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CASE REPORT

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Coexistence of cecal duplication cyst and Meckel's diverticulum presenting as intussusception in a malnourished child a case report with literature review

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Abstract

Alimentary tract duplications, or enterocystomas, are relatively uncommon developmental anomalies that can occur anywhere from the mouth to the anus. One-third of these enteric duplications present within the neonatal period, while the remaining two-thirds appear within the first two years of life. However, some cases may manifest in later childhood or even adulthood. The diagnosis is often incidental, though patients may present with abdominal pain or obstructive symptoms. In certain cases, these lesions can serve as leading points for intussusception in children, which is a common cause of emergency surgical admission in pediatric surgical units. We present the case of a 15-month-old male child who was admitted to our pediatric surgery unit with acute intestinal obstruction due to intussusception. Clinical evaluation and ultrasonography confirmed the diagnosis of bowel obstruction secondary to intussusception. During surgery, the intussusception was found to involve the distal ileum, cecum, ascending colon, and extended through the transverse colon down to the rectum. A cystic mass in the cecum, identified as the lead point, was observed causing the bowel segments to telescope into one another, with the intussuscepted segment protruding through the anal canal. All affected bowel segments were carefully reduced, revealing a cystic mass in the proximal cecum serving as the lead point for intussusception. A Meckel's diverticulum was also identified at a distinct site in the ileum, proximal to the location of the intussusception. A right hemicolectomy and Meckel's diverticulectomy were performed, followed by the creation of a diverting loop ileostomy. Histopathological examination confirmed the lesion to be a duplicated cyst. The postoperative course was uneventful. This report highlights a rare coexistence of cecal duplication cyst and Meckel's diverticulum causing intussusception, a combination scarcely reported in pediatric surgical emergencies.

Keywords Alimentary, Duplication, Cecum, Hemicolectomy, Diverticulectomy, Ileostomy

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Introduction

Cecal duplication cyst (CDC) represents an extremely rare form of gastrointestinal (GI) tract duplication, accounting for approximately 0.4% of all enteric duplication cases. It can potentially result in intestinal obstruction [1, 2]. Meckel's diverticulum (MD) is a more common GI anomaly, occurring in approximately 2% of the population. Both CDC and MD are more frequently observed in boys than in girls and typically present in infancy or early childhood. These conditions can mimic each other, often manifesting with GI bleeding, a palpable mass, or intestinal obstruction.

Ultrasonography (USG) and computed tomography (CT) scans are useful diagnostic modalities; however, technetium-99 m radionuclide scans can further help identify the location, size, and contents of these anomalies. A definitive diagnosis is usually made during exploratory laparotomy [3, 4].

Case presentation

A 15-month-old male child presented to our emergency unit with frequent vomiting, bloody diarrhea, and abdominal distension. The child initially experienced vomiting and greenish diarrhea one week ago and was admitted to a nearby district hospital (DH). After three days of in-hospital management, the child was discharged in stable condition.

The following day, he was admitted under pediatric medicine and received appropriate treatment for four consecutive days. Despite this, his condition worsened, with greenish diarrhea progressing to a bloody form, persistent vomiting, and increasing abdominal tenderness and distension.

The patient was subsequently referred to our surgical unit for further evaluation. Clinical examination revealed signs of dehydration, shock, high fever, and abdominal tenderness. No palpable mass was detected, but protrusion of the intestine was noted from the anal canal (Fig. 1).

Upon admission, the patient weighed 8 kg. A nasogastric tube and a Foley catheter of appropriate sizes were inserted, and intravenous fluid resuscitation was initiated with Ringer's lactate at the dose of 100 cc/kg. Broad-spectrum antibiotic therapy was also administered, including Ceftriaxone at the dose of 100 mg/kg and Metronidazole at the dose of 7.5 mg/kg intravenously. A blood sample was sent for crossmatching, and fresh blood was ordered.

An abdominal plain radiograph and USG had already been performed, with the latter suggesting a possible intussusception. The patient was rehydrated, maintaining a urine output of 1.5 mL/h, and subsequently prepared for surgery.

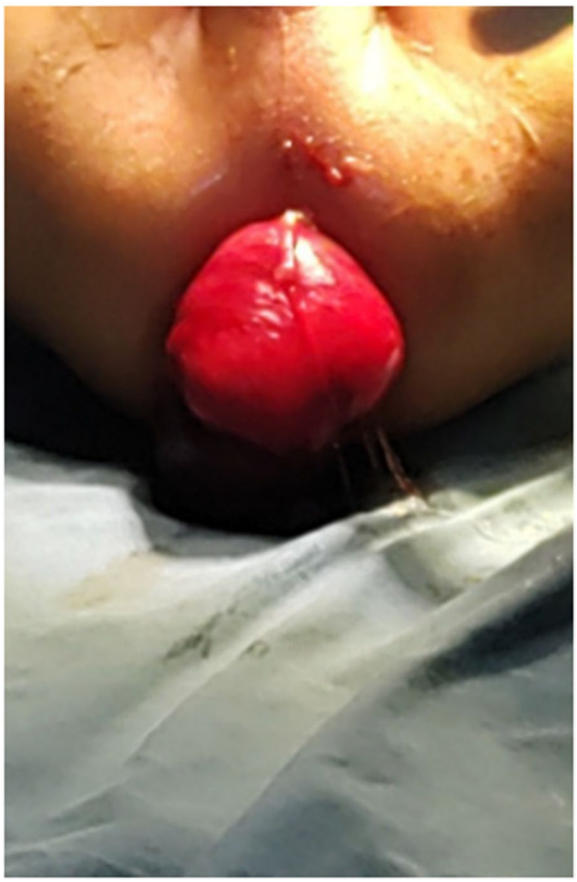

Fig. 1 intestinal protrusion through the anal canal

A right upper transverse incision was made for surgical exploration. Initially, the right upper quadrant appeared empty, revealing invagination of the distal ileum into the cecum, ascending colon, and transverse colon down to the rectum, with a portion protruding from the anal canal (Fig. 2). The surgical team first reduced the protruded bowel from the anal canal back into the abdomen, followed by complete reduction of the intussusception using warm saline-soaked abdominal pads. A round cystic structure measuring approximately 3 × 3 cm was observed at the proximal cecum (Fig. 3). Approximately 30 cm proximal to the ileocecal valve, a walnut-sized MD with a wide base was identified (Fig. 4).

A right hemicolectomy was performed, involving the division and ligation of the ileocecal vessels, along with resection of the bowel from the distal ileum to the proximal transverse colon (Fig. 5). Due to the presence of an inflamed, broad-based diverticulum, a diverticulectomy and end-to-end anastomosis were

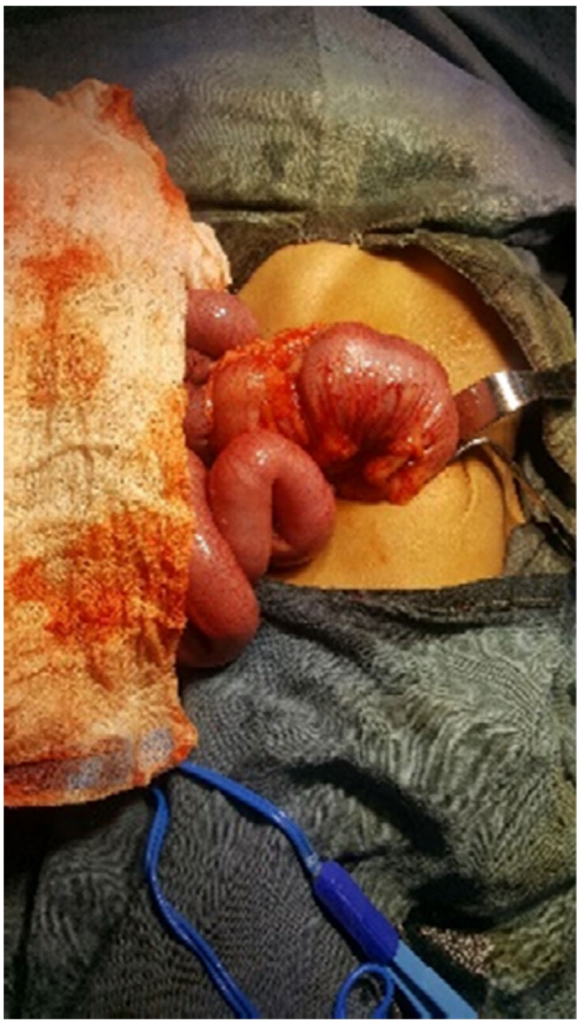

Fig. 2 Intussusception involving the cecum, and extending into the ascending and transverse colon down to the anal canal

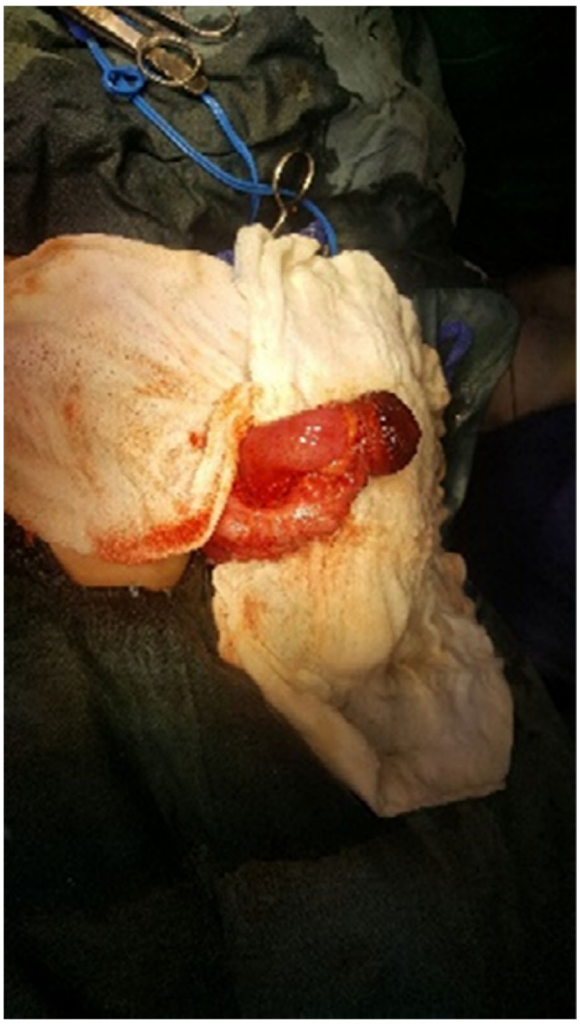

Fig. 3 Cecal duplication cyst

performed instead of a wedge resection. This was followed by an end-to-end ileotransverse anastomosis (Fig. 6). Given the patient's critical condition, a small-sized loop ileostomy was created proximal to the diverticulectomy site (Fig. 7). Histopathological analysis confirmed that the lesion was a duplication cyst (Fig. 8). The postoperative course was uneventful.

The patient was discharged after confirmation of stoma function and was provided with appropriate nutritional guidance. Four weeks later, the child was readmitted for ileostomy closure. However, a high white blood cell (WBC) count indicated leukocytosis, prompting initial conservative management. The patient underwent successful stoma closure after nutritional optimization, with full recovery. The entire treatment process was managed with optimal care.

Discussion

Enteric duplication cysts (EDCs) are congenital malformations, most commonly seen in the small intestine and rarely seen in the colon, but they are rarest in the cecum. Most of the cases are present in the first two years of life [5]. Fitz was the first to use the word "intestinal duplication," which then was popularized by Ladd in 1930. Gross classified enteric duplication in 1950. EDCs can occur at any site of the GI system, with the stomach and terminal ileum and ileocecal junction being the most common locations (53%), followed by esophagus, stomach, and duodenum. The incidence of colonic duplication is (13%), and cecal involvement is considered the rarest type of all GI duplications [6].

Morphologically, EDCs are classified as either tubular or spherical. They are true diverticula of the GI system, comprising three essential components: enteric

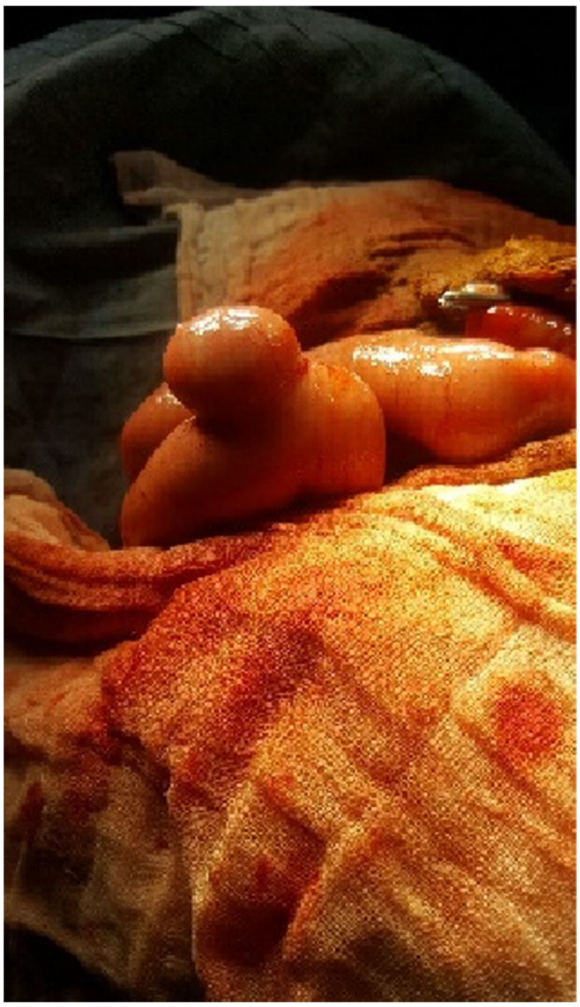

Fig. 4 Meckel's diverticulum

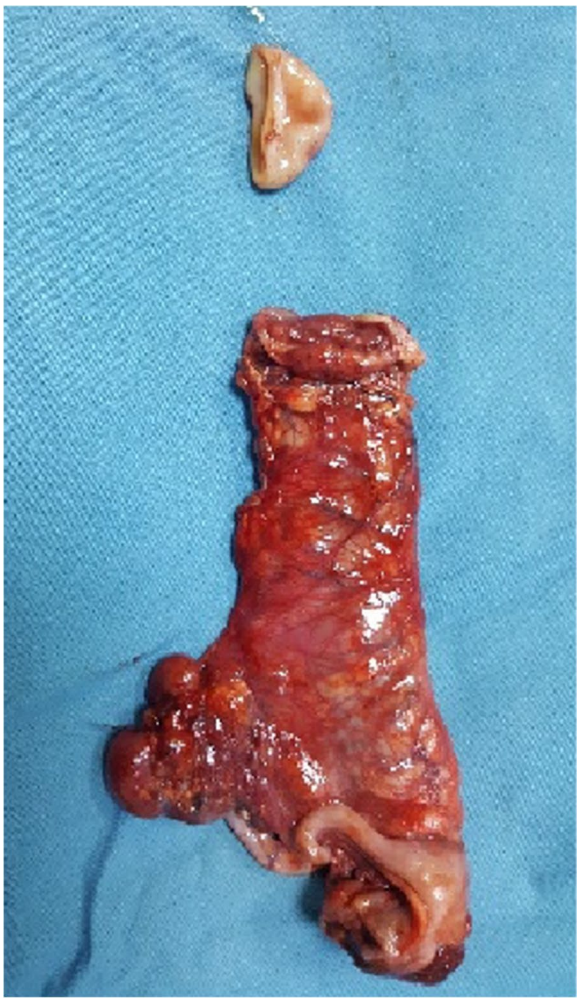

Fig. 5 Resected segment of the right colon

mucosa, a muscle layer, and a nervous plexus. The exact cause of EDCs remains unknown. Proposed theories include the persistence of embryonic diverticula during GI tract development, intrauterine vascular accidents, faulty recanalization, and the fusion of embryonic longitudinal folds [7]. Differential diagnoses include MD, false diverticula, lymphangiomas, omental cysts, and mesenteric cysts [8].

MD is the most common congenital abnormality of the intestine, affecting approximately 2% of the general population. It can present with various symptoms, including small-bowel obstruction, peritonitis, or gross/occult GI bleeding [9]. The coexistence of EDC and MD is extremely rare, with only a few previous studies documenting such cases [10]. Congenital bands resulting in jejunal malrotation or volvulus [11], as well as cecal volvulus [12], can cause intestinal obstruction presenting with clinical features similar to those seen in EDCs.

Depending on their location, size, and type, duplication cysts (DCs) may cause acute abdominal pain or remain asymptomatic. They often present as a palpable abdominal mass, along with symptoms such as vomiting and abdominal distention. In rare cases, DCs can lead to acute abdominal conditions, including intussusception, volvulus, obstruction, and perforation. Most DCs associated with acute abdomen are located in the colon [13].

Since EDCs and MD can both present with abdominal pain, lower gastrointestinal bleeding, bowel obstruction, and an abdominal mass, they may mimic each other clinically. Imaging modalities such as USG, CT, and technetium-99 m radionuclide scans are useful in determining the location, size, and contents of EDCs and MD, particularly in detecting ectopic tissues. In some cases, a definitive diagnosis is only possible during surgery [14].

Due to the rarity of coexisting MD and EDC, there are no established management guidelines. Various surgical techniques have been described for treating CDC while

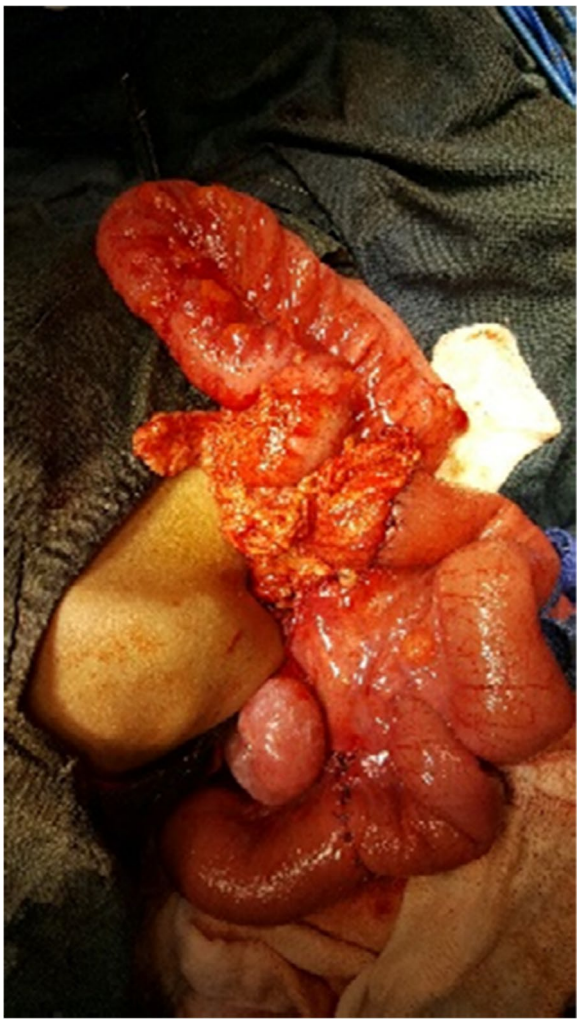

Fig. 6 Bowel anastomosis

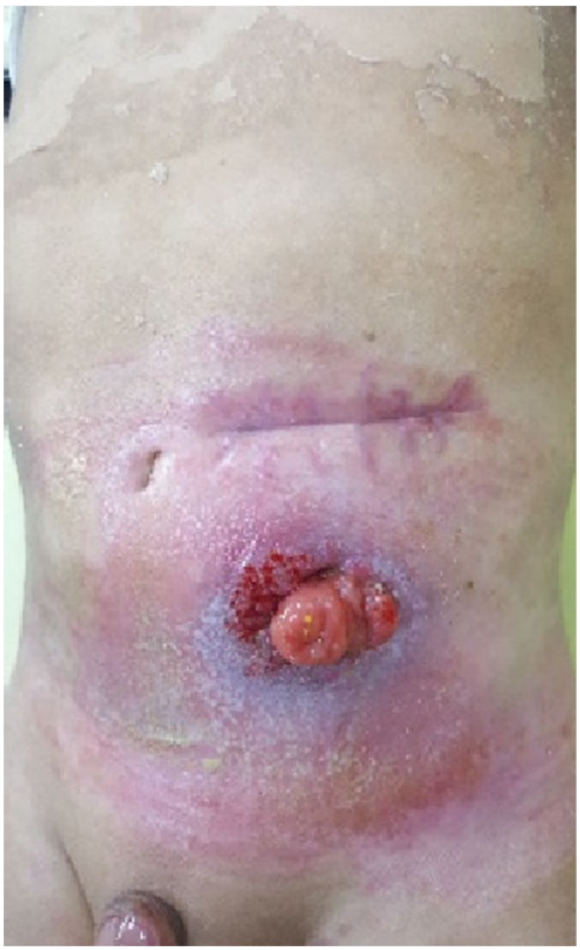

Fig. 7 Ileostomy after 4 weeks

preserving the ileocecal valve, including enucleation, marsupialization, and simple drainage along the antimesenteric border with mucosal stripping and plication of the common wall [15]. Rattan et al. [16] reported performing resection with end-to-end anastomosis for ileal, cecal, and colonic DCs, while excising the cyst with mucosal stripping for gastric and duodenal cysts. Resection of the affected bowel segment with end-to-end anastomosis remains the most commonly performed procedure.

The index case involved a malnourished child who presented late to our emergency surgical unit in a state of shock. The patient had ileocolic intussusception, with the invaginated bowel segment protruding from the anal canal. Given the patient's critical condition and USG findings, our team opted to forgo further investigations and proceeded with surgical preparation once Foley catheter drainage reached 1.5 mL/kg/h and fresh blood was secured.

We performed a right hemicolectomy with end-to-end ileo-transverse anastomosis, Meckel's diverticulectomy with resection and anastomosis, and a pre-anastomotic small ileal stoma for stool diversion due to the patient's toxic condition. Given that our patient was a malnourished child, the protrusion of a segment of intestine through the anal canal may be attributed to reduced intestinal tone and laxity associated with nutritional deficiency. To maintain procedural simplicity, the MD was not utilized for stoma formation, owing its broad base and associated pathology necessitating resection to achieve clear margins. Given the stepwise surgical approach and the extent of bowel loss, the patient was referred to our university's nutrition department for specialized nutritional management.

In Afghanistan, inaccessibility to healthcare facilities, low socioeconomic status, poor literacy rates, and lack of awareness regarding emergency conditions contribute to delayed presentations and increased morbidity and mortality. Misdiagnosis due to a shortage of experienced

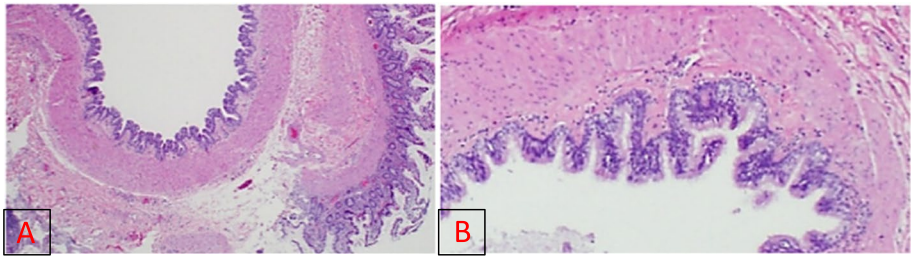

Fig. 8 (**A** and **B**): Pathologic features of cecal duplication cyst

clinicians and imaging professionals (mostly on an outpatient basis), along with the unavailability of advanced diagnostic tools such as the technetium-99 scan, further complicates timely diagnosis and treatment. Despite the challenges of a resource-limited setting, including the absence of a well-equipped intensive care unit (ICU), we made every effort to ensure the patient's full recovery.

Conclusion

CDCs coexisting with MD are rare clinical entities that can lead to surgical emergencies requiring urgent intervention. Delayed diagnosis can further worsen the child's clinical outcome. In low-resource settings, raising general awareness and strengthening family medicine programs to educate families are key factors in ensuring timely and effective management of such cases.

Abbreviations

CDC	Cecal duplication cyst
EDCs	Enteric duplication cysts
DCs	Duplication cysts
MD	Meckel's diverticulum
GI	Gastrointestinal
USG	Ultrasonography
CT	Computed tomography
DH	District hospital
WBC	White blood cell
ICU	Intensive care unit

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Authors' contributions

Turyalai Hakimi (TH) conceptualized the manuscript, conducted a literature review, and wrote the original draft. Mansoor Aslamzai (MA) managed post-operative conservative care. TH and Mohammad Anwar Jawed (MAJ) performed the surgical procedures, including right hemicolectomy, diverticulectomy, ileostomy, and stoma takedown. TH, Farukh Seyar (FS) and Zamaryalai Hakimi (ZH) contributed to study design and manuscript editing. ZH provided post-surgical nutritional counseling. Sultan Ahmad Halimi (SAH) conducted pathological analysis. TH also supervised the entire study process and edited the manuscript. All authors have read and approved the final manuscript.

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Data availability

The datasets used in the current article, are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Written informed consent was obtained from the patient's parents for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Competing interests

The authors declare no competing interests.

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References

1. Enteric duplication in children: a case series. Liaqat N, Latif T, Khan FA, Iqbal A, Nayyar SI, Dar SH. https://pubmed.ncbi.nlm.nih.gov/25047310/ Afr J Paediatr Surg. 2014;11:211–214. https://doi.org/10.4103/0189-6725.137327. [PubMed] [Google Scholar]
2. Perforated caecal duplication cyst presenting as an appendicular abscess. Sookram J, Naidoo N, Cheddie S. https://pubmed.ncbi.nlm.nih.gov/28240467/ S Afr J Surg. 2016;54:42. [PubMed] [Google Scholar]
3. Kim YS, Kim DJ, Bang SU, Park JJ. Intestinal duplication cyst misdiagnosed as Meckel's diverticulum. Chin Med J (Engl). 2016;129(2):235. https://doi.org/10.4103/0366-6999.173544. [PMCfreearticle][PubMed] [GoogleScholar].
4. Wheatley K, Jayatunga R, Singh M, Gardiner C. A duplication cyst masquerading as a meckel's diverticulum. Arch Dis Child. 2012;97(Suppl. 1):A15. https://doi.org/10.1136/ARCHDISCHILD-2012-301885.36. [GoogleScholar].
5. S.W. Keum, M.W. Hwang, J.I. Na, S.T. Yu, D.B. Kang, Y.K. Oh. Intestinal obstruction caused by a duplication cyst of the caecum in a neonate. Korean J. Pediatr., 52 (2009), pp. 261–264. View at publisherCrossref-Google Scholar
6. S. Verma, M. Bawa, K.L.N. Rao, K.S. Sodhi. Caecal duplication cyst mimicking intussusception. BMJ Case Rep. (2013), pp. 1–3. Google Scholar
7. S.W. Keum, M.W. Hwang, J.I. Na, S.T. Yu, D.B. Kang, Y.K. Oh.Intestinal obstruction caused by a duplication cyst of the caecum in a neonate. Korean J. Pediatr., 52 (2009), pp. 261–264. View at publisherCrossref-Google Scholar

8. Kyo K, Azuma M, Okamoto K, et al. Laparoscopic resection of adult colon duplication causing intussusception. World J Gastroenterol. 2016;22(7):2398–402. https://doi.org/10.3748/wjg.v22.i7.2398. [PMC-freearticle][PubMed][GoogleScholar].
9. Fonseca S, Mourão F, Faria MT, Fernandes S, Fragoso AC, EstevãoCosta J. Symptomatic Meckel's diverticulum in children: a 12-year survey. J Pediatr Neonat Individual Med. 2021;10:e100114. https://doi.org/10.7363/100114. CrossRefFullText|GoogleScholar.
10. Hamza AR, Bicaj BX, Kurshumliu FI, Zejnullahu VA, Sada FE, Krasniqi AS. Mesenteric Meckel's diverticulum or intestinal duplication cyst: a case report with review of literature. Int J Surg Case Rep. 2016;26:50. https://doi.org/10.1016/J.IJSCR.2016.06.043. ViewPDFViewarticleViewinScopusGoogleScholar.
11. Ahmed Azzam, Ali N. Abdulkarim, Ahmed E.M. Shehata, Ibrahim Mahran, Ahmed Arafa, Ahmed Arafat, Sherifa Tawfik, Muayad Shaban, Aliyu Anache, Sherif Kaddah, Heba Taher, A report of two infant cases operated for jejunal duplication cyst associated with malrotation and volvulus, International Journal of Surgery Case Reports,Volume 67, 2020,Pages 227–230,ISSN 2210–2612, https://doi.org/10.1016/j.ijscr.2020.02.009
12. Ahmed E. Shehata, Mohamed A. Helal, EzzElDien A. Ibrahim, Basma Magdy, Mohamed El Seoudy, Muayad Shaban, Heba Taher, Cecal Volvulus in a child with congenital dilated cardiomyopathy: A case report, International Journal of Surgery Case Reports, Volume 66, 2020,Pages 30–31, ISSN 2210–2612, https://doi.org/10.1016/j.ijscr.2019.10.008
13. Erginel B, Soysal FG, Ozbey H, Keskin E, Celik A, Karadag A, et al. Enteric duplication cysts in children: a single-institution series with forty patients in twenty-six years. World J Surg. 2017;41:620–4. https://doi.org/10.1007/s00268-016-3742-4. [PubMed][GoogleScholar].
14. Y.S. Kim, D.J. Kim, S.U. Bang, J.J. Park. Intestinal duplication cyst misdiagnosed as Meckel's diverticulum. Chin Med J (Engl), 129 (2) (2016), p. 235. Jan. https://doi.org/10.4103/0366-6999.173544. View PDFView article-Google Scholar
15. Endo K, Maeda K, Mishima Y, Tamaki A, Takemoto J, Morita K, et al. A case of ileocecal duplication cyst protruding into the intestinal lumen enucleated via an anti-mesenteric approach. J Pediatr Surg Case Rep. 2016;15:10–3 CROSSREF.
16. Rattan KN, Bansal S, Dhamija A. Gastrointestinal duplication presenting as neonatal intestinal obstruction: an experience of 15 years at tertiary care centre. J Neonatal Surg. 2017;6:5 PUBMED | CROSSREF.

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