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TREATMENT OF PANCREATIC RUPTURE*

BY

M. SULAMAA and I. VIITANEN

From the Children's Hospital, Helsinki, Finland

An isolated complete rupture of the pancreas following non-penetrating abdominal trauma is rare, only 26 cases having been published (Hublin, 1950; Blandy, Hamblen and Kerr, 1959; Letton and Wilson, 1959; Bracey, 1961; Lindholm and Peterson, 1963). Pseudocysts are relatively common, but they may be interpreted as late sequelae of undiagnosed ruptures.

If the duct system of the pancreas has become lacerated, pancreatic secretion leaks into adjoining spaces. Doubilet and Mulholland (1959) have stressed the importance of both the loss of salt-rich fluid and the digestive capacities of the activated trypsinogen. Trypsin is capable of digesting pancreas itself and all structures in the path of flow. The reason for the variations in proteolytic activity in different cases is unknown. Three cases treated at the Children's Hospital, Helsinki, are of therapeutic interest.

Case Reports

Case 1. A boy of 10 years of age was hit by the handle-bar of his bicycle. At laparotomy on the following day only haematomas were found. After two weeks he entered hospital again because of fever and abdominal pain. His general condition deteriorated rapidly, and ascites was aspirated several times from the peritoneal cavity. He was admitted to our hospital six weeks after the onset of the disease in a very poor condition. At laparotomy a pancreatic rupture with a totally disrupted pancreatic duct was found, and its site was canalized. Large amounts of pancreatic fluid were subsequently drained from the tubes, and the condition of the patient remained poor for a long time. In three months the secretion, however, gradually decreased and the tubing was removed. Recovery then progressed rapidly, and the patient has remained asymptomatic for one year.

Case 2. A boy of 7 years of age, fell from his bicycle and was sent to our hospital on the following day. The initial symptoms, slight abdominal tenderness and fever, were followed by ascites and increasing abdominal swelling. At operation two weeks later abundant yellowish fluid and loose adhesions as well as some small necrotic fat areas were found. The pancreas was almost totally ruptured behind the head, and both ends of the pancreatic duct were open. The duodenum was opened. A division of the sphincter of Oddi was made. A thin polythene catheter was threaded through the proximal pancreas to the caudal duct. The other end was guided out in the proximal jejunum, and the pancreatic capsule was sutured with silk (Fig. 1). Post-operatively about half a litre of pancreatic fluid was drained and given orally by tube back to the patient. Recovery progressed rapidly, and two weeks later pancreatography (Fig. 2) showed normal ducts. The tubing was removed and the boy was discharged in good condition after six weeks in hospital. At follow-up later he was doing well. This case was very similar to the first one, but as the operative dissection revealed the rupture of the pancreatic duct it

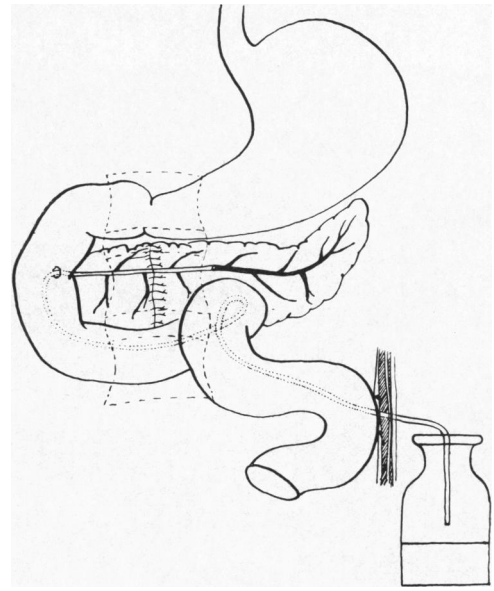

FIG. 1.—Case 2. Splinting and drainage of ruptured pancreatic duct.

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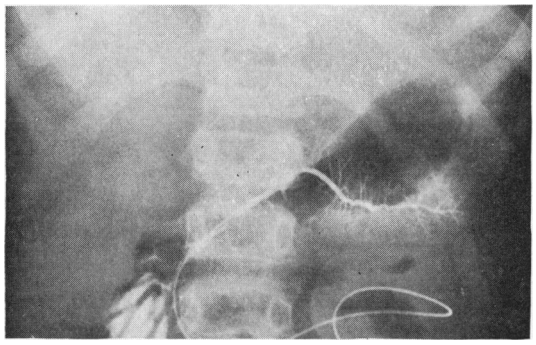

FIG. 2.—Case 2. Pancreatography two weeks after the operation shown in Fig. 1, showing normal duct.

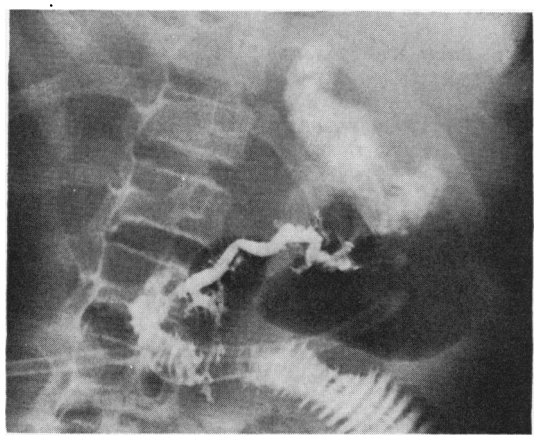

FIG. 3.—Case 3. Pancreatography showing fluid escaping from caudal duct.

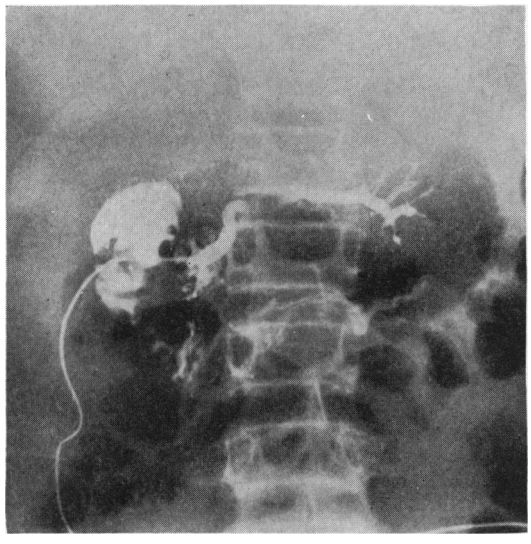

FIG. 4.—Case 3. Pancreatography 10 days after Fig. 3, showing irregular and dilated ducts but no leakage.

was possible to make a splinting drainage and the patient never came to such a dangerous condition as the first case, where the pancreatic secretions were drained.

Case 3. A boy of 14 years of age had, since the age of 2, suffered with recurrent abdominal pains, sometimes with abdominal swelling and fever. At 9 years appendicectomy was done, and mesenteric adenitis was found. During the three months before being in hospital he had several attacks of pain and vomiting. Pancreatitis was diagnosed by increased amounts of amylase in his blood and urine. Calcified opacities were seen on radiograph in the region of the pancreatic head. He was admitted to our hospital on account of increased abdominal pain and ascites, and was in a poor condition. At laparotomy the duodenum was opened, the sphincter of Oddi divided and the pancreatic duct was canalized as in the previous case. The site of leakage was not found, but pancreatography some days later revealed contrast fluid escaping out of the caudal duct (Fig. 3). At the second laparotomy the rupture with digested borders was found and the tail of the pancreas was removed. Pancreatic fluid was subsequently draining freely through the tubing and was given to the patient by mouth. Pancreatography 10 days later (Fig. 4) showed the rest of the dilated irregular ducts with no leakage. Recovery was uneventful.

In the resected specimen papillomatous formations were seen in the dilated ducts, as well as cystic degeneration and fibrosis of the pancreatic tissue with increased mononuclear cells.

The symptomatology in this case was so confusing that we could not interpret correctly the cause of the ascites. The urgent therapeutic problem, however, was the same as in a traumatic rupture.

Post-operative pancreatography revealed the site of the rupture. The very serious condition was then saved by the resection of the pancreatic tail, and recovery seemed to be rapid and complete. Subsequently, however, the boy was admitted to hospital on account of jaundice.

Discussion

Pancreatic ruptures should be treated as urgent cases for surgery. The method of operation depends on the site of the rupture. If the rupture is situated in the tail of the pancreas, removal of the distal part is the safest method (Blandy *et al.*, 1959; Letton and Wilson, 1959). When the rupture is situated more proximally, suture is preferred (Perman, 1945; Kinnaird, 1956). When the pancreatic duct is broken it has been intubated with a polythene tube acting as a splint (Doubilet and Mulholland, 1959). The other end of the tube is drawn through the abdominal wall, passing either through the duodenum, the choledochus and the gall-bladder or, as in Case 2, through the duodenum and jejunum. This will decrease the leakage of the pancreatic secretion into the peritoneal cavity or the retroperitoneal space.

Using this tube, post-operative pancreatography may be carried out as described by Doubilet, Poppel and Mulholland (1955). These authors emphasize the importance of sphincterotomy, so abolishing the hindrance of the pancreatic secretion formed by the sphincter of Oddi.

Summarizing we should like to recommend a temporary splinting drainage of the pancreatic duct in a case of pancreatic rupture, instead of suturing, marsupialization or sphincterotomy. If the caudal fragment, however, is relatively small, the safest procedure may be its removal.

REFERENCES

Blandy, J. P., Hamblen, D. L. and Kerr, W. F. (1959). Isolated injury of the pancreas from non-penetrating abdominal trauma. *Brit. J. Surg.*, **47**, 150.

Bracey, D. W. (1961). Complete rupture of the pancreas. *ibid.*, **48**, 575.

Doubilet, H. and Mulholland, J. H. (1959). Surgical management of injury to the pancreas. *Ann. Surg.*, **150**, 854.

——, Poppel, M. H. and Mulholland, J. H. (1955). Pancreatography. *Radiology*, **64**, 325.

Hublin, H. (1950). Subkutan pancreasruptur. *Nord. Med.*, **43**, 595.

Kinnaird, D. W. (1956). Pancreatic injuries due to non-penetrating abdominal trauma. *Amer. J. Surg.*, **91**, 552.

Letton, A. H. and Wilson, J. P. (1959). Traumatic severance of pancreas treated by Roux-Y anastomosis. *Surg. Gynec. Obstet.*, **109**, 473.

Lindholm, Å. and Peterson, H. I. (1963). Isolerad total pankreasruptur vid icke-penetrerande buktrauma. *Nord. Med.*, **69**, 239.

Perman, B. (1945). Fall av subkutan pankreasläsion. *ibid.*, **26**, 1048.