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Clinical Presentation, Surgical Management, and Outcomes of Mesenteric Cysts in Pediatric Patients: A Retrospective Analysis

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Abstract: Background: *Mesenteric cysts are rare intra-abdominal tumors that can occur in pediatric patients. These cysts arise from the mesentery along the gastrointestinal tract, with a higher incidence in children under the age of 5. This study aims to evaluate the clinical presentation, imaging characteristics, surgical management, and outcomes of mesenteric cysts in pediatric patients.* ***Methods:*** *A retrospective analysis was conducted on 70 pediatric patients diagnosed with mesenteric cysts at the Department of Pediatric Surgery, Bangladesh Shishu Hospital & Institute, Bangladesh, from January to December 2022. Data were collected from patient case sheets, including clinical, radiological, perioperative, and histopathological findings. Imaging techniques such as ultrasound and CT were utilized for diagnosis. Descriptive statistics were applied to analyze the data using SPSS version 27.* ***Results:*** *Of the 70 patients, 60% were male, and 51.1% were aged 1-5 years. Abdominal pain was the most common symptom (62.8%), followed by abdominal mass (25.7%) and incidental findings (11.4%). Ultrasound was the primary diagnostic tool (88.5%), with CT used in 65.7% of cases. Surgical management included cyst excision with bowel resection and anastomosis in 74.2% of patients, and cyst excision alone in 25.7%. No deaths were reported, and no recurrences were observed during follow-up.* ***Conclusion:*** *Mesenteric cysts in pediatric patients often present with nonspecific symptoms, making preoperative diagnosis challenging. Ultrasound and CT are useful diagnostic tools, while surgical excision remains the treatment of choice. Complete resection offers an excellent prognosis, with no recurrences reported in this cohort. Further studies with larger sample sizes and longer follow-up periods are needed to explore long-term outcomes and optimal management strategies.* ***Key words:*** *Mesenteric cysts, pediatric surgery, clinical presentation, surgical management, ultrasound, CT scan, cyst excision, bowel resection.*

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I. Introduction:

Mesenteric cysts are rare intra-abdominal tumors that can develop anywhere within the mesentery, ranging from the duodenum to the rectum [1,2,3]. Although these cysts can also be found in adults, approximately 60% of cases occur in children under the age of 5 [4]. These cysts are generally considered to have a congenital origin due to their distinct characteristics and early onset [5]. They can be located anywhere along the digestive tract, with the small intestine being the most common site of involvement [6,7]. Symptoms vary widely, but abdominal discomfort is present in 80% of cases, with other common symptoms including abdominal distention (30-50%), nausea, vomiting, constipation, diarrhea, weight loss, fever, abdominal mass, and peritonitis [2,8]. Clinical manifestations can range from asymptomatic cases to severely ill patients presenting with peritonitis, perforation, and even death [9]. The non-specific nature of these symptoms makes the diagnosis particularly difficult, as they can mimic other abdominal conditions [1].

Surgical intervention is the treatment of choice for mesenteric cysts, as complete resection with negative margins is curative and prevents recurrence [9]. While Caucasians are more prone to developing mesenteric cysts, they typically appear in the fourth decade of life, with a slight female predominance [9]. Several theories have been proposed regarding their development, including the abnormal growth of congenital lymphatic tissue, trauma, degenerating lymph nodes, and improper fusion of the mesentery's leaves [1,2,9]. These various mechanisms suggest that mesenteric cysts may have multiple etiological causes [1,2,9]. Most mesenteric cysts are solitary and can be either unilocular or multilocular, ranging in size from a few centimeters to large cysts that can occupy a significant portion of the peritoneal cavity [1,9]. Hemorrhagic cysts, which are trauma-related, may

occur anywhere in the bowel, while chylous cysts are usually connected to the small bowel mesentery, and serous cysts tend to arise in the mesocolon [1].

Since mesenteric cysts lack pathognomonic signs, diagnosing them preoperatively based solely on clinical symptoms is particularly challenging [10]. Imaging techniques, including ultrasound and CT, can help determine the cyst's location, size, septation, debris, fluid levels, and wall thickness. However, magnetic resonance imaging (MRI) is considered more accurate in evaluating mesenteric cysts [10]. Surgical excision remains the preferred treatment, with the first recorded surgical resection performed by a French physician in 1880, who identified the "Tillaux sign," describing the cyst's mobility in the transverse plane, but not in the longitudinal plane [9,11]. The most effective approach may involve straightforward cystectomy or extensive resection of the adjacent intestine [12,13]. Due to the high risk of infection and recurrence, aspiration and marsupialization are not recommended [14]. In some cases, a localized resection of the intestine or surrounding tissues may be necessary to ensure complete cyst removal [9].

Despite the recognition of mesenteric cysts in children, there are limited studies available on this topic. Therefore, the current study was conducted to evaluate the prevalence, clinical presentation, and management of mesenteric cysts in the pediatric population.

II. Methodology:

This study was a retrospective analysis aimed at examining the clinical, radiological, perioperative, and histopathological findings of children diagnosed and treated for mesenteric cysts at the Department of Paediatric Surgery, Bangladesh Shishu Hospital & Institute, Bangladesh. The study period spanned from January 2022 to December 2022, and a total of 70 patients were included. Patients were selected through a purposive non-probability sampling technique. The inclusion criteria were children aged 15 years or younger who had at least 1 year of follow-up after treatment. Exclusion criteria included patients older than 15 years and those lost to follow-up before completing 1 year. Data were retrieved from patient case sheets, which included clinical, radiological, perioperative, and histopathological findings. Imaging studies, such as ultrasound and CT scans, were used to diagnose mesenteric cysts, and patients were followed up to monitor recovery and any complications. Descriptive statistics were applied to analyze the collected data, with frequency and percentage distributions calculated for categorical variables using SPSS version 27.

III. Result:

Table 1: Demographic and Clinical Characteristics of the Study Subjects (N=70)

Total patients = 70	Number (n)	Percentages (%)
Sex		
Male	42	60
female	28	40
Age at presentation and surgery		
< 1 year	10	14.2
1 to 5 years	36	51.1
> 5 years	24	34.2
Clinical finding		
Pain in abdomen only	44	62.8
Abdomen mass with pain	18	25.7
Indecently	8	11.4
Imaging of abdomen		
Ultrasound	62	88.5
CT	46	65.7
Presentation		
Acute	24	34.3
Chronic	46	65.7
Surgery		
Emergency	24	34.3
Elective	46	65.7
Cyst excision	18	25.7
Cyst excision with resection and anastomosis of bowel	52	74.2

In this study, 74.3% of patients had multiple mesenteric cysts, while 25.7% had a single cyst. The majority of cysts were located in the ileal region (77.1%), with fewer cysts found in the jejunal (14.3%), mesocolon (2.8%), and omentum (5.7%) areas. Regarding cyst size, 60% of the cysts measured between 5 to 10 cm, while 28.5% were between 10 to 20 cm in size, and 11.4% were larger than 20 cm. Cyst loculation was predominantly multiple, with 60% of cysts being multilocular, while 40% were unilocular. The most common fluid content within the cysts was chylous (82.8%), followed by serosanguinous (11.4%) and serous (5.7%) fluid. The cyst walls were predominantly lined with a cuboidal or columnar layer (77.1%), while 22.9% had a flattened endothelial layer.

Table 2: Cyst Characteristics of the Study Subjects (N=70)

Total patients = 70	Number (n)	Percentages (%)
Number		
Single	18	25.7
Multiple	52	74.3
Site		
Ileal	54	77.1
Jejunal	10	14.3
Mesocolon	2	2.8
Omentum	4	5.7
Size		
5 to 10 cm	42	60
10 to 20 cm	20	28.5
> 20 cm	8	11.4
Loculation		
Single	28	40
Multiple	42	60
Fluid content		
Serous	4	5.7
Chylous	58	82.8
Serosanguinous	8	11.4
Lining of cyst wall		
Flattened endothelial layer	16	22.9
cuboidal / columnar layer	54	77.1

IV. Discussion:

Mesenteric cysts are rare intra-abdominal tumors that arise from the mesentery along the gastrointestinal tract, typically from the duodenum to the rectum. Although rare, the incidence of mesenteric cysts is reported as 1 in 105,000 admissions to general hospitals and 1 in 200,000 admissions to pediatric hospitals. Approximately one-third of mesenteric cysts occur in children under the age of 10 [15-19]. These cysts are generally considered to have a congenital origin. The first reported mesenteric cyst was described by anatomist Beneviem in 1507, with subsequent significant contributions by Von Rokitansky in 1842, who identified chylous mesenteric cysts, and French surgeon Tillaux, who performed the first successful surgical excision in 1880. The first marsupialization was carried out by Pean in 1883 [20].

The exact etiology of mesenteric cysts remains unclear, with various theories proposed, including incomplete fusion of the mesentery leaves, occult trauma, neoplastic processes, localized degeneration of lymph nodes, and obstruction or degeneration of existing lymphatic channels [21]. Our findings corroborate the literature, showing that the majority of mesenteric cysts in the pediatric population occur in the small bowel mesentery, with the ileal region being the most frequently affected (77.1%) [22]. Other locations include the jejunal mesentery, mesocolon, and omentum, with the most common cyst type being multilocular (60%), as seen in our study.

The clinical presentation of mesenteric cysts can vary widely, ranging from asymptomatic cases to those presenting with acute symptoms such as abdominal pain, mass, or even life-threatening conditions like volvulus and intestinal perforation. In our cohort, the most common symptom was abdominal pain (62.8%), followed by abdominal mass (25.7%) and incidental findings (11.4%). The diverse clinical manifestations can make the diagnosis challenging, often leading to a delay in diagnosis. This is consistent with the literature, where mesenteric cysts often present with nonspecific symptoms that mimic other abdominal conditions [21].

Imaging studies, including ultrasound and CT, play a critical role in the preoperative diagnosis of mesenteric cysts. In our study, ultrasound was the most commonly used diagnostic tool (88.5%), followed by CT scans (65.7%). While these imaging modalities help in localizing the cyst and determining its characteristics, they

are not always definitive, and surgical exploration is often necessary for confirmation [15, 23]. MRI, although not routinely used in our cohort, has been shown to provide superior detail in the evaluation of mesenteric cysts, particularly in complex cases [22].

Surgical excision is the definitive treatment for mesenteric cysts, and complete resection is crucial to prevent recurrence. In our study, 74.2% of patients underwent cyst excision along with bowel resection and anastomosis. The goal of surgery should be to achieve total excision of the cyst and its mesenteric origin. Drainage or marsupialization is not recommended due to the high risk of cyst reaccumulation and infection, which may necessitate further surgical intervention [24]. While laparoscopic techniques have been increasingly adopted for the excision of mesenteric cysts, providing advantages such as reduced postoperative discomfort and quicker recovery, our study did not utilize this approach. Laparoscopic surgery, however, has been successfully described in the literature, with McKenzie's 1993 study being one of the earliest reports of laparoscopic excision of mesenteric cysts [25]. Despite its advantages, laparoscopic surgery may not always be feasible, especially in retroperitoneal cases where complete excision is difficult and may require a second surgery [25-27].

The prognosis following complete surgical excision of mesenteric cysts is generally excellent, as evidenced by the favorable outcomes in our study. No patients experienced recurrence during follow-up, supporting the notion that total resection minimizes the risk of recurrence. This is consistent with previous studies, which suggest that recurrence is more likely in cases where complete excision is not achieved [6]. Notably, there were no deaths in our study, further emphasizing the positive outcome associated with complete surgical removal of mesenteric cysts.

Limitations:

This study has several limitations. First, its retrospective design restricts the ability to establish causality or control for confounding factors. Second, the small sample size (70 patients) may not fully represent the broader pediatric population, limiting the generalizability of the findings. Additionally, the study was conducted at a single institution, which may not reflect the diversity of patient populations or surgical practices elsewhere.

V. Conclusion:

In conclusion, mesenteric cysts in the pediatric population present with varied clinical symptoms, and while preoperative diagnosis can be challenging, imaging techniques such as ultrasound and CT play a pivotal role in identifying these cysts. Surgical excision remains the treatment of choice, with complete removal of the cyst and its mesenteric origin offering the best prognosis. Further studies are needed to explore optimal surgical techniques, particularly the role of laparoscopy, in managing these rare but significant cases.

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