FURTHER CONSIDERATIONS IN THE INTERNAL DRAINAGE OF PANCREATIC CYSTS*

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THE PROBLEM OF TREATMENT of a pancreatic cyst or pseudocyst presents itself infrequently but may prove difficult because of several factors peculiar to these cysts. The etiology of these processes is varied, and they are often associated with acute or chronic pancreatitis, or disease of the biliary tree. Once drainage is established to the exterior, they may continue to drain for long periods, may recur if drainage becomes inadequate or obstructed, and present a problem in local care of the skin around the fistula. The ideal treatment is total excision of the cyst, but this is rarely possible for technical reasons. Most surgeons have performed marsupialization, which has been successful in the greater majority of cases, but nevertheless may permit the above mentioned complications to occur, prolonging convalescence and increasing morbidity. The purpose of this paper is to propose internal drainage as the ideal treatment of all cysts not suitable for total excision, and to report results in three cases treated by this method, two of which have been observed for nine years following operation.

CLASSIFICATION

The classification of pancreatic cysts is interesting from the viewpoint of pathology and etiology, but in reality offers the surgeon little aid in the decisions concerning treatment or prognosis.[9, 10, 16, 21, 23]

The classification given by Mahorner and Mattson[13] is most widely used and is given below:

1. Cysts due to defective development.
   a. In infants
   b. Associated with polycystic disease of kidneys
   c. Dermoid cysts
   d. Inclusion
2. Cysts due to trauma.
3. Retention cysts.
4. Neoplastic cysts.
   a. Cystadenoma
   b. Cystadenocarcinoma
   c. Teratoma
5. Cysts due to parasites.

The distinction between true cysts and the pseudocysts is largely one for the pathologist, for practically speaking it is frequently impossible to distinguish at operation between true and pseudocysts. The former may lose their lining and after some time come to resemble pseudocysts in all respects.

One additional type of cyst might be added to the above classification. This is the pancreatic abscess or so-called pancreatic collection, which may result from acute or chronic pancreatitis, or from pancreatolithiasis[17] with infection or biliary tract disease.[19] The acute phase of the disease which precedes the appearance of the cyst helps to differentiate its etiology. Cysts of this type might well constitute a sixth group in the above classification.

ETIOLOGY

The etiology of pancreatic cysts has been discussed in a number of excellent articles. Mahorner and Mattson have considered both etiology and pathology at

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length. This report will not discuss this aspect in any detail but will only note the frequent association of both trauma[2, 10, 13, 23, 24] and pancreatitis[19, 28] with the formation of pancreatic cysts.

A history of trauma is obtained in a significant number of pancreatic cysts and definitely predominates in the pseudocysts. The antecedent injury need not be recent or severe, and the formation of cysts may follow a relatively minor blow to the abdomen. The immobile pancreas, lying transversely across the upper abdomen, is caught against the lumbar spine by a force applied anteriorly, resulting in contusion or laceration of the organ. The cysts caused by trauma are almost always pseudocysts, with a portion of their wall being formed by the lesser peritoneal sac.

The occurrence of cysts following pancreatitis has been emphasized by Pinkham,[19] who points out that both true and pseudocysts may be found. The role of this disease in the formation of cysts is more prominent than was formerly thought, and must be considered in all cases in which a cyst appears to have arisen insidiously or without a history of trauma.

DIAGNOSIS

The diagnosis is suggested by the triad of upper abdominal pain, pressure symptoms from adjacent organs, and the presence of a palpable mass. Pain itself is usually experienced in the epigastrium or back, may vary from mild to severe, and is the most common symptom of pancreatic cyst.[1, 2, 5]

Pressure upon or displacement of surrounding organs such as the stomach, duodenum or colon may give rise to varied symptoms, depending upon the organ involved. There may be vague indigestion, anorexia, nausea or vomiting, and if concurrent biliary pathology or pancreatic insufficiency is present, fat intolerance may be noted.

A palpable mass is always found on examination of the upper abdomen, and is the most single reliable finding upon which the diagnosis is based. It is characteristically high, immobile and often tense.

Roentgenographic examination by the scout film of the abdomen may reveal displacement of the hollow viscera.[7, 19] This is readily confirmed by fluoroscopic examination of the barium filled stomach, duodenum or colon. Pyelography occasionally supplies a clue if the kidney or ureter is shifted abnormally. Cholecystography may reveal poor or absent gallbladder function.

Following trauma or various types of pancreatitis, serum amylase levels may be elevated above normal, dependent upon the amount and degree of pancreatic necrosis.[19] Additional laboratory studies may reveal abnormal glucose tolerance, glycosuria or an intolerance for fat.[21]

SURGICAL TREATMENT

Surgical intervention is indicated in every case of proved or suspected pancreatic cyst.[14, 20] A policy of temporization or a program of conservative management may bring disastrous consequences for the patient. Rupture of the cyst into the free peritoneal cavity may result in hemorrhage, shock or peritonitis.[11]

Three methods of surgical treatment[3, 5, 6] may be employed: total excision of the cyst; drainage to the exterior by catheter or marsupialization; and internal drainage by anastomosis of the cyst to some portion of the gastro-intestinal tract.

Total excision is to be performed whenever possible, and is useful with small cysts, especially those located near the tail of the gland. This method, while ideal, can be accomplished in only a small percentage of cases, because of technical difficulties.

Marsupialization or drainage with a catheter or large soft rubber drain[3, 14, 18 25, 26] may be employed in cysts too large for excision. This form of treatment has always

enjoyed wide usage, because of its technical simplicity and the low operative mortality rate. The disadvantages of this form of treatment are the excoriation of the surrounding skin and the tendency for the drainage tract to close, allowing the cyst to recur. Drainage may be intermittent and continue for long periods.

Internal drainage, while technically more difficult, has none of the disadvantages of marsupialization.[1, 8, 12, 15, 20, 27] By anastomosing the cyst to some portion of the gastro-intestinal tract, most commonly the jejunum, adequate drainage is obtained, the persistence of draining external fistulas with skin excoriation is prevented, and the external pancreatic secretion is utilized by the alimentary tract. Some authors have described cystogastrostomy and cystocholecystostomy, but these two proecdures do not seem to be as satisfactory as the use of the jejunum.[8]

The anastomosis may be made without interrupting the continuity of the gastrointestinal tract, by suturing the cyst wall to the side of the bowel, taking care to establish a stoma of not less than 4 cm. in diameter.[20]

One objection may be raised to internal drainage, that of allowing food particles, bile, or intestinal juices to enter the cyst, thereby causing re-infection or reactivation of inflammatory processes. This is found infrequently, as the postoperative course following internal drainage is usually uneventful. This objection, however, may be circumvented by utilizing the Roux-Y type of anastomosis, in which a defunctionalized segment of jejunum from ten to 20 cm. in length is fashioned and end-to-side anastomosis performed between the cyst and the end of the jejunal segment.[15]

CASE REPORTS

Case 1.—A Negro female, age 46, was admitted to the hospital on May 4, 1939, because of the insidious appearance of an epigastric mass. There was no previous history of disease or trauma; the mass was high, immobile and displaced the stomach upward. At laparotomy a large pseudocyst of the pancreas was marsupialized. Drainage continued for 3 weeks and then stopped. The patient was not seen again until 2 years later, because of the re-appearance of the mass. At the second laparotomy the cyst was anastomosed to the stomach. Postoperative course was uneventful and subsequent studies, including roentgenograms, have revealed no abnormalities with the exception of a mild intolerance for fat.

This case is an example of recurrence of a pancreatic cyst after marsupialization had apparently been successful. Following internal drainage, utilizing the stomach, there has been no further difficulty over a nine-year period.

Case 2.—A 17-year-old white male was admitted to the hospital Feb. 17, 1940, approximately 48 hours after a severe blow to his epigastrium. He was treated conservatively and recovered without incident. One month later he was readmitted because of intermittent vomiting. The epigastrium was filled with a large tense mass, which seemed to be fixed posteriorly. At laparotomy, a large pseudocyst of the pancreas was drained externally. Drainage was free for 4 weeks and then ceased abruptly. The mass re-appeared, increased in size and was painful. Incision and drainage was repeated and for the next 14 months alternating drainage and recurrence of the cyst occurred. On Sept. 21, 1941, an antecolic cystojejunostomy was performed. The subsequent course has been satisfactory.

This case also exemplifies the problem of prolonged external drainage, with recurrence of the abdominal mass and pain. The course for nine years after internal drainage has been satisfactory, despite a two-year period of internment in a Japanese prisoner-of-war camp under most adverse circumstances.

Case 3.—A 41-year-old Negro laborer was admitted on March 21, 1949, complaining of abdominal pain, nausea, vomiting and obstipation of 4 days duration. This was the third episode in 3 years; there was no history of abdominal trauma. A mass was palpable in the epigastrium; a plain roentgenogram of the abdomen revealed fine calcification in the region of the mass, with displacement of the stomach and colon. A clinical diag-

nosis of chronic pancreatitis with pseudocyst was made. At laparotomy a pseudocyst measuring 15 cm. in diameter was found to occupy the lesser peritoneal sac. The cyst was opened through the transverse mesocolon, and cystojejunostomy, utilizing the Roux-Y technic was performed, the dependent passage of material into the cyst itself (Fig. 1).

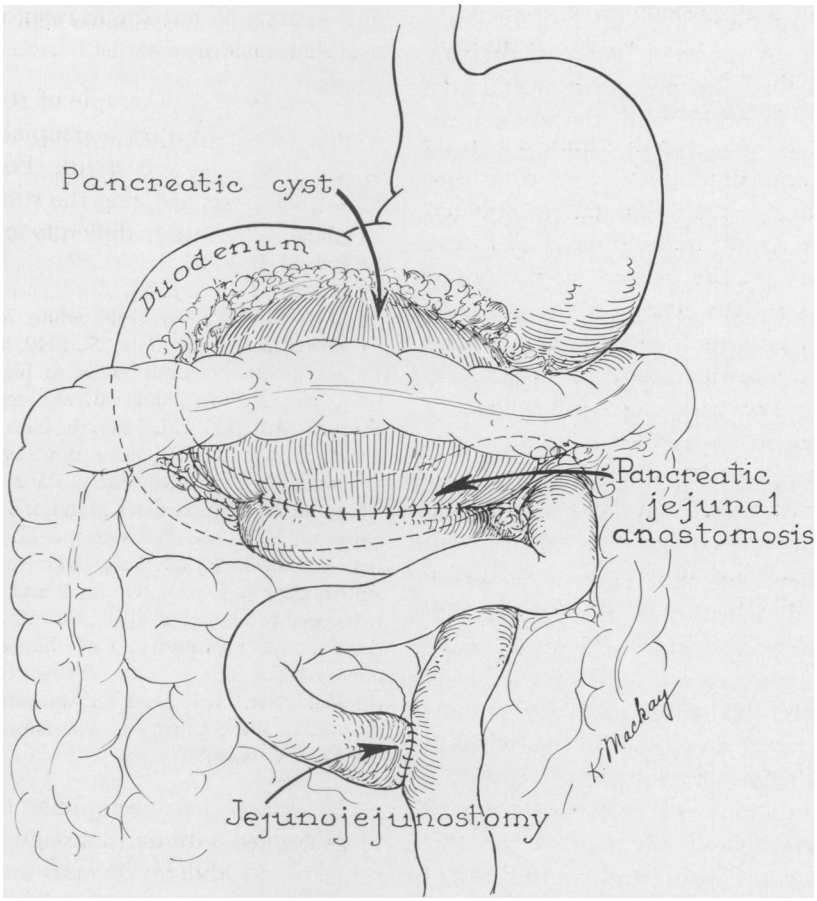

FIG. 1.—Internal drainage of pancreatic cyst by utilization of the Roux-Y method of anastomosis to jejunum.

functionalized jejunal segment being 10 cm. in length. Postoperative course was uneventful except for phlebothrombosis, for which both superficial femoral veins were ligated. One year later, a small firm mass was palpable in the upper abdomen and the patient has remained asymptomatic.

The advantages of drainage internally are again emphasized in this case. The use of the Roux-Y anastomosis precludes the

DISCUSSION

Other than those cysts due to neoplasm, the etiology or pathology of pancreatic cysts are chiefly matters of conjectural interest. Surgical exploration should be performed in all cases, and biopsies obtained from the gland and cyst wall, remembering that an operable malignancy may be associated with cyst formation.[4] Spontaneous regression is unusual, and conservative management only poses additional hazards for the patient.

Of the three methods of surgical treatment, the experience of others, as well as that of the author, points to internal drainage as the procedure of choice. The inconvenience and increased morbidity of external drainage, as well as the economic factor of prolonged hospitalization point out the need for an improved method for drainage. From the reports of internal drainage in the literature, this procedure would seem to compare favorably with the other methods in operative mortality, and has a decidedly lower morbidity.

The increasing use of the Roux-Y procedure in gastro-intestinal tract surgery,[22] such as total gastrectomy, cholecystojejunostomy and esophagectomy, logically indicated the possibility of its use in the drainage of cysts of the pancreas. The use of this method of anastomosis affords adequate drainage for the cyst without reflux of intestinal contents, which has been the major objection of those opposed to internal drainage.

The large infected cyst or pancreatic abscess still constitutes an indication for external drainage, since the cyst wall is usually partly necrotic and unsuitable for anastomosis. The subsequent formation of a fistula or cyst may then be treated by internal drainage with satisfactory results.

Manifestations of pancreatic insufficiency may follow any one of the three treatment procedures, and routine tests of pancreatic function should be performed. Medical management by regulation of diet and administration of pancreatin may be of value.

SUMMARY

The problem of the pancreatic cyst from the viewpoint of treatment has been presented.

Of the three methods of surgical management available: total excision, marsupialization and internal drainage, the last is considered the preferable method.

The utilization of the Roux-Y procedure offers the most satisfactory method of anastomosis.

Three case reports are presented in which internal drainage was used. Two of these (cystogastrostomy and cystojejunostomy) have been followed for a period of nine years, and one for 18 months following cystojejunostomy with a Roux-Y anastomosis.

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DISCUSSION.—DR. MICHAEL E. DEBAKEY, Houston: Our experience with this method of treatment is too limited to provide adequate evaluation, but we have used the procedure in three cases, with an opportunity to inspect the results by subsequent laparotomy in two of them. The first patient was followed for about a year only and was apparently well during this time, so that the operation appeared successful in this case, at least to that extent. In the second case, a cholecystojejunostomy was done at the first operation for obstructive jaundice produced by a mass in the pancreas which was considered inflammatory on the basis of biopsy. At the second operation, done several months later because of recurrence of jaundice and a cystic mass in the epigastrium, the large pancreatic cyst was drained by cystojejunostomy and a T tube was placed in the common duct. Biopsies were again taken from the pancreas and again showed only marked fibrosis and inflammatory reaction. At the third operation, done several months later, the patient was found to have an inoperable carcinoma of the pancreas. This undoubtedly existed at the time of the previous operations, but was not recognized grossly and the biopsies failed to show it. Interestingly enough, the cyst, which was approximately the size of a large grapefruit at the previous operation, was no longer present on this occasion and it was impossible to demonstrate any residuum of it.

The third case was the most interesting. This was a Negress 25 years of age who had a large epigastric mass which was diagnosed as a pancreatic cyst, and at operation was treated by a cystojejunostomy with a stoma about two inches in length. The patient was free of symptoms for approximately ten months and then returned with recurrence of the mass. Approximately six months after it re-appeared, or approximately 16 months after the first operation, another operation was done and at this time the cyst was found to be approximately the size of the original cyst, and it was noted that the cystojejunostomy had closed and separated completely with bits of fibrous tissue along the suture line in the jejunum. The cyst was completely excised and recovery was uneventful. This illustration (slide) shows the intact cyst, about 15 cm. in diameter, as it was removed and the next slide shows the cyst opened. On microscopic examination there was only a fibrous tissue wall without evidence of epithelial lining.

I believe that wherever possible the choice of treatment is excision but, of course, as Dr. Poer stated, under certain circumstances the procedure may be difficult and carry considerable risk. Under these circumstances the internal drainage operation may be the preferable procedure.

DR. KENNETH W. WARREN, Boston: First of all, I want to thank Dr. Brindley and the members of the Association for the privilege of the floor.

For many years we, at the Lahey Clinic, have had a particular interest in pancreatic cysts, and recently Dr. Cattell and I reviewed our total experience with this problem. As a result of this review we tried to relate the selection of each therapeutic measure to several factors. First, we have considered the etiology of the cyst; second, the location of the cyst and, finally, the degree of peripancreatic inflammation.

In many of these cysts, particularly the retention cysts, the inflammatory reaction will be minimal. These cysts, as Dr. DeBakey has suggested, can be treated satisfactorily in most instances by enucleation of the entire cyst. That is the procedure of choice when conditions are favorable. Others can be resected by distal or proximal pancreatectomy. In many instances, however, total excision, especially by enucleation, is impossible.

Marsupialization, once regarded as the procedure of choice, still has a limited application in the treatment of these tumors. In discussing this procedure I think we should recognize that the principle of marsupialization played an important role in the historical development of the surgical treatment of pancreatic cysts. At the time it was advocated it was the safest procedure. Even today we elect marsupialization in the critically ill patients, and in the presence of severe degrees of pancreatitis or peripancreatitis where it is impossible or unwise to resect the cyst. We