

Omental, Mesenteric, and Retroperitoneal Cysts:

A Clinical Study of 33 New Cases

ALLAN R. WALKER, M.D., THOMAS C. PUTNAM, M.D.

From the Department of Surgery, University of Rochester School of Medicine and Dentistry, Rochester, New York

CYSTIC LESIONS of the omentum, mesentery, and retroperitoneum are uncommon lesions which are seldom diagnosed prior to operation. Several authors^{4,14} have indicated that these lesions may be grouped in the same category since they are similar, both embryologically and pathologically.

Barr and Yamashita¹ stated that "preoperative diagnosis is infrequently made because they are not usually considered in the differential diagnosis". We have undertaken to review our experience with these lesions emphasizing clinical features rather than pathologic features. By placing emphasis on the clinical aspects of these lesions, we feel that a preoperative diagnosis or at least a high index of suspicion may be possible more frequently than has been previously reported. This study is based on a review of charts from the University of Rochester's Strong Memorial Hospital and four local affiliated teaching hospitals during the period from 1955 to 1970. We have excluded lesions which may be classified as intestinal duplications.

Results

Thirty-three new cases of omental, mesenteric, and retroperitoneal cysts are reported. The diagnosis was proven at operation in all cases.

There were six males and 27 females, with an age range of 1 day to 76 years. Analysis by age (Table 1) revealed a relatively even distribution throughout all decades. In addition to the six cases in the first decade, there were two other instances in the pediatric age group (15 years) making a total of eight cases (24%) in children.

Of the 33 cases, there were 13 omental cysts, 18 mesenteric cysts and two retroperitoneal cysts. Since

case records were not available for three women with mesenteric cysts, the remaining discussion will concern only the 30 patients for whom records were available. The clinical presentation of these 30 cases is shown graphically in Figure 1.

The lesions were incidental findings at operation in 12 of the 30 patients. Of these, eight were omental, three were mesenteric, and one was retroperitoneal. In the other 18 instances (Table 2), operation was performed for symptoms or signs directly attributable to the lesion. In five of the 18 patients, surgical treatment was performed on an emergency basis, due to the presence of acute intra-abdominal conditions. In the remaining 13 patients, operation was elective.

The five emergent cases included two adults with apparent acute appendicitis, one of whom (Case 12) had a mesocolic cyst with recent hemorrhage and inflammation and one (Case 8) who had an omental cyst which had undergone torsion. There were two infants with large omental cysts that had ruptured with hemorrhage, showing a clinical picture of abdominal distention and intra-abdominal bleeding. One was a neonate (Case 1) and the other was aged 23 months (Case 4). The fifth emergent instance (Case 6) occurred in a 6-year-old girl who showed a clinical picture of small bowel obstruction secondary to a large mesenteric cyst.

Of the 13 patients operated upon electively, ten had mesenteric cysts. Eleven of the 13 had palpable abdominal masses, and two were children with large cysts causing generalized abdominal distention. In six cases, a mobile, non-tender abdominal mass was found on routine examination and no symptoms were present. Histories of pain varying in duration from 4 days to 5 years were elicited from the other seven patients. The pain was intermittent in three patients and steady in

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Request reprints: Allan R. Walker, M.D., c/o Department of Surgery, Highland Hospital, Rochester, New York 14620.

TABLE 1. *Distribution of Cases by Age and Location*

| Decade | Omental | Mesenteric | Retroperitoneal | Total |
|--------|---------|------------|-----------------|-------|
| 0-10 | 4 | 2 | | 6 |
| 11-20 | 0 | 2 | | 2 |
| 21-30 | 2 | 2 | | 4 |
| 31-40 | 2 | 3 | | 5 |
| 41-50 | 2 | 2 | 1 | 5 |
| 51-60 | 0 | 4 | 1 | 5 |
| 61-70 | 2 | 2 | | 4 |
| 71-80 | 1 | 1 | | 2 |
| | | | | 33 |

four. The pain was accompanied by nausea and vomiting in three patients.

X-ray examinations of various types were carried out in 15 of the 18 patients in whom the cyst was considered to be the primary source of symptoms and/or signs. Plain films of the abdomen were reported in 11 patients and showed positive findings in ten. Nine patients had evidence of a soft tissue mass and one demonstrated a pattern typical of small bowel obstruction. Displacement of bowel by the mass was noted on the plain films in three and calcifications of the mass was seen in five patients. An upper gastrointestinal series was done in seven patients, and seven patients had barium enema X-rays performed. Two of these patients underwent

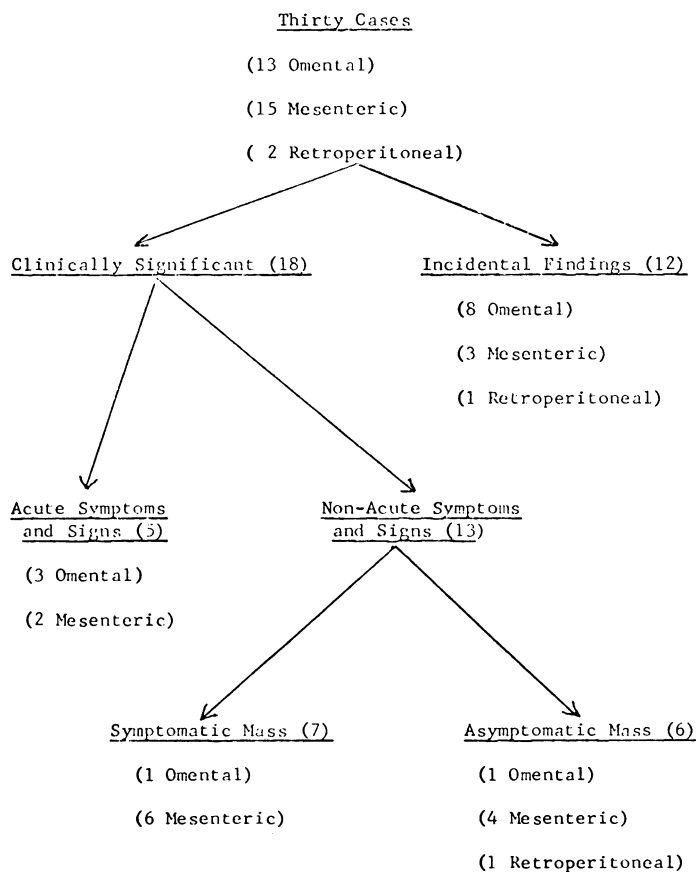


FIG. 1. Summary of clinical presentation of 30 cases.

both studies. These studies demonstrated extrinsic compression or displacement of some portion of the gastrointestinal tract in five of the seven patients in each group. Intravenous pyelography was done in six patients. This study was normal in four patients, one had a displaced ureter and another patient had a unilateral hydro-ureter and hydro-nephrosis.

The pathologic features of these cysts showed a marked variability. There were 23 unilocular cysts, including 12 of the 13 omental cysts, and only seven multilocular. Lining cells were present in 16 patients, absent in ten and not reported in four. The lining cells, when present, varied from flattened, to cuboidal, to columnar epithelium.

There were seven cysts with evidence of bleeding. Three of these were acute with bright red blood, while in the remaining four patients, the bleeding was old and manifested by brown fluid in the cyst.

The size range varied from 1.0 cm. to large cysts filling the entire abdominal cavity. In general, the smallest cysts were omental with eight of the 13 being 4.0 cm. or less in greatest diameter. In contrast to this, the smallest of the mesenteric cysts was 3.0 cm. in diameter and 11 of the 15 were between 6 and 15 cm. in greatest diameter.

In two patients the lesions recurred. In one (Case 3), a recurrent cyst developed in the omental remnant 9 months after excision of a huge omental cyst. In the second (Case 15), a patient developed multiple recurrent mesenteric cysts ten years after excision of a retroperitoneal cyst.

Discussion

History and Incidence

The first report of a mesenteric cyst is commonly ascribed to a Florentine anatomist, Beneviene, who related the finding of a cyst of the small bowel mesentery during an autopsy in 1507. The first surgical excision was reported in 1880 by Tillaux, and since that time numerous case reports have been presented. Loeb¹⁵ reviewed the literature on mesenteric cysts in 1941 and estimated that 550-600 cases had been reported, and it is likely that there are now at least 700-750 cases in the literature.

Omental cysts were not described until the report of Gairdner in 1852, and are less common than the mesenteric variety. In 1964, Oliver¹⁷ estimated the total number of cases of omental cysts to be 150 and he reported an additional 13 cases.

Mesenteric cysts have been estimated to be three to ten times more common than omental cysts,² although on the basis of the numbers of reported cases, the ratio may be set at 4.5 to one.

The rate of incidence of both cyst types has been



FIG. 2A. Plain A-P film of an 11-month-old girl (Case 3) with fluid abdominal distention. Film revealed diffuse haziness suggestive of ascites.

variously reported from one case per 27,000 hospital admissions¹² to one per 100,000 admissions.¹⁸ In this series the rate was one case per 35,400 admissions.

These lesions are generally reported to be more common in females and this fact was supported by this series which showed that 82% occurred in females.

Pathology

Pathologically, these lesions are generally single, although multiple occurrences have been reported. They may be unilocular or multilocular and contain fluid which may range from a clear, straw-colored liquid to a thick cheesy-white material which is thought to be inspissated lymph fluid. They may exhibit evidence of bleeding into the cyst cavity, either recent or old. Calcification may occur but is generally reported to be a

rare event. There is no apparent correlation between calcification and previous bleeding. Only one of the five cysts in this series with calcification showed any evidence of recent or old bleeding.

Lining cells may or may not be present and may range from flattened endothelial cells to low cuboidal or high columnar epithelial cells.

Malignant change has been reported, but is uncommon. Hardin and Hardy¹² indicate that the malignancies are usually low grade sarcomas and carry a good prognosis if properly excised.

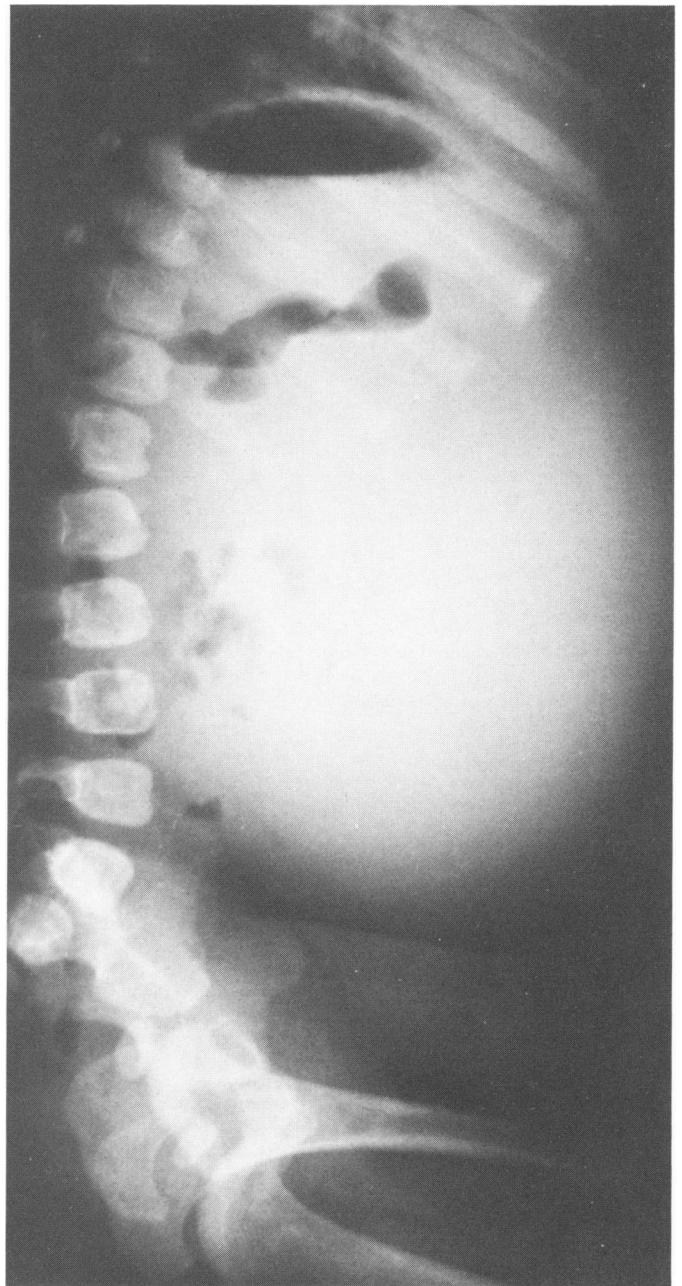


FIG. 2B. Lateral view of same patient demonstrating posterior displacement of intestinal gas, a finding indicative of intra-abdominal cyst.

TABLE 2. Summary of Findings of 18 Patients with Clinically Significant Lesions

| Case | Age & Sex | Symptoms and Signs | X-ray | Pathology | Location and Size | Remarks |
|------|-------------|--|---|---|--|---|
| 1 | 1 day F | Abdominal distention, pallor, lethargy, bloody fluid on paracentesis. | None. | Unilocular cyst—ruptured with hemorrhage. | Omentum—large cyst filling abdominal cavity. | |
| 2 | 14 wk. F | Mobile right flank mass on routine physical examination. | <i>Plain film</i> —5 cm. calcific density in right lower quadrant. <i>Upper GI series</i> —small bowel displaced to left. | Unilocular cyst no lining cells old bleeding. | Omentum—4 × 6 cm. | |
| 3 | 11 mo. F | Abdominal distention—Recurrent abdominal pain and vomiting for 3 months. | <i>Plain film</i> —Diffuse abdominal haziness. <i>Lateral view of abdomen</i> —Bowel gas displaced posteriorly <i>Upper GI series</i> —Displacement of small bowel to left. | Multilocular cyst columnar epithelial lining. | Huge omental cyst filling abdominal cavity. | Patient returned 9 months later with recurrent cyst of omental remnant. |
| 4 | 23 mo. M | Lethargy and pallor of sudden onset. Abdominal distention. | <i>Plain film</i> —Upward displacement of bowel. <i>Barium enema</i> —Displacement and extrinsic compression of cecum and sigmoid colon | Unilocular cyst with mesothelial lining ruptured with hemorrhage. | Omentum—Huge cyst filling abdominal cavity. | |
| 5 | 5 yrs. M | Abdominal distention for 2 to 3 weeks. Right upper quadrant pain for 4 days. | <i>Plain film</i> —Upward displacement of transverse colon by mass with calcified rim. <i>Barium enema</i> —Extrinsic compression. <i>IVP</i> —Right hydronephrosis and hydro-ureter. | Multiloculated cyst. No lining cells. | Jejunal mesentery 25 cm. | |
| 6 | 6 yr. F | Abdominal and pain vomiting for 3 days. Abdominal distention. | <i>Plain film</i> —Gas pattern characteristic of small bowel obstruction. | Unilocular cyst. No lining cells. | Jejunal mesentery 10 cm. | |
| 7 | 13 yr. F | Intermittent abdominal pain and vomiting for 2 years. Abdominal mass. | <i>Upper GI series</i> and <i>Barium enema</i> —Extrinsic compression of bowel by central mass. | Unilocular cyst with “chocolate” fluid. No lining cells. | Transverse Mesocolon 15 cm. | |

Etiology and Classification

As early as 1916, it was suggested by Hadley¹⁰ that “it seems more than probable that the group of abdominal tumors classified as chylous cysts do not all have the same origin . . .”

The etiology of these lesions has been subject to much discussion in the literature over the years, with the principal debate centering around the question of whether or not these lesions are congenital. Some writers have claimed that all of these cysts are congenital with some not being found until adulthood. Others cite the relatively low incidence in childhood, such as the 25% reported by Burnett, *et al.*,⁵ as evidence that they are not congenital. It is now recognized that there is no single etiologic mechanism involved in the development of all these cysts. The literature contains several examples of cysts which are definitely congenital, but

there are also a large number of definitely acquired cysts which have been reported.

In 1950, Beahrs *et al.*,³ proposed the following etiologic classification for these lesions:

- A. *Embryonic and Developmental Cysts*
including enteric, urogenital and dermoid cysts, as well as cysts arising from embryonic defects in lymph tissue.
- B. *Traumatic or Acquired Cysts*
No lining cells are seen.
- C. *Neoplastic Cysts*
Benign and malignant including lymphangiomata.
- D. *Infective and Degenerative Cysts*
of mycotic, parasitic or tuberculous origin.

We believe this to be a complete and logical classifi-

TABLE 2. (Continued)

| Case | Age & Sex | Symptoms and Signs | X-ray | Pathology | Location and Size | Remarks |
|------|-------------|--|--|--|---|--|
| 8 | 24 yr. F | Right lower quadrant pain for several hours. Right lower quadrant tenderness and spasm. | None. | Unilocular cyst with torsion. | Omentum 7 × 5 × 4 cm. | |
| 9 | 28 yr. F | Abdominal pain, nausea and vomiting for 2 weeks. Mobile mass in left mid-abdomen. | <i>Barium enema</i> — Negative. <i>IVP</i> —Displaced left ureter. | Multiloculated cyst. No lining cells. Brownish fluid. | Jejunal mesentery 15 cm. | |
| 10 | 34 yr. | Lower abdominal pains for 5 years. Left flank ache for 1 month mobile left upper quadrant cystic mass. | <i>Plain film</i> —Left upper quadrant mass with calcified rim. | Unilocular cyst. No lining cells. | Proximal jejunal mesentery—6 cm. | |
| 11 | 50 yr. M | Asymptomatic left lower quadrant mass on routine examination. | <i>Plain film</i> — Calcified left lower quadrant mass. | Unilocular— No lining cells. | Mid-jejunal mesentery 6 × 4 cm. | |
| 12 | 52 yr. M | Right lower quadrant pain for several hours. Right lower quadrant guarding and tenderness. | None. | Unilocular cyst. No lining; recent hemorrhage and inflammation. | Transverse Mesocolon 4 × 7 cm. | |
| 13 | 55 yr. M | Large mid-abdominal, mobile mass for 4 years. | <i>Plain film</i> —Soft tissue mass. No bowel displacement. | Unilocular cyst. No lining cells. | Small bowel mesentery 25 cm. | |
| 14 | 58 yr. F | Right lower quadrant mass on routine physical examination. | <i>Barium enema</i> — Extrinsic pressure on cecum by calcified mass. | Multiloculated cyst. Flattened epithelial lining. | Retroperitoneal cyst medial to cecum 10 × 12 × 5 cm. | |
| 15 | 60 yr. F | Left abdominal mass— asymptomatic. | <i>Plain film</i> —Soft tissue density in abdomen. | Multiloculated cysts. Cuboidal and columnar epithelium. | Multiple mesenteric cysts filling abdominal cavity. | Previous excision of retroperitoneal cyst. |
| 16 | 60 yr. F | Left abdominal mass on routine physical examination. | <i>Plain film</i> —Abdominal mass. <i>Upper GI series</i> — Displacement of jejunum. | Unilocular cyst. No lining cells. | Jejunal mesentery 10 × 12 cm. | |
| 17 | 62 yr. F | Abdominal pain for 6 months. Tender upper abdominal mass. | <i>Barium enema</i> — Extrinsic compression of transverse mesocolon. | Unilocular cysts. No lining cells. | Transverse mesocolon 7 cm. | Previous vagotomy and pyloroplasty— no cyst at that time. |
| 18 | 66 yr. | Pain in right side of back for 1 month. Soft, mobile, epigastric mass. | <i>Upper GI series</i> — Compression of lesser curvature. | Unilocular cyst. No lining cells. | Gastro-hepatic mesentery 14 cm. | |

cation which is consistent with currently available factual information. As suggested by Beahrs,³ this classification also serves to clarify much of the confusion resulting from the use of such terms as “chylous” or “lymphatic” cysts.

Diagnosis

The diagnostic features of clinically significant omental and mesenteric cysts appear to be a function of size, location, and presence or absence of complicating factors such as hemorrhage, torsion, infection, rupture, or pressure on adjacent structures.

It is obvious that a very small cyst may be asymptomatic and nonpalpable and therefore discovered only as an incidental finding at operation. In this series, there were 12 (40%) such cases. It is of interest that the ma-

ajority of these (8/12) were omental in location; however, the size of the lesion rather than the location, appears to be a more important factor. Of the 12 cysts found incidentally only three were larger than 4 cm. and the smallest of the clinically significant cysts was 6 cm. in diameter.

The symptoms and signs caused by omental and mesenteric cysts are variable, and none may be considered pathognomonic. Patients with clinically important (*i.e.*, non-incident) cysts may be classified into two basic groups, acute and non-acute.

The acute group includes those patients with acute symptoms which require operation on an emergency basis.

In 1964, Oliver¹⁷ reviewed the subject of acute abdominal crisis caused by omental cysts. In addition to the three cases in his series, he was able to find only



FIG. 3A. Plain A-P film of a 5-year-old boy (Case 5) showing mass defect with calcified inferior rim.

15 other reports in the literature for a total of 18 cases. This is approximately 10 per cent of all the omental cysts reported. In 93 per cent of these cases, the preoperative diagnosis was acute appendicitis; however, it was stressed that the clinical picture was non-specific. The tenderness was usually diffuse and masses were not usually palpable. It is of interest to note that the clinical picture of an acute surgical abdomen caused by omental cysts is a disease of children almost exclusively. Of the 18 cases summarized by Oliver, the oldest was 24 years and only three patients were over ten years of age. In our series, there were three such patients with ages one day, 23 months, and 24 years. As reported by Oliver, the most common complication is torsion (8/18) with infection (6/18) being next most common.

Mesenteric cysts are probably an even rarer cause of the acute abdomen than omental cysts. Two such cases are seen in this series, one of small bowel obstruction and the other a case of hemorrhage and inflammation. Both of these complications have been reported previously by other authors.^{6,7,11}

In both omental and mesenteric cysts which present as acute surgical emergencies, the mass may not be palpable because of abdominal rigidity. Nausea, vomiting and anorexia are commonly seen, as are coincidental leukocytosis and fever. Because of similarity to many more common conditions, preoperative diagnosis is rare in the cases with acute symptoms.

The non-acute group includes those patients with asymptomatic abdominal masses and those with chronic abdominal symptoms with or without a mass. These masses are usually described as being smooth, round, non-tender, and mobile. Mesenteric cysts are often said to be more mobile in a transverse plane than in a cephalo-caudad plane, while omental cysts are very mobile in all directions. Lesions which seem cystic and tethered to the pelvis are most likely to originate from the uterus, ovaries and urinary bladder.

Some authors^{1,9} feel that these lesions most commonly occur as slowly enlarging painless lesions, while other investigators⁵ have found pain to be a more predominant component of the clinical picture. In this series, pain was observed in 7/12 (60%) of the non-acute cases. Six of these were mesenteric in location.

The character of the pain will, of course, depend on the mechanism of its production. Steady pain may be a result of stretching the overlying peritoneum or of traction on the root of the mesentery. Intermittent crampy pain is usually thought to be a result of partial

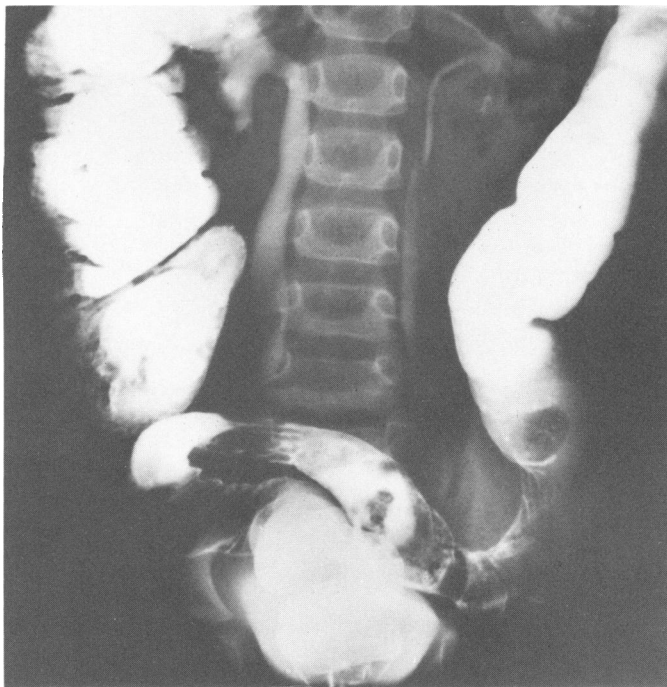


FIG. 3B. Combined barium enema X-ray and intravenous pyelogram of same patient demonstrating right hydronephrosis and hydro-ureter and extrinsic compression of colon.

obstruction of the gastrointestinal tract by extrinsic pressure. Generally speaking, the pain is of low-grade intensity and not related to meals. Nausea and vomiting may occur, but are generally thought to be less common.

Radiographic studies may be of utmost importance in the preoperative diagnostic work-up. Berger and Rothenberg⁴ stated that "the correct diagnosis would have been made more often in our series of cases had the surgeons resorted more frequently to X-ray investigations". The demonstration of these cystic lesions is dependent upon their size, density, affect on adjacent organs, and calcification of the wall of the cyst when present.

A plain film of the abdomen is seldom of great assistance in confirming the diagnosis, although evidence of a soft-tissue mass is common and displacement of the bowel may be present. Ladd and Gross¹³ have pointed out the value of a plain lateral view of the abdomen which may reveal that the mass in question lies anterior to the intestines, a finding which suggests the possibility of an omental cyst (Figs. 2A and 2B). These findings made possible a correct preoperative diagnosis of omental cyst in Case 3. Calcification of the cyst wall and/or contents may also be noted on plain films (Fig. 3A) but is generally reported to be a rare finding.¹⁹ In this series, there were five cases that showed calcification.

The demonstration of displacement of the bowel by an extrinsic mass may be more consistently obtained by contrast studies, *e.g.* upper gastrointestinal series and barium enema X-ray. Bowel displacement was seen in over 70 per cent of the patients in whom these contrast studies were done in this series (Fig. 3B). Even if negative, these studies are helpful in that they rule out primary disease of the intestinal tract.

Similarly, intravenous pyelography, which should be performed in all cases of abdominal mass, rules out renal lesions. Obstruction or displacement of ureters or compression of urinary bladder (Fig. 3B) may be demonstrated. Selective superior mesenteric angiography has been carried out in one case of a large mesenteric cyst¹⁶ but this was a normal study and not thought to be of any diagnostic value.

Summary

A series of 33 patients with omental, mesenteric, and retroperitoneal cysts is presented with an emphasis on the clinical features.

There were six males and 27 females, ranging in age from 1 day to 76 years. Clinical data are presented for

30 of the patients. Twelve had cysts discovered as incidental findings at operation. Five patients with symptoms and signs of an acute abdomen required emergency operation, and preoperative diagnosis would have been difficult. Thirteen patients with chronic symptoms and signs, operated upon electively, had preoperative findings suggestive of cyst. There are no pathognomonic clinical characteristics which permit an accurate preoperative diagnosis in these lesions; however, we feel that retroperitoneal cysts (including mesenteric and omental) should be suspected in any patient with a mobile abdominal mass, with or without chronic pain, and in whom plain and contrast radiographic studies of the abdomen demonstrate the mass to be extrinsic to the alimentary and urinary tracts.

References

1. Barr, W. B. and Yamashita, T.: Mesenteric Cysts. *Am. J. Gastroenterol.*, **41**:53, 1964.
2. Beahrs, O. M. and Dockerty, M. D.: Primary Omental Cysts of Clinical Importance. *Surg. Clin. N. Am.*, **302**:1073, 1950.
3. Beahrs, O. M., Judd, E. S. and Dockerty, M. B.: Chylous Cyst of the Abdomen. *Surg. Clin. N. Am.*, **302**:1081, 1950.
4. Berger, L. and Rothenberg, R. E.: Cysts of the Omentum, Mesentery, and Retroperitoneum. *Surgery*, **5**:522, 1939.
5. Burnett, W. E., Rosemond, G. P. and Bucher, R. M.: Mesenteric Cysts. *Arch Surg.*, **60**:699, 1950.
6. Fahmy, A., Smith, R., Garner, M. T., Frazier, H. M. and Walker, M., Mesenteric Cyst Presenting as an Acute Surgical abdomen. *Am. Surg.*, **32**:654, 1966.
7. Fish, J. C., Fair, W. R. and Canby, J. P.: Intestinal Obstruction in the Newborn—An Unusual Case Due to Mesenteric Cyst. *Arch. Surg.*, **90**:307, 1965.
8. Gordon, R. B., Capetillo, A. and Principato, D. J.: Angiographic Demonstration of Lymphatic Cyst of the Mesentery. *Am. J. Roentgenol.*, **1042**:870, 1968.
9. Greene, R. E.: Abdominal Mass in Infancy. *JAMA*, **293**:1095, 1967.
10. Hadley, M. N.: The Origin of Retroperitoneal Cystic Tumors. *Surg. Gynecol Obstet.*, **22**:174, 1916.
11. Hardin, W. J., Elliot, R. L., Wesson, R. L. and Lowicki, E. M.: Hemorrhagic Mesenteric Cyst Simulating an Acute Abdomen. *Am. Surg.*, **33**:733, 1967.
12. Hardin, W. J. and Hardy, J. D.: Mesenteric Cysts. *Am. J. Surg.*, **119**:640, 1970.
13. Ladd, W. E. and Gross, R. E.: *Abdominal Surgery of Infancy and Childhood*. W. B. Saunders, Philadelphia, 1947, p. 233.
14. Lahey, F. H. and Eckerson, E. B.: Retroperitoneal Cysts. *Ann. Surg.*, **100**:231, 1934.
15. Loeb, M. J.: Mesenteric Cysts. *N.Y. State J. Med.*, **412**:1564, 1941.
16. Oh, C., Danese, C. A. and Dreiling, D. A.: Chylous Cysts of Mesentery. *Arch. Surg.*, **94**:790, 1967.
17. Oliver, G. A.: The Omental Cyst: A Rare Cause of the Acute Abdominal Crisis. *Surgery*, **56**:588, 1964.
18. Sprague, N. F.: Mesenteric Cysts. *Am. Surg.*, **26**:42, 1960.
19. Vaughn, A. M., Lees, W. M. and Henry, J. W.: Mesenteric Cysts. *Surgery*, **23**:306, 1948.