

Mesenteric Cysts: An Institution Experience Over 14 Years and Review of Literature

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Abstract

Background Mesenteric cysts are rare intra-abdominal lesions and account for only one in 100,000 acute adult admissions. There is a broad spectrum of symptoms and patients present with nonspecific complaints of abdominal pain, distension, or an abdominal mass. In this study, we present a series of patients with mesenteric cysts, with emphasis on the presentation, management, and outcome. **Methods** A total of 16 cases presented to our institution from 1994 to 2007. The cases were retrospectively reviewed and information was culled from the case documents.

Results There were nine females and seven males (age range, 12–68 years). The most common presentation was abdominal pain (63%), followed by abdominal mass (44%). Laparoscopic surgical excision of the cyst was performed in 3 (19%) patients, laparotomy in 12 (75%), and 1 patient refused surgery. The size of the cyst ranged from 4 to 29 cm. The cyst originated from the retroperitoneum in five patients, the sigmoid mesocolon in four patients, and small bowel mesentery in four patients. Although most of the cysts were benign, three had foci of malignancy and another had a focus of gastrointestinal stromal tumor. None of the cases recurred during follow-up.

Conclusions Mesenteric cysts have diverse presentation and arise from a variety of sites. They can be successfully

managed by complete resection, and laparoscopic excision of the cysts is becoming an increasingly popular option.

Introduction

Mesenteric cysts are rare intra-abdominal tumors, with an incidence ranging from 1 in 27,000 to 1 in 250,000 [1, 2]. Since the first case was reported in 1507, less than 1,000 cases have been reported [3, 4]. Mesenteric cysts are unique in that whilst classified as a distinct entity, the clinical presentation, etiology, radiological features, and pathological characteristics are rather diverse. Many attempts have been made to classify this broad group of diseases based on etiology and histological features [5, 6].

The first case of a mesenteric cyst was documented in 1507 by the Florentine anatomist Benevieni, after he performed a postmortem examination on an 8-year-old boy [1]. In 1842, von Rokitansky first described a chylous cyst, and in 1852, Gairdner first described an omental cyst [1]. In 1880, Tillaux described the first successful surgical treatment of a mesenteric cyst, consequently lending his name to the eponymous sign, which describes a cyst that is mobile in the transverse plane, but not in the longitudinal plane [3, 7]. In 1883, Pean described marsupialization of a mesenteric cyst [1]. However, it was not until 110 years later, in 1993, that Mackenzie first reported successful laparoscopic resection of a mesenteric cyst—a method that has since gained popularity [4, 8].

The unpredictability of mesenteric cysts has posed significant challenges to physicians and surgeons alike; from achieving accurate diagnosis using the various diagnostic modalities to the optimal management. Thus, the following

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report was designed to summarize our experience in the management of mesenteric cysts during a 14-year period, with a secondary objective of reviewing the current literature to highlight the numerous issues surrounding the management of mesenteric cysts.

Patients and methods

We reviewed 16 consecutive patients who were diagnosed with mesenteric cysts in our institution from 1994 to 2007. The diagnosis was made with the use of two imaging modalities: ultrasound and computed tomography (CT). The medical records of these patients were retrospectively reviewed, and the data culled were analyzed.

Results

The study group was comprised of seven males and nine females (median age, 38 (range, 12–68) years). Some of the presenting symptoms included abdominal pain ($n = 10$, 62.5%) abdominal mass ($n = 7$, 43.8%), and acute intestinal obstruction ($n = 1$, 6.3%). One patient was asymptomatic, and the mesenteric cyst was incidentally diagnosed on ultrasound during her pregnancy. Palpable abdominal mass was the commonest sign elicited on physical examination. The diagnosis was achieved through ultrasonography in eight (50%) patients, with half of them undergoing an additional computed tomographic (CT) scan to complement the ultrasound. In the remaining eight (50%) patients, CT was the only modality used (Fig. 1). Table 1 illustrates the various characteristics of our study group.

Laparoscopic surgical resection of the cyst was performed in 3 (18.8%) patients, laparotomy in 12 (75%), and 1 patient refused surgery. In two of the laparoscopic cases,



Fig. 1 CT scan showing mesenteric cyst

Table 1 Characteristics of the 16 patients with mesenteric cyst

Characteristics	Results
Median age (year)	38 (12–68)
Gender	38 (12–68)
Male	7 (43.8%)
Female	9 (56.2%)
Racial distribution	
Chinese	15 (93.8%)
Malay	1 (6.3%)
Symptoms	10 (62.5%)
Abdominal pain	
Abdominal mass	7 (43.8%)
Abdominal distension	1 (6.3%)
Intestinal obstruction	1 (6.3%)
Asymptomatic	1 (6.3%)
Signs	
Palpable abdominal mass	11 (68.8%)
Abdominal tenderness	4 (25.0%)
Abdominal distension	2 (12.5%)
Radiological modality	
Ultrasonography	8 (50.0%)
Computed tomography	12 (75.0%)

the cysts were aspirated before successful resection was performed because of the considerable size (20 and 21 cm, respectively). The third case had an uneventful en bloc resection of the mesenteric cyst without the need for aspiration.

The sizes of the cysts excised ranged from 4 to 29 cm. The commonest sites of the mesenteric cysts include the retroperitoneum ($n = 5$, 31.3%), sigmoid mesocolon ($n = 4$, 25%), and small bowel mesentery ($n = 4$, 25%). Table 2 illustrates the surgical findings. All specimens were sent for histological examination after surgery. Twelve cysts (75%) were benign with diagnoses, such as benign cyst, dermoid cyst, and gastrointestinal stromal tumor.

There was evidence of malignancy within the cysts in three (18.8%) patients. The histological diagnoses included mucinous cystadenocarcinoma ($n = 2$) and leiomyosarcoma. Inadvertent spillage of the cystic contents was present in one patient, and the other two patients had questionable resection margins. All three received postoperative chemotherapy. Two patients had only en bloc removal of the cysts, whereas the other patient required an associated right hemicolectomy due to the proximity of the tumor to the ileocolic pedicle, necessitating its resection. These patients underwent postoperative gastroscopy and colonoscopy as part of the workup to exclude any intrinsic lesions.

Table 2 Surgical intervention and findings of the mesenteric cysts

Characteristics	Results
Type of surgery performed	
Laparotomy surgical resection	3 (18.8%)
Laparoscopic surgical resection	12 (75%)
Refusal to surgery	1 (6.3%)
Sizes of mesenteric cysts (cm)	4–29
Site of mesenteric cysts	5 (31.3%)
Retroperitoneum	
Sigmoid mesocolon	4 (25%)
Small bowel mesentery	4 (25%)
Ascending colon mesentery	1 (6.3%)
Transverse mesocolon	1 (6.3%)
Paraesophageal tissues	1 (6.3%)
Histological diagnosis	
Benign	12 (75%)
Malignant	3 (18.8%)

None of the patients developed a recurrence. The mean duration of follow-up was 9 months (range, 2 months to 4 years).

Discussion

The incidence of mesenteric cysts ranges from 1 in 27,000 to 1 in 250,000 admissions [1, 2]. Our series shows a total of 16 patients, admitted during a 14-year period from 1994 to 2007, giving an incidence of approximately 1 in 10,000 admissions, which is somewhat higher compared with the world literature. Most authors report a wide range of ages from 22 to 46 years [1–3], but generally agree that the highest incidence is in the fourth decade of life [9, 10]. In our series, the age range of our patients was 12 to 68 years. There is a female preponderance, which also is seen in our series. From previous reports, the incidence is low in Africans; the majority of cases reported are Caucasians [2]. Ours might be the largest series based on an Asian population.

The clinical presentation of mesenteric cysts is extremely varied and is dependent on numerous factors: the size of the cyst, its location, and the presence or absence of complications. In general, patients can present in one of three ways: (1) asymptomatic: these patients are picked up incidentally on routine physical examination, during abdominal surgery, or routine imaging as seen in one of our patients. Approximately 40–45% of patients present this way; (2) nonspecific abdominal complaints: which include pain and distension, occasionally associated with nausea and vomiting, diarrhoea, constipation, and loss of weight; and (3) acute abdomen: due to complications of the cyst

and can occur in approximately one-third of patients [2, 9, 11]. Some of these complications include intestinal obstruction (due to compression of adjacent bowel), volvulus (which can lead to gangrene, peritonitis, and shock), hemorrhage (secondary to trauma and erosion), infection, or cyst rupture [2, 9].

The most common presenting complaint is abdominal pain (55–82%), followed by the complaint of an abdominal mass (55–61%) and the sensation of abdominal distension (17–61%) [1–3, 12]. In our series, the most common presentation was abdominal pain (62.5%), followed by an abdominal mass (43.8%) and abdominal distension (18.8%), and intestinal obstruction (6.3%).

Physical examination revealed a mass in 68.8% of our patients, which is higher than the figure reported previously by Burnett (50%) and Takenchi (24%) [2]. Kurtz et al. [1] reported that the average duration of symptoms was 2–6 months (range, 12 h to 12 months). Our series shows an average duration of 45 days (range, 1 day to 4 months).

Most authors reported that the most common location of mesenteric cysts is in the small bowel mesentery (50–67%), of which half were found in the ileal mesentery [1–3]. Approximately 24–37% of cysts were found in the mesocolon and 14.5% in the retroperitoneum [1–3]. This is in contrast to the data obtained in our series, where only 25% of the cysts were in the small bowel mesentery, and the most common locations were the mesocolon (37.5%) and retroperitoneum (31.3%). There also was one mesenteric cyst that arose from the paraesophageal region. This might indicate a racial variation; however, our study size is too small for a definite conclusion to be made.

Most cysts are single, but can be uni- or multi-locular [10, 13]. The average size ranges from 2 to 35 cm [10, 13], which is comparable to our study, for which the range is 4–29 cm. One of the patients was mistaken to have ascites before being referred to our unit. This patient underwent abdominal paracentesis, an occurrence that has been reported in the literature [13].

Most cysts are lined with a single layer of columnar or cuboidal epithelial cells [13]. This layer is sometimes destroyed as a result of pressure exerted by the cyst fluid. As a result, the cyst wall becomes composed of fibrocollagenous tissues infiltrated with chronic inflammatory cells [2, 10, 13]. Cyst fluid can be chylous, serous, or hemorrhagic. Chylous cysts are usually associated with small bowel mesentery, serous cysts with mesocolon, and hemorrhagic cysts are caused by trauma [2, 10].

The incidence of malignancy is reported to be approximately 3% [1, 9]. Most cases are sarcomas, with only a few reported cases of adenocarcinomas [3, 9, 13]. Of the cysts that were malignant, 40% were retroperitoneal cysts. However, in our series, the incidence of malignancy is an astonishing 19%, which is considerably higher than those

reported in the literature. It is uncertain why there is such a significant discrepancy. One of the radiological features seen in these three patients included solid components within the cyst. This finding must alert the surgeon on the increased possibility of malignancy and wide resection margin must be considered.

The mesentery, omentum, and retroperitoneum have the same embryologic origin, consisting of two layers of peritoneum containing connective tissue, blood vessels, lymphatics, nerves, and fat [11, 13]. Several theories have been suggested to explain the etiology of mesenteric cysts: misplacement of islands of lymph tissue, proliferating without access to drainage; mechanical obstruction of lymphatics; trauma to the lymphatics, with subsequent continued growth; failure of the mesenteric leaves to fuse; or formation of bowel diverticula, which subsequently grow in the mesentery as cysts [13].

Many classification systems exist, based on the etiology and pathological features. A new classification was recently proposed by de Perrot et al. [6]. This is based on histopathological features and includes the following six groups: (1) cysts of lymphatic origin (simple lymphatic cyst and lymphangioma); (2) cysts of mesothelial origin (simple mesothelial cyst, benign cystic mesothelioma and malignant cystic mesothelioma); (3) cysts of enteric origin (enteric cyst and enteric duplication cyst); (4) cysts of urogenital origin; (5) mature cystic teratoma (dermoid cysts); and (6) pseudocysts (infectious and traumatic cysts).

Because mesenteric cysts have diverse clinical manifestations, the correct preoperative diagnosis was made in only 26% in the past [1]. Plain radiographs may show a noncalcified mass displacing the bowel [6]. Occasionally, barium studies may reveal abnormal mucosal patterns, obstruction, or duplications [6]. Unfortunately, these investigation modalities lack sensitivity and specificity. With ultrasound and CT becoming more accurate and widely available, the number of cases with successful diagnoses made preoperatively has increased [3]. Eight of our patients had an ultrasound, whereas CT was performed in 12 patients. An accurate preoperative diagnosis was made in all the patients.

Ultrasound and CT can detect the location and size of the lesion, the presence of septa, and the thickness of the wall [6]. Ultrasound is more sensitive in the diagnosis of the internal nature of the mesenteric cysts [1]. It reveals septation, debris, and fluid levels. CT is more accurate in the determination of the nature of the fluid contents [6]. Magnetic resonance imaging (MRI) has been found to be more precise than CT for detection of the location of the cyst, and also in the evaluation of cyst contents [4]. Although ultrasonography has been deemed to be the diagnostic modality of choice by some [7], with the rapid

improvement of high resolution CT (HRCT) over the years, the authors opined that HRCT, if possible, should be the diagnostic modality of choice in the initial investigations.

The treatment of choice for mesenteric cysts is surgery. Simple aspiration and marsupialization are not recommended because both are associated with unacceptable high recurrence and infection rate [3, 4, 9]. The procedure of choice for benign lesions is complete enucleation [1, 11]. Although some had reported good cure rate for malignant cysts through enucleation, the authors opined that complete excision of the cyst with clear margins is recommended to reduce the risk of recurrence [7]. Localized resection of the intestine or surrounding structures may be required to excise the cyst en bloc [7]. Minimal access techniques can still be performed in suspected malignant cases provided that the principles of oncologic surgery are adhered to [7].

There has been no clear consensus with regards to the follow-up of mesenteric cysts if conservative management is preferred. The authors felt that the frequency of surveillance scans should be dependent on the initial radiological features of the cysts. Some of the features that warrant more frequent imaging would include a bigger size, solid component within the cyst, and faster rate of growth because these may be suggestive of malignant change or higher risks of developing complications.

Laparoscopic resection of mesenteric cysts has been well described. The advantage of laparoscopy is that of minimal access and thus a shorter hospital stay and recovery time for the patient [14]. Shimura et al. [12] and Vu et al. [14] have described cases of successful laparoscopic resection of mesenteric cysts. In the former instance, cyst contents were aspirated before resection for ease of handling. In the latter, aspiration was only performed after mobilization to aid extraction. In both papers, complete resection was achieved and there was no recurrence. We managed to perform laparoscopic surgical resection successfully in 19% of our patients.

The operating time is longer for laparoscopic resection, but it was noted that the postoperative stay is shorter and results in less postoperative pain and earlier return to normal activity [12, 14]. However, no large series of laparoscopic excision of mesenteric cysts has been performed to allow a more thorough evaluation of this procedure.

As with most studies, there were several limitations in the present one. This series of patients was enrolled from a single institution and the data were retrospectively reviewed. The small number of patients also might mask several other factors that could be important in the management of mesenteric cysts. Although these limitations are significant, this study remains important because it highlights the possibility that mesenteric cysts in Asians may be a slightly different entity compared with the west. Some of

the differences would include its presentation, location of cyst, and questionable higher malignant potential.

Hence, for the management of any patient with mesenteric cyst, an in-depth history and thorough physical examination is mandatory. Laboratory tests have not been found to be useful in the assessment of mesenteric cysts but may confirm the presence of associated complications, such as septicemia and anemia [7]. The authors suggest the usage of CT scan as the imaging of choice and if technically possible, laparoscopic resection is advised due to its numerous advantages.

However, if there are radiological features suggestive of malignancy, the decision to proceed with laparoscopic or open resection of the lesion is dependent on the expertise of the surgeon, the intraoperative assessment, and the feasibility of successful oncologic clearance. Endoscopic evaluation may be required in malignant cases to rule out intrinsic lesions.

The prognosis for mesenteric cysts is generally good, because most are benign and recurrence rate is low with complete excision. However, there is a significant correlation between recurrence of the cyst and its location. Retroperitoneal cysts have a higher recurrence rate, due to the fact that they are technically more difficult to excise completely as a result of proximity to major blood vessels and other organs.

Conclusions

Mesenteric cysts are rare intra-abdominal lesions. They can arise from various sites within the abdominal cavity. As a result of the diverse sites of origin, the symptoms are wide-ranging and nonspecific. The mode of diagnosis is usually radiological. With complete excision, the recurrence rate is

low and overall prognosis is good. Laparoscopic exploration and resection may be the preferred approach, but extreme caution must be taken to completely resect the lesion and to avoid intraoperative spillage of cyst contents in case of malignancy.

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