PSEUDOCYST AND ABSCESS OF THE PANCREAS

by

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PANCREATIC pseudocysts and abscesses are rare, each occurring in less than 4 per cent of cases of acute pancreatitis.1,2,3,4 Both occur at differing intervals following an attack of acute pancreatitis, the abscesses occurring earlier.5 Differentiation between them is often difficult6,7 and is more so in the early weeks, due to oedema from the acute pancreatitis. Until recently, differentiation was mainly on clinical grounds but the introduction of ultrasound and CT scanning techniques has helped to change the situation.

A retrospective analysis was carried out to try to delineate those factors which could help to differentiate the conditions and to assess the methods of treatment.

CLINICAL MATERIAL

Over a period of 19 years, since 1960, 30 pseudocysts of the pancreas and 15 abscesses were managed at the Royal Victoria Hospital, Belfast. There were 24 men and 21 women in the series (Table 1); the average age was 51 years (range: 15-79 years). Thirty-seven of the patients had a recent attack of acute pancreatitis and nine patients had multiple attacks. The average time from the onset of pancreatitis to the diagnosis of abscess was three weeks; for pseudocysts it was 19 weeks. Gallstones were the commonest precipitating factor occurring in 18 patients, and alcohol played a role in 9 instances (Table 2). Two patients developed pseudocysts during pregnancy and a further patient following blunt trauma.

SYMPTOMS AND SIGNS

The majority of patients had upper abdominal pain which was often combined with back pain. Vomiting was also common. Twenty-five of the patients with

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TABLE 1

Numbers of patients seen from 1960-1978

|        | Pseudocyst | Abscess |
|--------|------------|---------|
| Female | 11 (1)     | 10 (4)  |
| Male   | 19 (2)     | 5 (0)   |
| Total  | 30 (3)     | 15 (4)  |

Deaths in parenthesis.
TABLE 2

Numbers of patients seen according to aetiology

| Aetiology                  | Pseudocyst | Abscess |
|----------------------------|------------|---------|
| Gallstones                 | 10 (1)     | 6 (2)   |
| Alcohol                    | 5          | 2       |
| Gallstones and Alcohol     | 2          | -       |
| Idiopathic                 | 8 (2)      | 6 (2)   |
| Other                      | 5          | 1       |

Deaths in parenthesis.

Pseudocysts had palpable masses, varying in size from 5 cm to 15 cm. Seven of the patients with a pancreatic abscess had a palpable mass but none was greater than 5 cm in diameter. Six patients with abscess had, in addition, a pleural effusion.

INVESTIGATIONS

The introduction of ultrasound and CT scanning has revolutionised the diagnosis of pancreatic inflammatory masses and the differentiation of acute pancreatitis from swelling due to abscess or pseudocyst (Figs. 1 and 2). The majority of patients in this series, however, were investigated prior to availability of these techniques; only 12 patients were studied in these ways (Table 3). Serum amylase was raised in 25 patients; the levels were higher in those with pseudocyst with a mean of 1,200 Somogyi units (range: 51-14,600) than for pancreatic abscess whose mean was 203 Somogyi units (range 39-550). The leucocyte count was higher for abscess (mean: 15,500) than for the pseudocyst (mean: 9,500). Pre-operative random serum glucose levels were frequently elevated in both groups. Two of the patients with pancreatic abscess were known to be diabetics prior to admission, and one further patient became diabetic; five of the patients with pseudocyst subsequently developed diabetes mellitus.

TABLE 3

Imaging investigations.

Numerator—Number of occasions the investigation was of help
Denominator—Total number of occasions it was performed

| Investigation     | Pseudocyst | Abscess |
|-------------------|------------|---------|
| Barium Meal       | 22/22      | 3/3     |
| Ultrasound Scan   | 6/7        | 2/2     |
| CT Scan           | 1/1        | 2/2     |
| Angiography       | 2/3        | 1/1     |

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FIGURE 1
Barium meal (a), longitudinal ultrasound scan (b) and CT scan (c) in a male patient with a past history of acute pancreatitis, who had, in his abdomen, a palpable mass which proved to be a pancreatic pseudocyst.

(a) BARIUM MEAL.
Shows enlargement of the duodenal loop, elevation of the antrum, with an impression of the upper, lesser curve.

(b) ULTRASOUND.
Shows classical transonic area with a dependent slough (arrowed).

(c) CT SCAN.
Shows the overall extent of the mass, but does not shows its cystic nature.
FIGURE 2

*CT scan at the level of the pancreas (a) and hip joints (b).*

*This demonstrates the value of a CT scan in assessing the extra-pancreatic extent of disease, showing a pancreatic abscess extending into the left flank (arrowed), the perinephric area (arrowed) and extending along the obturator internus in the pelvis, via the psoas sheath (arrowed).*

Barium studies of the upper gastro-intestinal tract (Fig. 1) were carried out in 25 patients and in all cases were helpful in localising retrogastric swellings (Table 3), but could not differentiate between abscess and cyst. Selective angiography was carried out in 4 patients where the question of tumour was raised, but the advent of ultrasound and CT scanning has largely eliminated the need for this invasive investigation. Endoscopic retrograde pancreatography was not employed because of the risk of infecting a pseudocyst.

**MANAGEMENT**

In those patients with pseudocysts, 26 were treated surgically and three conservatively; whilst the respective figures for those with abscesses were 11 and two. The average volume of fluid in the cysts was 1.2 litres. Cystogastrostomy was employed in 22 patients with pseudocyst and in three with abscess. The majority of
abscesses were drained externally, two patients requiring a second operation for drainage of recurrent abscess. External drainage was used in each of five patients with pseudocyst. In two it was used to drain the second cyst to the exterior, while the retrogastric pseudocyst was drained internally into the stomach. One pseudocyst was aspirated in combination with biliary tract surgery. In all 11 patients had additional biliary tract surgery; cholecystectomy in 2, cholecystectomy with exploration of the common bile duct in 3, choledochoduodenostomy in 2 and cholecystostomy, exploration of the common bile duct, cholecystoduodenostomy and choledocho-duodenostomy respectively in the others. Rupture into the peritoneal cavity and retroperitoneal tissues occurred in six patients with pancreatic abscess. In the remainder, the mass was confined to the pancreatic region. The organisms cultured were Klebsiella, Proteus, *E. coli.* and Staphylococci.

Six patients treated by external drainage developed a pancreatic fistula. Neither of the two patients with double cysts, who had simple drainage combined with cystogastrostomy, had this complication. In addition, two patients developed temporary colonic fistulae which closed spontaneously. Severe secondary haemorrhage occurred in two patients, one of whom required surgical intervention. The average length of stay in hospital was six weeks (range: 2-40 weeks).

**Mortality**

Of the 37 patients treated surgically, there were 3 post-operative deaths, 2 following cystogastrostomy for pseudocyst and 1 following drainage of an abscess. One of the pseudocyst patients died within the first 24 hours, probably from haemorrhage, but autopsy was not carried out. The other developed a pancreatic fistula with ascending cholangitis and died 13 days later. The third post-operative death resulted from generalised peritonitis and septicaemia, six weeks after external drainage of the abscess. One patient who had a conservatively treated abscess died of septicaemia and peritonitis. Three patients had the diagnosis made at autopsy, one with a ruptured pseudocyst, the others peritonitis following from an abscess.

**Follow-up**

One year after discharge from hospital 36 of the 38 survivors were available for review. All but five patients were symptom-free. One developed a recurrent pseudocyst two weeks after the first operation, and required revision of the anastomosis. Two patients, who had suffered from pseudocyst, had developed further attacks of acute pancreatitis, and two others complained of persisting upper abdominal pain.

During subsequent follow-up, one patient developed a recurrent pseudocyst two years after cystogastrostomy and was treated by transduodenal anastomosis of the pseudocyst combined with choledochoduodenostomy. Three patients had progressed to chronic pancreatitis and one of these required a pancreatico-duodenectomy. Three other patients developed sclerosing-cholangitis, portal hypertension and pyloric stenosis respectively.

**Discussion**

Pancreatic abscess and pseudocyst are relatively uncommon complications of acute pancreatitis. The reported incidence for either is between 2 and 4 per cent,
 pseudocysts occurring more frequently than abscesses.\textsuperscript{1,2,3} As in other British series, gallstones was the most commonly observed aetiological agent.\textsuperscript{3,8} Next in frequency was the idiopathic group followed by those in whom alcohol was implicated. Only one case was attributable to trauma. This is less than other series.\textsuperscript{7, 8, 9, 10} No case followed operation or invasive investigation, again contrasting with other reports.\textsuperscript{5,11}

It has been suggested that pancreatic abscesses occurring in alcoholics have a lower incidence of post-operative complications and fatalities.\textsuperscript{5,11} The present results tend to support this view; there were seven patients with a definite alcoholic aetiology and none died, developed fistulae or had recurrence. Their average stay in hospital was also shorter than that of those associated with biliary pathology. Patients whose aetiology was unknown had the highest mortality. It was also found that patients who developed a pseudocyst or abscess after multiple attacks of pancreatitis fared no worse than those who had had only a single attack.

The triad of symptoms, abdominal pain, back pain and vomiting has been observed repeatedly.\textsuperscript{3,9} A palpable mass was present in over 80 per cent of pseudocysts but in less than 50 per cent of patients suffering from pancreatic abscess. In many patients an abscess was diagnosed on the basis of a history of acute pancreatitis together with persistent pyrexia and leucocytosis, but in a significant number of patients was first found at autopsy.\textsuperscript{3,5} Only eight of our patients had a pre-operative diagnosis of pancreatic abscess. The mean time interval between the acute episode of pancreatitis and the development of a pseudocyst was 19 weeks. An average period of six weeks has been reported,\textsuperscript{3} the greater interval in our series is, however, due to two patients with an exceptionally long latent interval, three years and two years respectively.

The barium meal represents a readily available and a reliable method of localising a pancreatic inflammatory mass, particularly if adequate distension of the stomach, duodenum and upper jejunum are combined with multiple projections. The supine decubitus position is mandatory, and prone views, if possible, are helpful in lesions involving the body and tail. Unless there is evidence of gas within the mass, no indication can be given as to the presence of an abscess. The rapid advance of ultrasound technology has made this the method of choice for demonstrating inflammatory disease. Recent experience suggests that it is possible to differentiate accurately a solid from a fluid-filled, inflammatory mass and to monitor the progress of inflammatory pancreatic disease. In the two years that CT scanning has been available here, it has been possible to compare the images obtained with those of ultrasonography. The advantages of CT scanning are the ability to image the distal pancreas in all cases, even in the presence of bowel gas, and the ease with which multiple masses and extrapancreatic extension can be delineated. There was no obvious superiority in the demonstration of necrotic slough within the cavity, or in the ability to differentiate inflammatory exudate from the fluid content of a pseudocyst.

The treatment of choice for pancreatic pseudocyst is cystogastrostomy where feasible. Although five patients in this series had external drainage, this was because the anatomical position of the cyst made cystogastrostomy difficult. There were eight post-operative pancreatic fistulae and five occurred after external drainage of pancreatic abscesses. Those secondary to abscess closed spontaneously while those
related to pseudocyst required further surgery in two cases and contributed to death in another case. The combination of internal and external drainage in the two patients with double cysts did not, however, result in fistula.

The hospital mortality for pseudocysts was 10 per cent and includes a post-operative mortality of 7 per cent; whilst the respective figures for those with abscesses were 27 and 7 per cent. These are similar to other reported series.3, 7, 11, 12

When a patient develops a palpable mass after an acute attack of pancreatitis there is no reliable method which can distinguish the fluid containing pseudocyst or abscess from the swelling due to the pancreatic inflammatory mass. Folk13 coined the term 'pseudopseudocyst' to describe the acute oedema of the pancreas, and it is our experience that the final diagnosis is made only at laparotomy in 30 per cent of cases. Indeed even at laparotomy, it can occasionally be difficult to be certain.13, 14 It is hoped that the combination of CT and ultrasound scanning will rationalise management in the future, thereby avoiding unnecessary laparotomy which increases the risk of major peripancreatic infection.15

SUMMARY

Experience gained from 30 cases of pseudocyst and 15 abscesses of the pancreas seen in the Royal Victoria Hospital Belfast, in the past 19 years, has been reviewed. Thirty-seven patients were operated upon with three post-operative deaths. Five were treated conservatively, with one death, and three were first diagnosed at autopsy. Gallstones were the commonest aetiological agent. Clinical features were of the most value in differentiation. Cystogastrostomy was most commonly used to drain the pseudocysts while external drainage was used for the abscesses. There was only one pseudocyst which ruptured spontaneously. Following cystogastrostomy, recurrence and haemorrhage each occurred on two occasions, while following external drainage there were six persistent fistulæ. Three patients went on to develop chronic pancreatitis.

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