日消外会誌 14（8）：1256～1261，1981年

特　集

SURGICAL INTERVENTION IN ACUTE RANCREATITIS

Gabriel A. Kune, M.B.B.S., FRACS, FRCS, FACS

Professor of Surgery University of Melbourne, Repatriation General Hospital, Heidelberg, Australia

INTRODUCTION

The place of surgery in acute pancreatitis remains a controversial subject. Both the indications for surgery and the timing of surgical intervention is debated up to the present time. In this Lecture I would like to present my personal experience over a 15 year period covering 1966—1980, in which I have been personally responsible for the management of 416 cases of acute pancreatitis.

In 364 cases, the patients were seen for primary and immediate management and in the remaining 52 cases, they were referred from other hospitals and by other surgeons usually for the treatment of intermediate or late complications of their acute pancreatitis which was diagnosed in the previous Institution.

The aetiological associations in this group of 416 cases were as follows: gallstones 35%, alcoholic 25%, postoperative 8%, post-traumatic 1%, other antecedents 6% and idiopathic 25%.

INDICATIONS FOR SURGERY

In this group of patients, the indications for surgery could be summarised as follows:

1) Laparotomy for Diagnosis;
2) Excision of Necrotic Pancreas;
3) Surgical Treatment of Complications;
4) Late Surgery for
   a) Sequelae
   b) Aetiologic Antecedents.

Laparotomy for Diagnosis

In the 364 cases referred for primary treatment, there were 73 laparotomies, an incidence of approximately 20%. The reason for these laparotomies fell into three groups:

1) **Incorrect Presumptive Diagnosis**

There were 14 cases in which the presumptive diagnosis was either acute cholecystitis, small bowel obstruction, perforated peptic ulceration, choledocholithiasis with cholangitis, ischaemic bowel or acute appendicitis, but at surgery the correct diagnosis of acute pancreatitis was established.

2) **Peritonitis, Cause Unknown**

There were 43 cases in which a laparotomy was done for this and in these cases, the serum amylase level was either normal, it was not done or it was only slightly elevated but at surgery the correct diagnosis of acute pancreatitis was made. In this group of patients, the most marked feature in the patient was the presence of marked signs of peritonitis with severe abdominal pain, tenderness, guarding and rigidity and in these cases the indications for laparotomy followed the conventional reasoning in a patient who has peritonitis in whom the diagnosis is uncertain.

3) **Probable Acute Pancreatitis, High Serum Amylase Plus Marked Signs of Peritonitis**

In 16 cases I performed a laparotomy knowing that the most likely diagnosis was acute pancreatitis. Diagnostic laparotomy in the group was performed because of the extremely marked signs of peritonitis and with the knowledge that sometimes other conditions requiring urgent surgery, such as small bowel infarction or a perforated ulcer, can also occur with a high serum amylase level.

There were eight deaths in the 73 patients who were operated on and 27 deaths in the 291 patients who did not undergo operation. Thus, the mortality rate is very slightly higher in the operated group but it must be remembered that most of the deaths occurred in the severe cases, that is, in the cases with acute haemorrhagic pancreatitis and in this group the operation rate itself was much higher. In fact, if one only looks at the cases of

acute haemorrhagic pancreatitis, the mortality rate is slightly lower in the operated group than in the unoperated group. Thus, it appears from this series that diagnostic laparotomy in itself does not result in increased mortality provided that the patient is subsequently adequately treated for acute pancreatitis itself.

Up to the present time, it has not been possible to avoid laparotomy by the use of newer tests such as the amylase/creatinine clearance ratio, nor with the emergency use of abdominal ultrasound or computed tomographic scanning of the abdomen.

Also, it can be noted for those who believe that peritoneal lavage and peritoneal dialysis are helpful in the amelioration of the severe attack of acute pancreatitis, a laparotomy in fact provides an easy addition to this type of treatment. Thus, in the present state of knowledge, we continue to advocate laparotomy diagnosis of acute pancreatitis in the patient with marked signs of peritoneal irritation in whom we cannot be absolutely sure of the diagnosis.

Excision of Necrotic Pancreas

It has been suggested that in those patients in whom haemorrhagic pancreatitis is diagnosed and who deteriorate in spite of adequate resuscitation, laparotomy and excision of the necrotic pancreas has been advocated first on the assumption that removal of the pancreas will also remove the source of the various vasoactive peptides contributing to the seriousness of the situation and secondly, that necrotic tissue will become infected and will lead to the development of a pancreatic abscess with all of its complications.

In practice, the problem is to diagnose pancreatic necrosis preoperatively and even at operation it can be quite difficult to know which part or parts of the pancreas have become necrotic. The mortality rate of total pancreatectomy under these conditions is prohibitive but the use of partial pancreatectomy or sequestrectomy of a necrotic piece of pancreas, can at times be performed fairly quickly and with relative ease. The systematic removal in the future of necrotic pieces of pancreas in these severe cases may decrease the mortality rate and may prevent the formation of an infected slough which then becomes a pancreatic abscess, thus again lowering the ultimate mortality rate, but reliable controlled data on this are not yet available. In my own series, I have done two total pancreatectomies with disastrous consequences and therefore I do not advocate this. However, I have performed partial pancreatomy and sequestrectomy under these conditions with good results although I also do not have a control series to compare this with.

Future research on this subject should concentrate on the ways of preoperative and perioperative diagnosis of necrotic pancreas and also on establishing a controlled series of cases which shows the mortality and morbidity rate does in fact decrease with excision of necrotic pancreatic tissue.

Surgical Procedure Performed During Laparotomy

During laparotomy, the diagnosis of acute pancreatitis is confirmed by the finding of an oedematous pancreas or a pancreas with diffuse haemorrhage with or without necrosis together, very frequently, with free peritoneal fluid which in the case of haemorrhagic pancreatitis is bloodstained, and at times also with evidence of fat necrosis.

In the presence of associated gallstones, these may be safely removed if the general condition of the patient is satisfactory during surgery. However, if the condition of the patient during the operation is poor and if there is evidence of diffuse haemorrhagic pancreatitis, then it is probably unwise to proceed to remove these gallstones because this unduly adds to the patient's burden and also the gallstone operation is done to prevent further attacks of pancreatitis in the future rather than to help with the present attack, and therefore it should be considered merely as a prophylactic operation.

Drainage of the pancreatic area is probably unnecessary when finding oedematous acute pancreatitis. However, there is now some evidence to indicate that the insertion of drains into the lesser sac for the purpose of subsequent peritoneal dialysis can be valuable in the presence of acute haemorrhagic pancreatitis.

In the presence of obvious pancreatic necrosis seen in association with acute haemorrhagic pancreatitis, it is advocated in the present state of our knowledge that if the necrotic areas of pancreas can be removed with relative ease and without undue haemorrhage, then this should be done during that procedure and if this is being done then the operative area should be drained.

Thus, when an operation is performed for diagnostic laparotomy or when it is performed in severe cases of acute haemorrhagic pancreatitis, that is, for the first two indications mentioned earlier, then the surgeon may perform one or several of the following procedures: laparotomy only; gallstone surgery may or may not be performed; peritoneal dialysis may or may not be done and excision of necrotic pancreatic tissue and drainage may or may not be done also.

SURGICAL TREATMENT OF COMPLICATIONS

There are a number of complications of acute pancreatitis which may need consideration for surgical treatment. It is interesting to note that since the mortality rate of acute pancreatitis has decreased with improved management over the past 20 years, the number and the range of post-pancreatitis complications seen has increased significantly.

Pancreatic Mass Lesion

A post-pancreatitis mass lesion is the most common complication of acute pancreatitis. This mass may be merely a swelling of the pancreas or the phlegmon or it may be a pancreatic cyst formation or an infected necrotic pancreas with pus formation and then it is called a pancreatic abscess. The definition of pancreatic swelling can be difficult because under normal circumstances the pancreas does swell with an attack of acute pancreatitis. However, in this situation, it is assumed that the swelling has reached such proportions that it is causing symptoms in itself and it is interfering with the functioning of the adjacent organs, such as the stomach, the duodenum and occasionally the bile duct.

There were 62 cases of a pancreatic mass lesion in this series of 416 cases and of these there were eight symptomatic swellings of the pancreas, 13 pancreatic cysts (pseudocysts) and 41 cases of pancreatic or peripancreatic abscesses.

Diagnosis

It is important to diagnose not only the presence of a pancreatic mass lesion but also its nature because the management of the three types of mass lesions is entirely different. In all cases the patient is known to have had an attack of acute pancreatitis, but the clinical symptoms and signs do not settle completely after the acute attack. In all cases, a mass lesion can be demonstrated either by clinical palpation, but more particularly by the performance of a barium meal examination which shows that there is a mass in and around the pancreas distorting the stomach and duodenum.

A pancreatic phlegmon is the least serious of these three conditions and presents with some vague gastrointestinal symptoms of anorexia, nausea and perhaps vomiting but the patient otherwise feels reasonably well. There is no leucocytosis, no fever and a computed tomographic scan merely shows swelling of the pancreas itself and this is also confirmed by an ultrasound examination.

In the presence of a pancreatic cyst the patient feels less well, although there is still not usually a fever and no leucocytosis. Often the cyst is palpable clinically but the most important means of diagnosis is by ultrasound examination which shows fluid around the pancreas. This is confirmed by a computed tomographic scan.

The most important and the most serious mass lesion is an infected pancreatic slough with pus formation which is called a pancreatic abscess. In this situation, the patient almost always had an attack of acute haemorrhagic pancreatitis as the initiating factor followed probably by pancreatic necrosis and the development of secondary infection. In these cases the patient is quite ill, has a fever and a leucocytosis and the most important means of obtaining a diagnosis is by computed tomographic scan of the abdomen which shows a mass lesion around the pancreas in the retroperitoneal tissues, and on occasions, this can be quite extensive going up to the diaphragm and down to the pelvis.

Treatment

Once diagnosis of a mass lesion is made, the treatment of a pancreatic phlegmon is conservative and in recent years the use of total parenteral nutrition has been of enormous value to allow the swelling to settle down spontaneously, particularly as these lesions are often associated with a duodenal ileus as well.

A pancreatic pseudocyst is best handled by internal drainage, but recent experience has shown that a number of these disappear spontaneously over the first few weeks and therefore it is not advocated to operate on these before about two or three months after the initial attack. Earlier operation is only required if the cyst is getting bigger rapidly or if it is causing severe symptoms. The usual type of treatment is internal drainage into the gastrointestinal tract, such as cystogastrostomy or cystojejunostomy.

The treatment of the pancreatic abscess is surgical and in essence it involves removal of the infected sloughing pancreas and sloughing peripancreatic tissue and drainage of the pus. This is best done transperitoneally rather than retroperitoneally because this allows the surgeon to confirm the diagnosis and to remove the infection which has often tracked around the pancreas up towards the diaphragm, down the pericolic gutters and occasionally even into the pelvis. On occasions, recurrent or residual infection requires a second drainage procedure later and very rarely, even a third operation may be required. The postoperative management of

these patients, whose abscesses have been drained, require intensive supportive care and close attention to fluid and electrolyte balance, supportive nutritional care and antibiotic management.

Mortality

In this series the mortality rate can be described as follows:

Pancreatic Phlegmon	0/8
Pancreatic pseudocyst	0/13
Pancreatic abscess	8/41

Thus, the mortality after drainage of pancreatic abscesses is high at 20% but it should be noted that before drainage used to be instituted, the mortality was 100%.

The technical aspects of diagnosis and surgical treatment of these pancreatic mass lesions will be demonstrated with slides during the lecture.

External Pancreatic Fistula

There have been 11 cases of a persistent external pancreatic fistula in this series and they followed either external drainage of a pancreatic abscess or less commonly, external drainage of a pancreatic cyst when internal drainage was not possible. In the past these fistulae drained for several weeks or months before they closed spontaneously and at times, surgical procedures were necessary in order to implant the fistula track into the gastrointestinal tract. In the past few years however, with the use of total parenteral nutrition or with gastrointestinal elemental nutritional support, these fistulae have closed rapidly and spontaneously and usually within one month or six weeks of their appearance without the need for surgery. In the past few years the only times surgery has been necessary, was when an external fistula was associated with a residual focus of infection in the form of pancreatic or peripancreatic abscess formation. In these cases, the procedure is performed in order to remove the focus of infection with external drainage of the pus and necrotic pancreatic tissue, and this is then subsequently followed by the use of total parenteral nutrition and with a very rapid closure of the pancreatic fistula.

Duodenal Obstruction/Duodenal Ileus

There were 23 cases of this problem in the present series but many of these cases were referred to the writer specifically for the management of this complication and therefore the actual complication itself is relatively uncommon. In every case this complication was seen in association with a pancreatic mass lesion and the management of duodenal obstruction or duodenal ileus is dependent basically on the management of the pancreatic mass lesion. Thus, in the presence of a pancreatic phlegmon in which there is extensive swelling in the area, the management remains conservative with no oral feeding and total parenteral nutrition and the complication of duodenal ileus will resolve with the resolution of the pancreatic swelling. However, in the presence of a pancreatic pseudocyst pressing on the duodenum or a pancreatic or peripancreatic abscess, the treatment of duodenal ileus is directed to the treatment of the mass lesion, that is, either external drainage of the abscess or internal drainage of the pancreatic cyst into the gastrointestinal tract.

Large Bowel Complications

Complications in relation to the large bowel usually occur in relation to the transverse colon but these complications are uncommon. We have had three cases of large bowel ileus in association with an extensiev pancreatic phlegmon, one case of a peripancreatic abscess perforating into the large bowel giving rise to extreme diarrhoea and one case of both perforation and necrosis of a small segment of the large bowel discovered during surgery for drainage of a peripancreatic abscess.

If large bowel ileus is discovered in the absence of abscess formation, then the treatment is conservative. If large bowel complications are suspected in the presence of abscess formation then the treatment is surgical and is directed primarily to excision and drainage of the abscess and at times this also means resection of part of the large bowel and occasionally exteriorisation of the large bowel with a transverse colostomy.

Haemorrhage

In the present series, there have been 14 patients with significant haemorrhage in association with a recent attack of acute pancreatitis. In nine cases this was gastrointestinal haemorrhage and in five cases, internal haemorrhage into the abdominal cavity.

Most of the gastrointestinal haemorrhages were due to gastroduodenal stress ulcerations which bled and if these occurred within the first one or two weeks of the illness, then with the simple use of blood transfusion and intravenous Cimetidine therapy, the bleeding stopped. In two cases, stress ulceration occurred as a terminal event in patients with multiple other complications after several weeks of illness and both of these patients died, although not from the effects of gastrointestinal haemorrhage. There was one patient who developed bleeding from a pre-existing chronic peptic ulcer.

Internal haemorrhage occurred by erosion of blood vessels within an acutely developing pseudocyst and interestingly, both of these patients presented with features of internal haemorrhage and hypovolaemic shock as well as the rapid onset of obstructive jaundice following attacks of acute pancreatitis and their cases will be illustrated in the lecture. In three other cases, major blood vessels were eroded in patients with neglected pancreatic abscess formation and these again represented terminal events and all three patients died.

In summary therefore, bleeding due to stress ulceration can be dealt with by Cimetidine and blood transfusion while bleeding into cysts needs to be treated by early surgery with ligation of the bleeding vessels and drainage of the cyst. The erosion of major intraabdominal blood vessels is a terminal event and here the early and adequate drainage of pancreatic and peripancreatic abscesses is the important mode of prevention.

Obstructive Jaundice

Prolonged and persistent obstructive jaundice after an attack of acute pancreatitis was uncommonly seen and there were only eight such cases in this series. In contrast, transient jaundice which disappeared within a few days, was seen in 31 cases. In the eight cases of persistent obstructive jaundice, in two instances it was due to associated choledocholithiasis, in two cases due to haemorrhage into a cyst in relation to the head of the pancreas, in two cases it was due to extensive swelling of the head of the pancreas in patients with pre-existing chronic pancreatitis, and in two cases it was due to an associated carcinoma of the pancreas which presented as acute pancreatitis and which was followed by persistent obstructive jaundice.

The investigation of these patients followed lines which are very similar to those of investigating obstructive jaundice in general. Thus, it involves in the first instance, a careful outlining of the biliary ductal system to look at the site and cause of the jaundice. In practice, this means ultrasound examination of the bile ducts followed on many occasions by a more detailed look at the bile ducts with the use of either percutaneous transhepatic cholangiography or more commonly, by the use of endoscopic retrograde cholangiopancreatography. The latter technique can be more useful in pancreatic cases than percutaneous transhepatic cholangiography because with an ERCP it is possible also to outline the pancreatic duct as well as the bile duct, thereby giving more useful information. The surgical treatment of these causes of obstructive jaundice following acute pancreatitis, involved established principles of surgical technique, that is, removal of associated stones in the common bile duct, the evacuation of the blood filled cyst in the head of the pancreas with ligation of the bleeding artery, biliary intestinal bypass procedures for both associated pancreatic carcinomas and for those whose jaundice was due to acute on chronic pancreatitis causing duct compression. These principles will be illustrated by the management of actual cases drawn from this series.

LATE SURGERY FOR SEQUELAE

By this is meant surgery that is performed months or years after a previous attack of pancreatitis and it is done for one of two reasons: the first is for the sequelae of the actual attack of acute pancreatitis itself, and the second, is to deal with the associated antecedents, in particular gallstones either in the gallbladder or common bile duct, or both.

There were four patients in this series who had direct surgery to their pancreas following acute attacks of acute pancreatitis because these patients developed chronic relapsing pancreatitis, two following pancreatic abscess drainage in which a stricture had developed in the distal part of the main pancreatic duct in whom a Puestow type of pancreaticojejunostomy was performed. In two other cases, a distal pancreatectomy and splenectomy was performed following post-traumatic acute pancreatitis in which the body and tail of the pancreas had subsequently developed chronic pancreatitis and the pancreatic duct was the site of stricture at the level of the pancreas trauma. The precise technique of surgical intervention in these patients will be illustrated by slides drawn from the actual cases.

The most important aetiological antecedent to deal with is associated gallstone disease in the biliary tract. It is now known that recurrent attacks of pancreatitis can be very well prevented by the removal of gallstones whether they be in the gallbladder or the common bile duct. In this series, gallstones were systematically

removed either during an initial operation if this was done for some other indication such as diagnosis, or they were removed some months after the acute attack had settled down. Indeed this policy has shown that recurrent attacks of pancreatitis in association with gallstones can be prevented in the majority of cases by surgery directed to the gallstones themselves.

In four cases a carcinoma of the head of the pancreas presented as acute pancreatitis, two were followed by jaundice, one by persistent duodenal ileus and one by a pseudocyst of the pancreas. All four required biliary bypass, in one the cyst was drained as well and in one a duodenal bypass was also done.

Summary

In this Lecture, the author's personal experiences drawn from 416 cases of acute pancreatitis, are presented with respect to the indications for and the timing of surgical intervention during an attack of acute pancreatitis. It will be shown that the surgeon has a well defined role in acute pancreatitis when performing a laparotomy for diagnosis, when considering excision of necrotic pancreas, when dealing surgically with certain post-pancreatic complications and when performing late surgery for either the sequelae of an attack of acute pancreatitis, or when dealing with precipitating factors especially gallstones to prevent recurrent attacks of acute pancreatitis. The references which follow are the author's previous publications on surgical intervention in acute pancreatitis[1,2,3,4,5,6,7].

REFERENCES

1. Kune, G.A.: The challenge of severe acute pancreatitis. Med. J. Aust., 2: 8—12, 1968.
2. Kune, G.A.: Abscesses of the pancreas. Aust. N. Z. J. Surg., 38: 125—128, 1968.
3. Kune, G.A. and Coster, D.: Typhoid pancreatic abscess. Med. J. Aust., 1: 417—418, 1972.
4. Kune, G.A. and King, R.: The late complications of acute pancreatitis. Pancreatic swelling, cyst and abscess. Med. J. Aust., 1: 1241—1246, 1973.
5. Reid, B.G. and Kune, G.A.: Accuracy in diagnosis of acute pancreatitis. Med. J. Aust., 1: 583—587, 1978.
6. Kune, G.A., Thomas, R.J. and Russell, J.: External pancreatic fistula: a recent advance in management. Aust. N.Z. J. Surg., 48: 287—290, 1978.
7. Reid, B.G. and Kune, G.A.: Natural history of acute pancreatitis. A long-term study. Med. J. Aust., 2: 555—558, 1980.