

Clinical Presentation and Management of Mesenteric Cystic Masses in Children: A Six-Year Single-Center Analysis in Bangladesh

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Abstract

Background: Mesenteric cysts are intra-abdominal masses found in children, mainly caused by embryonic defects in the development of the lymphatic system. This study aims to evaluate the clinical findings, management strategies, and outcomes associated with mesenteric cysts at our institution.

Materials and methods: This prospective observational study involved 27 pediatric patients who underwent surgery for mesenteric cysts at the Department of Pediatric Surgery of Chattogram Maa-O-Shishu Hospital Medical College between January 2019 and December 2024. We assessed clinical findings, radiological investigations, surgical procedures, histopathological evaluations, post-operative complications, and follow-up data. All data were collected prospectively.

Results: The median age at diagnosis was 5.25 years, with a female-to-male ratio of 1.45:1. The most common clinical manifestations were abdominal pain (70.4%) followed by a palpable abdominal mass (55.5%) and vomiting (25.9%). The jejunal mesentery (55.5%) was the most common site of origin for mesenteric cysts, followed by the ileal mesentery (33.3%) and 11.2% originated from the sigmoid mesentery. The median size of the mesenteric cystic mass was 8.6 ± 4.4 cm. Complete and successful removal of the mesenteric cysts was achieved in all cases. Surgical management included enucleation (n=17) cyst excision combined with bowel resections and primary intestinal anastomosis (n=8) and laparoscopic resection of the cyst (n=2). Early post-operative complications included only wound site infections in three (11.1%) patients. Histologically, simple cyst with mesenteric lymphangiomas was detected in 19 cases and mesotheliomas in 6 cases. None of the patients experienced a recurrence of their condition.

Conclusions: The most common presenting symptom of a mesenteric cyst was abdominal pain. Jejunal mesentery was the commonest site. The relationships between the mesenteric cyst and adjacent organs largely influence the surgical approach.

Key words: Enucleation; Intra-abdominal mass; Lymphangioma; Mesenteric cyst; Recurrence.

Introduction

A mesenteric cyst is a type of cyst found anywhere in the mesentery of the gastrointestinal tract, from the duodenum to the rectum, and may extend from the base of the mesentery into the retroperitoneum.^{1,2} Mesenteric cysts are rare, histologically benign intra-abdominal masses.^{3,4} They can be either unilocular or multilocular and are lined with endothelial or mesothelial cells.^{5,6} Several theories have been proposed to explain the etiology of mesenteric cysts.^{1,7} In 2000, De Perrot et al. proposed a detailed and well-accepted classification, based on histopathological features and their origin, dividing them into six groups:

- i) □ Cysts of lymphatic origin (Simple lymphatic cyst and lymphangioma)
- ii) □ Cysts of mesothelial origin (Simple mesothelial cyst, benign cystic mesothelioma and malignant cystic mesothelioma)
- iii) □ Cysts of enteric origin (Enteric cyst and enteric duplication cyst)
- iv) Cysts of urogenital origin
- V) □ Mature cystic teratoma (Dermoid cysts)
- VI) pseudocysts (Infectious and traumatic cysts).⁸

This study aimed to determine and evaluate the demographic patterns, clinicopathological manifestations, management strategies, histopathological findings and outcomes associated with mesenteric cysts at our institution.

Materials and methods

This hospital-based, prospective observational study was conducted with 27 patients at or below 15 years who underwent surgical intervention for mesenteric cystic masses at the Department of Pediatric Surgery of Chattogram Maa-O-Shishu Hospital Medical College, between January 2019 and December 2024.

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Each case was comprehensively evaluated with a complete medical history, thorough clinical examination and various radiological investigations, including X-ray of the abdomen in an erect position, abdominal ultrasonography and in certain instances, Computed Tomography (CT) scans of the abdomen. The clinical manifestations, surgical procedures, as well as anatomical and pathological findings associated with mesenteric cystic masses were carefully assessed. Histopathological evaluations and patient outcomes were also analyzed. Following surgery, all specimens were sent for histological examination, which confirmed the diagnosis of mesenteric cyst. Follow-up periods ranged from six months to two years. Ethical approval was obtained before start the study.

Results

The median age of the patients was 5.25 years (IQR: 3-7 years). There was a predominance of females, with a female-to-male ratio of 1.45:1. Only 3 out of the 27 patients (11.1%) were diagnosed antenatally.

Children diagnosed with mesenteric cysts may present with a range of symptoms, including acute or chronic manifestations and a subset of patients may remain asymptomatic. The predominant clinical manifestations observed include abdominal pain (70.4%) a palpable and freely movable abdominal mass (55.5%) vomiting (25.9%) and abdominal distension (22.2%) as detailed in Table I.

Table I Presenting symptoms and signs of the patients with mesenteric cyst

Clinical Findings	Patients of the study group (n=27)
Symptoms	
Abdominal pain	19 (70.4%)
Vomiting	7 (25.9%)
Distention of the abdomen	6 (22.2%)
Constipation	5 (18.5%)
Early satiety	3 (11.1%)
Asymptomatic	2 (7.4%)
Signs	
Fever	5 (18.5%)
Palpable and freely movable abdominal mass	15 (55.6%)
Abdominal tenderness	4 (14.8%)
Visible bowel loop	2 (7.4%)

The jejunal mesentery (55.5%) was the most common site of origin for mesenteric cysts, followed by the ileal mesentery (33.3%), and 11.2% originated from the sigmoid mesentery (Table II). The median size of the mesenteric cyst was 8.6 ± 4.4 cm, ranging from 4.5 cm to 22.7 cm. Most of the patients presented with a single and multiloculated mesenteric cyst in 74.1% and 81.5% cases, respectively (Table II). However, in 25.9% of cases, the presence of multiple cysts involved a 12-28 cm length of the intestine, all of which required bowel resections and subsequent primary intestinal anastomosis.

The mesenteric cysts in this study were generally contained in serous fluid (59.3%), followed by chylous and mixed fluid (Table II). Cultures of the cyst contents did not reveal any bacterial growth. More than 90% of cases had a very thin (<2mm) capsular wall in these cysts.

All patients were histologically confirmed to have simple cysts, with mesenteric lymphangiomas identified in 19 cases and mesotheliomas in 6 cases (Table II). Additionally, two patients had dermoids (mature cystic teratomas). There were no reported incidences of malignant conditions.

Table II Anatomical and pathological findings of the mesenteric cystic masses

Findings	Patients of the study group (n=27)
Location	
Jejunum	15 (55.5%)
Ileal	9 (33.3%)
Sigmoid	3 (11.2%)
Size (cm)	
Median	8.6 ± 4.4
Smallest size	$4.5 \times 4.1 \times 2.2$
Largest size	$22.7 \times 9.5 \times 4.8$
Number of Cysts	
Single	20 (74.1%)
Multiple	7 (25.9%)
Loculation	
Unilocular	5 (18.5%)
Multilocular	22 (81.5%)
Colour of the fluid	
Serous	16 (59.3%)
Chylous	6 (22.2%)
Hemorrhagic	1 (3.7%)
Mixed Fluid	4 (14.8%)
Capsular thickness (mm)	
< 2	25 (92.6%)
> 2	2 (7.4%)
Histopathological Diagnosis	
Benign: Mesenteric	
Lymphangioma	19 (70.4%)
Cystic mesothelioma	6 (22.2%)
Dermoid	2 (7.4%)
Duplication cyst	0
Malignant: Immature teratoma	0
Adenocarcinoma	0

Complete and successful removal of mesenteric cysts was achieved in all cases; there was no need for partial excision or marsupialization for any patients. The surgical management options included enucleation (n = 17) cyst excision combined with bowel resections and primary intestinal anastomosis (n = 8) and laparoscopic resection of the cyst (n = 2), as shown in Table III.

The median length of their hospital stay was 5.7 days, ranging from 4 to 8 days. Early postoperative complications were minimal, with only three patients (11.1%) experiencing wound-site infections (Table IV). There were no incidents of anastomotic leakage following primary intestinal anastomosis.

The median follow-up period for the patients was 10 months, ranging from 6 months to 2 years. Among these patients, only one developed postoperative adhesive ileus, which was successfully managed with conservative treatment. Encouragingly, none of the patients experienced a recurrence of their condition.

Table III Types of Surgical intervention for mesenteric cystic masses

Type of surgery performed □ □	Patients of the study group (n=27)
Enucleation □	17 (63.0%)
Cyst excision combined with segmental resection of intestine and primary anastomosis □	8 (29.6%)
Laparoscopic resection of the cyst □	2 (7.4%)
Partial excision and marsupialization □	0
Drainage □	0

Table IV Post-operative complications of the patients with mesenteric cyst

Post-operative complications □ □	Patients of the study group (n=27)
Superficial surgical site infections □	3 (11.1%)
Anastomosis leakage □	0
Post-operative bands and adhesions □	1 (3.7%)
Recurrence □	0

Discussion

The incidence of mesenteric cysts in the pediatric population has been reported to be 1 in 20,000 hospital admissions, with 75% of these patients being under five years of age.¹ Although earlier studies suggested that males were more frequently affected, recent publications have indicated a

higher prevalence in females.^{9,10} Our research aligns with these findings; we observed a higher incidence of mesenteric cysts in females, with most patients being around five years old. According to Lewis et al. 37% of antenatally diagnosed abdominal cysts resolved spontaneously, while 63% persisted postnatally. Among the persistent cases, 21% required surgical intervention.^{11,12} In the present study, 11.1% of the cases were identified during the antenatal period.

As mesenteric cysts arise from various locations in the gastrointestinal tract, they may present with a wide spectrum of symptoms.^{4,12} The clinical presentation of mesenteric cysts is extremely varied and depends on numerous factors, including cyst size, location, compression of adjacent organs by large mesenteric cysts, and the presence or absence of complications.^{7,13,14} In our study, the most common presentation was acute abdominal symptoms, including abdominal pain (70.4%) vomiting (25.9%) and abdominal distension (22.2%) Clinical examination reveals a palpable, freely movable abdominal mass that moves in the transverse plane. Research by De Perrot et al. and Egozi et al. supported that the most commonly observed presenting symptoms are abdominal distension, pain and vomiting.^{8,15}

Plain radiographs may show a noncalcified mass displacing the bowel.¹³ USG and CT scans of the abdomen are highly sensitive for diagnosing mesenteric cysts.³ Abdominal ultrasound and CT scan can detect the location and size of the lesion, the presence of septa, and the thickness of the wall.^{9,12} CT is preferred for localization, preoperative planning, and evaluation of the relationship of the cyst to adjacent organs.^{9,16} Other diagnostic modalities included barium enema.¹⁷ Occasionally, barium studies may reveal abnormal mucosal patterns, obstruction or duplications.^{14,17}

A well-defined, fluid-filled cystic structure adjacent to bowel loops may be visible on ultrasound.⁴ In our study, septations were identified in 22 cysts and exhibited thin walls (<2 mm) in 92.6% of cases. Calcifications and hemorrhage were not identified in any of these lesions.

A CT scan of the abdomen with intravenous contrast provides more information regarding the location, extent, and nature of the cyst.^{9,10} CT scan

demonstrated a rim of bowel over the margin of the cyst or bowel wall compressed between the two cystic structures.^{9,18} CT demonstrates a septate cystic mass of variable sizes and the relationship of the lesion to visceral organs and vessels.⁹ This aids in planning the surgical approach, especially if minimally invasive surgery is considered.⁵

Mesenteric cysts can develop anywhere in the mesentery of the gastrointestinal tract, ranging from the duodenum to the rectum.^{1,3} Regarding the locations of mesenteric cysts, most authors reported the small bowel mesentery as the most common site (50–67%), with half located in the ileal mesentery.^{7,19} Additionally, approximately 24–37% of cysts were found in the mesocolon and 14.5% in the retroperitoneum.^{1,8} In our study, we observed that the most common location was the jejunal mesentery, representing 55.5% of cases, followed by the ileal mesentery at 33.3% and the sigmoid mesentery at 11.2%.

Most cysts are typically single and vary in size, but can be multi-locular.⁸ Most patients (80%) presented with a single mesenteric cyst, while 20% presented with multiple cysts.^{3,7} The diameter of excised cysts ranged from 4 cm to 27 cm along the long axis, with a median size of 12 cm.¹⁴ According to Kim et al. the median size of the mesenteric cyst was 10 ± 4.4 cm, ranging from 3.5 cm to 25 cm.² In our study, cyst size ranged from 4.5 cm to 22.7 cm along the long axis and our findings were consistent with the existing literature.^{10,12,20}

Cyst fluid can be classified as chylous, serous or hemorrhagic.^{7,13} Chylous cysts were usually associated with small bowel mesentery, serous cysts with mesocolon, and hemorrhagic cysts were caused by trauma.^{13,21} Chylous cysts were to be differentiated from other fluid-filled abdominal cystic masses, such as mesenteric, omental, and dermoid cysts.⁵ This distinction was crucial because lymph fluid was predominantly found in the mesentery of the small intestine and within the thoracic duct.^{5,22}

Histologically, mesenteric cysts are benign cystic proliferations of lymphatic tissue.⁷ However, these cysts typically do not communicate with the lymphatic system and may be found in the mesentery or associated with the intestinal wall.^{3,23}

In this study, histological examination revealed that mesenteric lymphangiomas were present in 70.4% of the cases, while mesotheliomas were observed in 22.2%. Additionally, it has been estimated that about 3% of these cysts may undergo malignant transformation.^{4,24} In our study, no cases of malignancy were reported.

The preferred treatment for mesenteric cysts is complete excision of the cyst, which may or may not require bowel resection.¹ Complete excision has shown a good prognosis without recurrence.⁷ The choice of surgical method for mesenteric cysts often depends on factors such as the cyst's location, size, and whether it has invaded surrounding organs.²⁵ Enucleation is the most commonly used technique^{10,12} However, a resection of the adjacent organ may be required if enucleation cannot be performed safely because the cyst wall adheres to mesenteric tissue and surrounding structures or if blood vessels that supply the intestine are involved.⁴

If complete excision, even with bowel resection, is not possible, then another option is partial excision with marsupialisation of the remaining cyst cavity.¹ Deroofing and drainage were alternative treatment options, however, they have a higher recurrence rate.⁴

Prakash et al. reported that complete excision was successful in 65% of their patients, while marsupialisation with cauterization of margins was performed in 35% of cases.¹ Additionally, Tripathy et al. noted that bowel resection was required in 31% of their cases to achieve complete cyst excision.¹⁴

Laparoscopic excision of mesenteric cyst has also been reported in recent studies.^{5,26,27} Shimura et al. and Vu et al. reported successful laparoscopic resection of mesenteric cysts.²⁶ They successfully performed laparoscopic resection in 19% of their patients.^{13,26} In our study, laparoscopic resection of the mesenteric cyst was performed in 7.4% of patients. To facilitate easier handling, the cyst contents were aspirated before resection.

The morbidity associated with the treatment of mesenteric cysts varies depending on the type of surgical procedure performed. Kim et al. found 18.1% (4/22) of patients experienced post-operative complications in their study.² Among

these patients, superficial surgical site infection developed in three patients, and one experienced anastomosis leakage. Similarly, Yavuz et al. reported adhesive ileus in three patients, which resolved with conservative treatment, and one patient had intra-abdominal chyle leakage, which also resolved with conservative treatment.¹⁰ In our study, we observed similar post-operative complications, all of which were successfully resolved with conservative treatment.

Tripathy et al. usually discharged their patients on the 2nd post-operative week.¹⁴ Similarly, Kim et al. documented an average hospital stay of 5.77 (2–15) days, which was similar to our findings.²

In our study, the median follow-up period for patients was 10 months, ranging from 6 months to 2 years. We recommended regular follow-up using abdominal ultrasound to monitor for early recurrence of the mesenteric cysts. During this follow-up period, none of our patients experienced a recurrence of their condition. Kim et al. and Tan et al. reported that the median follow-up period of 10.9 ± 6.9 months for their patients, with a range from 2 months to 4 years.^{2,13} The prognosis for mesenteric cysts is generally favorable, as most cases are benign, and the recurrence rate is low following complete excision.^{8,13}

Limitation

This study was conducted at a single center with a relatively small sample size, focusing solely on the pediatric age group. Therefore, the results may not accurately represent the entire population.

Conclusions

The most common presenting symptom of a mesenteric cyst was abdominal pain. The jejunal mesentery was the most frequently affected site. The anatomical relationships between the mesenteric cyst and adjacent organs largely influenced the surgical approach. Following surgical intervention, none of the patients experienced a recurrence of their condition.

Recommendation

It is recommended to conduct studies with larger sample sizes that include diverse age groups, as well as to implement multicenter designs.

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Contribution of the authors

MSI-Conception, study design, acquisition of data, analysis of data, manuscript writing & final approval.

MH-Interpretation of data, critical revision & final approval.

KL-Interpretation of data, critical revision & final approval.

MTSC-Acquisition of data, analysis of data, drafting & final approval.

Disclosure

All the authors declared that there is no conflict of interest.

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