Sex	Presentation	Key findings	Operative management	Final diagnosis	Outcome
1	45-day/ male	Abdominal distension and bilious vomiting	Multiloculated right subhepatic cyst; CT whirlpool sign; midgut volvulus	Segmental ileal resection with primary anastomosis	Mesenteric lymphangioma causing midgut volvulus	Survived
2	4-year/male	Acute abdominal pain, bilious vomiting, distension	Peritonitis; inflammatory ileal band; terminal ileum herniated through congenital mesenteric defect	Reduction of herniation, release of band, repair of mesenteric defect	Internal hernia through a congenital mesenteric defect with inflammatory band	Survived
3	1-year/male	Vomiting and respiratory distress for 1 day	Stomach in left hemithorax; mediastinal shift; gastric volvulus	Repair of diaphragmatic defect and gastropexy	Left congenital diaphragmatic hernia with acute gastric volvulus	Survived
4	4 day/ female	Bilious vomiting and abdominal distension after feeds	Dilated bowel loops; microcolon; distal ileal compression by cyst	Cyst excision with bowel repair	Vitellointestinal cyst causing distal ileal obstruction	Survived
5	5-year/female	Abdominal pain, distension, vomiting	Jejunal intussusception; ectopic pancreas as lead point; additional terminal ileal intussusception	Jejunal resection with anastomosis; manual reduction of ileal intussusception	Jejunal intussusception due to ectopic pancreatic tissue	Survived
6	1-year/male	Recurrent non-bilious vomiting and failure to thrive	Dilated stomach/proximal duodenum with abrupt narrowing(Down's child)	Web excision and Heineke–Mikulicz duodenoplasty	Congenital duodenal web	Survived
7	13-year/male	Severe abdominal pain, bilious vomiting, obstipation	Ileo-ileal knotting with gangrenous bowel	En-bloc bowel resection with primary ileo-ileal anastomosis	Ileo-ileal knotting	Survived
8	13-year/ male	Abdominal pain and bilious vomiting	Ileocolic intussusception due to terminal ileal mass	Limited right hemicolectomy with ileocolic anastomosis; chemotherapy	Burkitt's lymphoma presenting with ileocolic intussusception	Survived
9	12 year/female	Acute intestinal obstruction after COVID-19	Bowel mucormycosis with multiple perforations	Bowel resection and systemic antifungal therapy	Intestinal mucormycosis	Survived
10	13 year/female	Recurrent persistent vomiting	Stenosis at pylorus with no thickening of pyloric wall	Gastrojejunostomy	Idiopathic gastric outlet obstruction	Survived
11	10-year/male	Bilious vomiting and abdominal pain	Left mesocolic hernia causing closed-loop small-bowel obstruction	Reduction of bowel and closure of mesenteric defect	Left mesocolic hernia	Survived

Case 1: Mesenteric Lymphangioma Cyst with Midgut Volvulus Presenting as Acute Intestinal Obstruction

A 45-day-old male neonate presented with a four-day history of abdominal distension and repeated episodes of bilious vomiting. On examination, the abdomen was

distended with visible bowel loops and peristalsis, and a palpable lump was noted in the right subhepatic region. Erect abdominal radiograph showed multiple dilated bowel loops with air-fluid levels. Ultrasonography demonstrated a 4.3 × 6.8 cm multiloculated cystic lesion in the right subhepatic region suggestive of a mesenteric cyst. Contrast-enhanced CT scan revealed a hypodense cystic lesion extending from the right iliac fossa to the subhepatic region with a characteristic whirlpool sign indicating midgut volvulus. Emergency exploratory laparotomy revealed a three-lobed mesenteric cyst arising from the terminal ileum causing volvulus. Segmental ileal resection with primary anastomosis was performed. Histopathological examination confirmed mesenteric lymphangioma.

Figure 1: Mesenteric lymphangioma

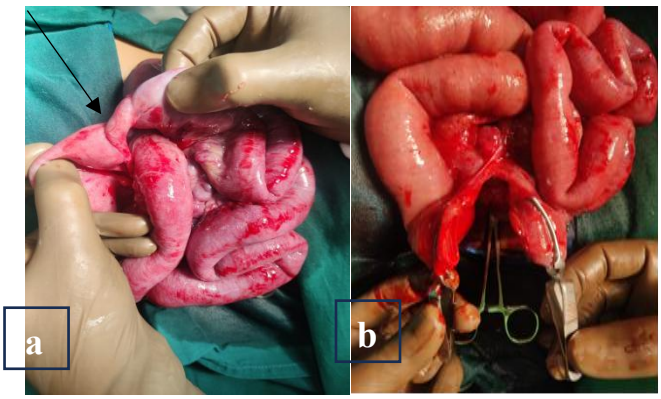


a) CT scan showing lymphangioma causing bowel obstruction. (Asterix)
b) Trilobed lymphangioma mass causing small bowel obstruction(Black triangle)

Case 2: Acute Bowel Obstruction due to Inflammatory Band with Internal Herniation through a Congenital Mesenteric Defect

A four-year-old child presented with sudden-onset abdominal pain, bilious vomiting for three days, and abdominal distension for two days. The clinical examination revealed generalised abdominal distension, guarding, rigidity, tenderness, and absent bowel sounds. During exploratory laparotomy, a significant amount of turbid peritoneal fluid was identified. A thick inflammatory band was found constricting the ileum, while a mesenteric defect located approximately 80 cm distal to the duodenojejunal junction allowed herniation of the terminal ileum, resulting in bowel obstruction. The herniated bowel was reduced, the inflammatory band was released, and the mesenteric defect was repaired successfully.

Figure 2: Internal hernia through mesenteric defect.

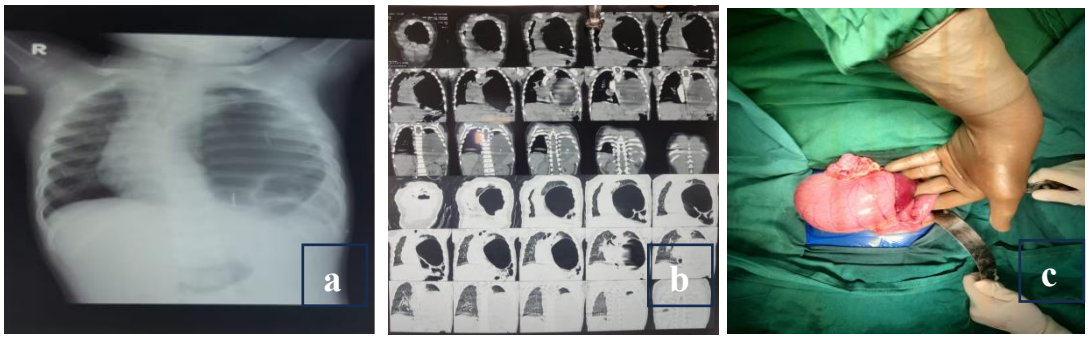


a) Arrow showing internal herniation of bowel
b) Resected ends of bowel.

Case 3: Left Congenital Diaphragmatic Hernia with Gastric Volvulus

A one-year-old child presented with vomiting and respiratory distress of one day's duration. Examination revealed tachycardia, tachypnea, subcostal retractions, and oxygen saturation of 91% on room air. Chest radiograph demonstrated rightward mediastinal shift with herniation of the stomach into the left hemithorax. Computed tomography confirmed left congenital diaphragmatic hernia associated with acute gastric volvulus. Exploratory laparotomy revealed a 4 × 5 cm posterolateral diaphragmatic defect containing the stomach, spleen, and small bowel loops. The diaphragmatic defect was repaired, and gastropexy was performed successfully.

Figure 3: Left CDH with acute gastric volvulus.



a) Chest X-ray showing large gastric shadow in left hemithorax.
b) CT chest showing left CDH with gastric volvulus.
c) Operative photo showing dilated stomach.

Case 4: Distal Ileal Obstruction due to Vitellointestinal Cyst

A term female neonate developed recurrent bilious vomiting and abdominal distension on the fourth day of life after initiation of feeds. Abdominal radiograph demonstrated dilated bowel loops, while contrast study showed a microcolon. Exploratory laparotomy revealed distal ileal obstruction approximately 50 cm proximal to the ileocecal junction due to compression by a vitellointestinal cyst. Complete excision of the cyst with bowel repair was performed. Histopathological examination confirmed a vitelline cyst.

Figure 4: Vitellointestinal cyst pressing distal ileum.

Case 5: Jejunal Intussusception.

A five-year-old child presented with abdominal pain, abdominal distension, and one episode of vomiting. Physical examination revealed a palpable paraumbilical mass with absent bowel sounds. Exploratory laparotomy demonstrated a 10 cm long jejunal intussusception approximately 100 cm proximal to the ileocecal junction. Manual reduction was unsuccessful; therefore, bowel resection with primary end-to-end anastomosis was performed. A short segment terminal ileal intussusception was also identified and successfully reduced manually.

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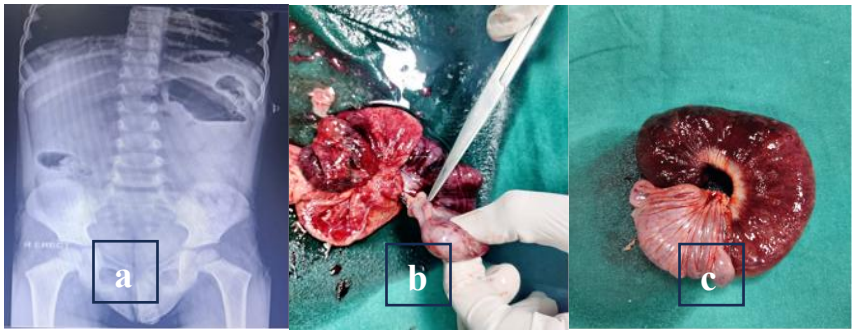
Figure 5:

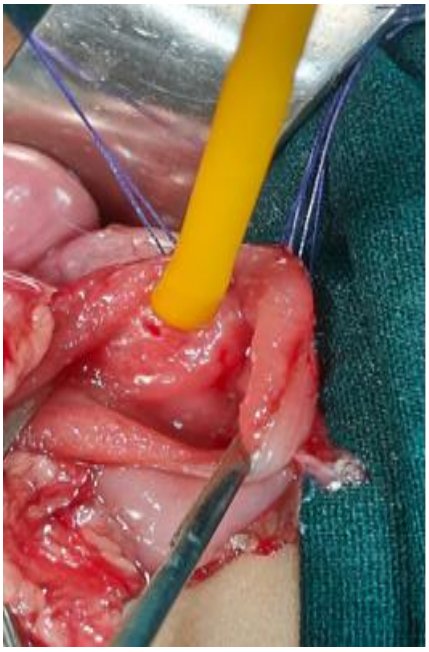


a) Erect abdomen X-ray showing jejunal air-fluid level.
b) Ectopic pancreatic tissue as lead point.
c) Resected jejunal specimen.

Case 6: Duodenal Web in Down's Syndrome

A one-year-old male child with Down syndrome and failure to thrive presented with recurrent non-bilious vomiting, repeated hospital admissions, and respiratory distress. Laboratory investigations revealed hypochloremic metabolic alkalosis with hyponatremia and hypokalemia. Upper gastrointestinal contrast study demonstrated marked dilatation of the stomach and proximal duodenum with abrupt narrowing. Exploratory laparotomy confirmed a congenital duodenal web. Excision of the web followed by Heineke–Mikulicz duodenoplasty was successfully performed.

Figure 6: showing duodenal web



Case 7: Ileo-Ileal Knotting

A 13-year-old boy presented with severe abdominal pain, multiple episodes of bilious vomiting, and obstipation for one day. Abdominal radiograph demonstrated multiple air-fluid levels suggestive of acute intestinal obstruction. Emergency exploratory laparotomy revealed ileo-ileal knotting involving the distal ileum approximately 10–15 cm proximal to the ileocecal junction. En-bloc bowel resection followed by primary ileoileal anastomosis was performed.

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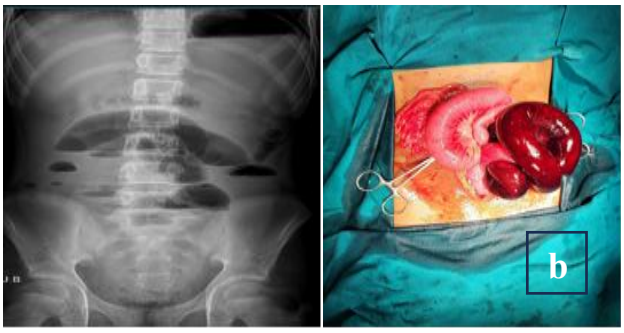
Figure 7:

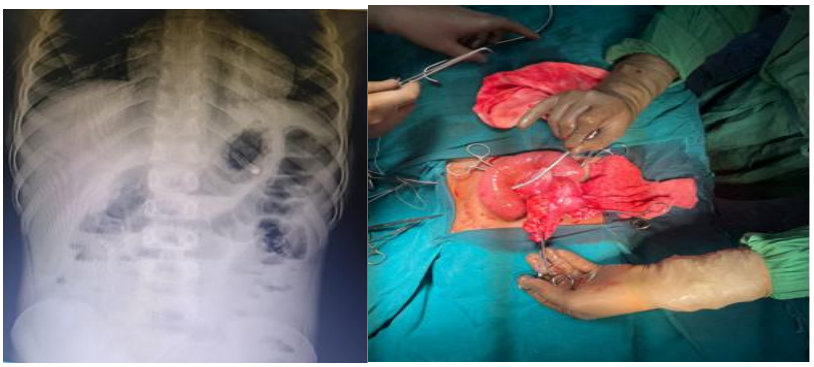


a) Erect abdomen X-ray showing multiple air-fluid levels.
b) Intraoperative image showing ileolileal knotting with gangrenous segment.

Case 8: Ileocolic Intussusception with Ileal Tumor

A 13-year-old boy presented with abdominal pain and bilious vomiting for three days. Exploratory laparotomy demonstrated ileocolic intussusception secondary to a terminal ileal mass acting as a pathological lead point. Limited right hemicolectomy with ileocolic anastomosis was performed. Histopathological examination confirmed Burkitt's lymphoma. Following surgery, the child recovered well and received chemotherapy accordingly.

Figure 8:

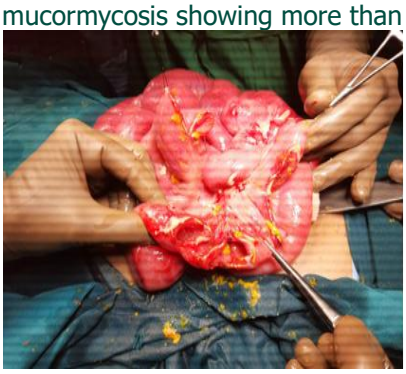


a) Erect abdomen X-ray showing multiple air-fluid levels
b) Arrow showing ileal tumor mass

Case 9: Bowel Mucormycosis

A rare case of acute intestinal obstruction secondary to bowel mucormycosis (post-COVID) was identified during exploratory laparotomy. The involved bowel segment was resected, and postoperative systemic antifungal therapy was administered. The patient recovered satisfactorily following combined surgical and medical management.

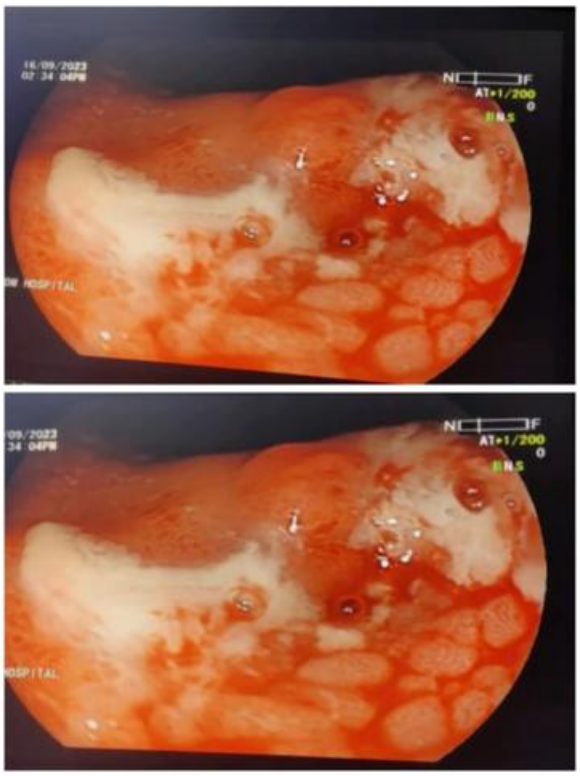
Figure 9: Bowel mucormycosis showing more than 10 perforations.



Case 10: Idiopathic Gastric Outlet Obstruction(GOO)

A child presented with recurrent episodes of persistent vomiting suggestive of gastric outlet obstruction. Despite detailed radiological evaluation and surgical exploration, no definite structural abnormality could be identified. Surgical management relieved the obstruction, while histopathological examination remained inconclusive, leading to the diagnosis of idiopathic gastric obstruction.

Figure 10: Endoscopic view showing stenosis at pylorus causing GOO.



Case 11: Left Mesocolic Hernia

A ten-year-old child presented with bilious vomiting and abdominal pain of one day's duration. Ultrasonography demonstrated dilated small bowel loops. Emergency exploratory laparotomy revealed a left mesocolic hernia causing closed-loop small bowel obstruction. The herniated bowel was reduced, the mesenteric defect was closed, and the child had an uneventful postoperative recovery.

Clinical and Demographic Features of the Case

The clinical and demographic features of the 11 pediatric patients participating in this retrospective study have been summarized in Table 1. The age of the patients varied from 4 days to 13 years, and there were 7 males and 4 females in the case group. Bilious vomiting, abdominal pain, abdominal distention, and vomiting were the most frequent complaints. The cases had different rare conditions associated with gastrointestinal obstruction, such as congenital abnormalities, internal hernia, volvulus, intussusception, mesenteric cyst, intestinal mucormycosis, and gastric outlet obstruction. The

patients were subjected to surgical treatment according to the condition, which included the resection of intestine, cyst removal, diaphragm repair, gastropexy, duodenoplasty, gastrojejunostomy, and mesenteric defect repair. It is important to note that all 11 patients were alive.

DISCUSSION

Rare etiologies of intestinal obstruction represent a small but clinically important subset of pediatric surgical emergencies. Their diagnosis is often challenging because the presenting features—bilious vomiting, abdominal distension, pain, and obstipation—are nonspecific and overlap with those of more common causes of obstruction. In the present series of 11 children, the etiologies ranged from congenital anomalies in neonates and infants to inflammatory, infectious, and neoplastic disorders in older children, emphasizing that age alone cannot exclude uncommon pathology. [4]

Mesenteric lymphangioma is a benign lymphatic malformation that may cause bowel obstruction or volvulus through mass effect or mesenteric distortion. Complete excision is the preferred treatment; segmental bowel resection may be necessary when the lesion is inseparable from the bowel or compromises its vascular supply. [8] Congenital mesenteric defects and mesocolic hernias are rare forms of internal hernia but warrant urgent surgical exploration because closed-loop obstruction may rapidly progress to strangulation and intestinal ischemia. [7,9]

Late-presenting congenital diaphragmatic hernia is another important diagnostic consideration in children with unexplained respiratory or gastrointestinal symptoms. When associated with gastric volvulus, it may cause acute gastric obstruction and carries a risk of ischemia or perforation; timely recognition and operative repair are therefore essential. [10] Similarly, although vitellointestinal duct remnants are relatively common, vitellointestinal cysts causing neonatal intestinal obstruction are distinctly uncommon and may mimic other causes of distal small-bowel obstruction. [11]

Intussusception in older children and small-bowel intussusception should raise suspicion for a pathological lead point. In this series, ectopic pancreatic tissue and terminal ileal Burkitt lymphoma were identified as underlying causes, illustrating the importance of thorough intraoperative assessment and histopathological examination of resected specimens. [12] In children with Down syndrome, persistent vomiting and failure to thrive should prompt evaluation for congenital duodenal obstruction, including duodenal web or stenosis. [13]

Ileo-ileal knotting and intestinal mucormycosis are exceptionally rare but potentially life-threatening conditions. Both may present as acute intestinal obstruction and require a high index of suspicion. Delayed treatment in ileo-ileal knotting can result in bowel gangrene, whereas intestinal mucormycosis requires combined surgical resection and systemic antifungal therapy for successful management. [14,15]

All children in the present series survived following individualized surgical treatment. Although the descriptive nature and small sample size of this case series preclude conclusions regarding incidence or comparative outcomes, it demonstrates that early recognition, appropriate imaging, prompt surgical consultation, and definitive operative management can lead to favorable results. Clinicians should remain alert to uncommon etiologies, particularly when the clinical course, imaging findings, or intraoperative appearance is atypical for routine pediatric intestinal obstruction.

CONCLUSION

Rare pediatric intestinal obstructions arise from a broad range of congenital, inflammatory, infectious, and neoplastic disorders. Their nonspecific presentation may delay recognition, increasing the risk of bowel ischemia, perforation, and other serious complications. A high index of clinical suspicion, appropriate imaging, early surgical consultation, and timely individualized operative management are essential for achieving favorable outcomes. This case series underscores the importance of considering uncommon etiologies when evaluating children with intestinal obstruction.

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List of abbreviations

Abbreviation	Full Form
GI	Gastrointestinal
GIT	Gastrointestinal Tract
USG	Ultrasonography
CT	Computed Tomography
MRI	Magnetic Resonance Imaging
X-ray	X-radiography
IV	Intravenous
NPO	Nil Per Os (Nothing by Mouth)

OR	Operating Room
PICU	Pediatric Intensive Care Unit
ROD	Retrospective Observational Study
SPSS	Statistical Package for the Social Sciences

Source of Funding
No external sources of funding were used for the present study. The investigation was carried out within the framework of institutional infrastructure, available clinical documents, and departmental assets. Financial support was not received from any governmental or private company.

Conflict of Interest
Conflict of interest is not declared in respect of the current study. There are no financial, professional, or personal interests that could have affected the course of this study.

Data Availability
Data for the current study were acquired through hospital records. In view of patient confidentiality and ethical institutional requirements, datasets cannot be released to the public but can be requested by the corresponding author.

Author Contribution

Author	Contribution
Dr. Prashant K. Zulpi	Conception, study design, surgical guidance, data analysis, manuscript revision, and final approval of the manuscript.
Dr. Suman Uppin	Data gathering, patient assessment, clinical interpretation, editing of the manuscript, and final approval of the manuscript.
Dr. Mithun Bhajantri	Analysis of data, Literature review, Manuscript preparation, Coordination of the research, Approval of the manuscript.

Biography of the Authors

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- Dr. Mithun Bhajantri is an Assistant Professor in the Department of Pediatrics, Shri Dharmasthala Manjunatheshwara College of Medical Sciences and Hospital, Dharwad. His area of interest includes pediatric medicine, gastroenterological conditions, clinical epidemiology, retrospective studies, and evidence-based medical practice.

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