An Address

ON

PANCREATITIS AND ITS ASSOCIATION WITH CHOLECYSTITIS AND GALL STONES.*

BY

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It is necessary to recall briefly the anatomy of the parts concerned. The common bile duct and the duct of the pancreas approach each other very obliquely and join in the ampulla of Vater, which opens through the papilla into the second part of the duodenum; a slight sphincteric apparatus surrounds the papilla. It is also necessary to recall that the lower portion of the bile duct is embraced by the head of the pancreas, as is the ampulla; also that the duct of the pancreas is a tube of considerable size, and that there is sometimes a secondary duct of the pancreas of small calibre opening into the duodenum apart from the common orifice with the bile duct.

It has been suggested that fluids may find their way from the duodenum into the bile and pancreatic ducts, but I think this unlikely. If, when the parts are removed at autopsy, the ends of the duodenum be ligatured and the gut filled with coloured fluid, it is not possible by forceful compression of the duodenum to squeeze fluid into the ducts. Important points for remembrance are: that infection may easily spread from the gall bladder down the bile ducts, thence by the pancreatic duct into the pancreas, and that inflammatory processes in the head of the pancreas may compress the ampulla and the terminal portions of the common bile duct and pancreatic duct, producing obstruction to the flow of secretions into the duodenum, causing also some damming of these secretions in the ducts and giving rise to jaundice.

I believe that the dominating factor in practically all cases of pancreatitis is infection from the biliary passages, usually, but not necessarily, associated with gall stones. Thrombosis and other factors, such as the adrenals, may play a part, but the presence of infection is the important matter. It is true that experimental injection of sterile bile into the pancreatic duct may set up an intense pancreatitis, as may the injection of other irritating fluids, but clinically I much doubt if pancreatic inflammation arises in this way. The most favourable circumstance for the regression of bile into the pancreatic duct would appear to be the impaction of a small stone in the lower end of the ampulla, but in four of my cases in which this occurred there was no pancreatitis present. Bearing on the induction of acute pancreatitis two cases of extraordinary interest were published recently.¹ In both cases a round-worm had intruded from the duodenum into the pancreatic duct, setting up in one case an acute haemorrhagic pancreatitis, in the other a less intense condition approximating to the subacute. It is highly probable that the inflammatory condition was induced partly by stasis of pancreatic secretion from the mechanical plugging of the duct, and partly by infective material carried in by the round-worm.

Infection of the biliary passages starts in and from the gall bladder, and is probably an excretory one through the liver. Once infection has arisen it is very difficult to exterminate, even when the gall bladder has been removed and the common duct drained, and one may recall how long-continued infection may be—twenty years or more, for instance, when the organism is the *Bacillus typhosus*.

Pancreatitis may range from an intense fulminating widespread condition which kills in a brief period through a gradually descending scale of intensity to a limited dense patch in the head of the organ, producing symptoms mainly of obstruction to the common duct, difficult to discriminate clinically in some cases from carcinoma, and distinguishable occasionally from carcinoma by microscopic examination only.

It is quite impossible in a brief review to give adequate consideration to these varying and widely divergent pictures presented by pancreatitis. On the survey of a large number of cases of operation for gall stones, it is possible to say that in from 25 to 30 per cent. some degree of pancreatitis is revealed.

Acute Pancreatitis.

Acute pancreatitis is a surgical emergency with a high but, I do not doubt, a lessening mortality. Never diagnosed in the early days when the condition was first recognized, it is now one of the possibilities always in the mind of the surgeon who is face to face with an acute abdominal emergency which does not conform absolutely to a type, and a correct diagnosis is now made from time to time. In view of the probability that an acute abdominal condition, incompletely diagnosed, requires operative interference, and that acute pancreatitis is one of the things which may be creating the necessity for interference, it is of great importance to secure as accurate a diagnosis as possible, because, whilst in most acute abdominal conditions the time spent in operating should be reduced to a minimum, it is especially true of acute pancreatitis, in which prolonged anaesthesia is very detrimental.

In the diagnosis of acute pancreatitis I should lay great stress on the following clinical points: the pronounced shock of the onset, the severe pain in the back about the lower dorsal region, and usually the localization of the pain and tenderness in the mid-abdomen. Are there any other indications which may help? The presence of glycosuria would, at all events, be suggestive, but it occurs quite infrequently. The diastatic index of the urine should certainly be investigated and Leewi's test should be applied; both, however, should be resorted to as early as possible after the onset of the attack. It is, I think, clear that the diastatic index may be greatly raised in the early hours of the attack and may quickly fall to something like normal. My colleague Dr. Rose tells me that in four recent cases under his care none of the patients had glycosuria, though in two out of three in which the examination was made the diastatic index of the urine was 50.

Dr. Hillier, clinical pathologist at the General Hospital, has been kind enough to make some observations for me in acute abdominal conditions other than pancreatic, to determine whether a raised diastatic index is found in acute conditions not due to the pancreas. He found a normal index in cases of acute appendicitis, strangulated intestine, perforated duodenal ulcer, and so on; in one case of pneumococcal peritonitis the index was as high as 50, but in another similar case it was only 10. The highest index he records was 200 in a case of cholecystitis with perforation of the gall bladder; unfortunately there is no record of the state of the pancreas. My colleague Dr. Russell has been kind enough to place at my disposal a fairly long series of cases of various kinds of diseases in which the state of the diastatic index was investigated. From these no very definite conclusion emerges, but they were practically all cases of chronic disease. What is needed is the estimation of the diastatic index of the urine in all cases of cholecystitis, gall stones, and suspected pancreatitis, and this estimate should be made in the earliest stage of the disease. If this were done, and it takes but a short time to carry out, I believe a real help may be found in a considerably raised index when the pancreas is gravely implicated, and so the most direct and the shortest operative interference would be promoted. Mackenzie Wallis distinctly confirms this view.²

What is the fate of a patient who recovers from this grave condition? In the few cases I have been able to follow the patients have had ordinary good health even when masses of pancreatic tissue have been removed. Glycosuria is generally absent in the acute attack, and as far as I can learn does not often follow it. The influence of disease of the pancreas in the production of glycosuria and diabetes is most potent, but I think we must conclude that the islands of Langerhans, or at all events a large proportion of them, escape destruction in acute pancreatitis. I believe this to be true also in the less severe forms of inflammation, for in my own experience glycosuria is uncommon in pancreatitis of the subacute or chronic kind, and if present may be quite transient. We all of us may, when investigating cases requiring operation in which there is no question of gall stones or infection of the pancreas, find moderate glycosuria, and we recognize that other organs may be at fault to explain the failure of metabolism which produces the glycosuria.

Professor Shaw Dunn and Dr. Wynn have placed at my disposal two specimens of diseased pancreas showing that severe destructive changes may occur in the pancreas and yet the islands of Langerhans survive. In the one the pancreatic trouble appears to have begun from calculi in the duct of Wirsung; this was followed by destruction of the whole of the glandular tissue of the pancreas, which is

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replaced by fat, and eventually a malignant growth developed in the middle of the organ. Despite the complete destruction of the gland tissue the islands of Langerhans escaped and can easily be seen in a lantern slide. On only one occasion out of five examinations was sugar found. The second specimen is one of haemachromatosis of the pancreas: the glandular tissue is again badly damaged by fibrosis, but the microscope shows the presence of a large number of the islands; in this case sugar was found *post mortem* in urine in the bladder.

Subacute Pancreatitis.

I have notes of several cases operated upon for gall stones with subacute inflammation of the pancreas almost merging into the acute form; they differ from the intense cases in that the operations were not emergencies, though enlargement of the pancreas could in some of the cases be determined by palpation; but what led to operation was the diagnosis of gall stones, present in all but one, in which there was only a well marked cholecystitis. Although the diagnosis of gall stones called for operation, features were present in some of these patients with subacute pancreatitis which strongly suggested that the pancreas was involved; in some it could be palpated. The pain complained of in the final attack differed from ordinary gall-stone colic in that it was diffuse, was centred mainly in the mid-abdomen, was persistent, and accompanied by pain in the back in the lower dorsal region; in one patient free fluid was recognized in the abdomen. All of the patients were more seriously ill than those with mere gall-stone colic, in whom there is generally rapid improvement when the acute pain has passed. I note also that there was jaundice in some of the patients and shivering; it is not easy to differentiate between stone in the common duct and infective pancreatitis.

In all the subacute cases of pancreatitis fat necrosis existed—sometimes quite slight, in others extensive; in some a considerable amount of free fluid was found in the peritoneal cavity, slightly brown in colour and with a curious sheen like shot silk; the fluid had a feeble digestive power, and I regard it mainly as a peritoneal exudate provoked by a slight escape of pancreatic secretion into the cavity. In none of these cases was the pancreas incised or otherwise dealt with directly; there seemed no indication, and relief was given only by draining the common bile duct; recovery was usually slow, and I have notes of two cases in which death followed.

In one of these the patient, a man aged 70, upon whom I had operated for stone in the gall bladder, cystic and common ducts (the gall bladder not being removed), there was then no pancreatitis, but the patient afterwards relapsed. At the second operation, eighteen months later, there was no recurrence of stone, but the pancreas was diffusely inflamed and fat necrosis existed. The common duct was drained, but death occurred on the tenth day.

In the other patient, a delicate woman of 60, upon whom I operated for stone in the gall bladder and common duct, the gall bladder was removed; a year later there was severe general pancreatitis, detected by palpation, and slight fat necrosis was found; there was no recurrence of stone. The common duct was drained; a slow convalescence followed, and the patient left the nursing home well and remained so for about two months, when, I am told, the pancreatitis recurred; the organ could be felt very much enlarged, and in a few days part of my incision reopened and purulent stinking fluid escaped. Further operation was refused, and the patient died a few days later, the actual cause of death being described as uraemia with suppression.

All my other cases have remained well and, with one exception, free from glycosuria. In the exception there was severe cholecystitis without gall stones and considerable glycosuria for a few days. After operation the sugar disappeared at once, but three years later sugar again appeared in the urine, and the pancreas appears to be enlarged.

Chronic Pancreatitis.

In the cases which may be grouped under chronic pancreatitis the disease is usually, though not always, limited to the head, especially to that part which embraces the common duct or ampulla. The condition arises in association either with stone in the gall bladder, in the bile ducts, or in both; but it may undoubtedly exist unassociated with stone and give rise to a train of symptoms indistinguishable clinically from carcinoma of the head of the pancreas, and distinguishable with certainty sometimes, even after the organ has been

exposed, only by microscopic investigation. It is worth bearing in mind that pancreatic calculus may give rise to a limited induration in the head of the organ and be quite as difficult to interpret as those cases in which the biliary apparatus is at fault. One of the real difficulties in operation for stone in the common duct arises from these dense indurations of the pancreatic head obscuring the presence of stone at or near the ampulla; this is the commonest explanation of a stone in the common duct missed at the time of operation. I have just had a vivid reminder of an example of this misfortune in one of my early cases.

I operated in 1904 on a patient for gall stones, found a small contracted gall bladder but no calculi; the gall bladder was excised, and the ducts, which were very patent, were opened and investigated, but no calculus was discovered; there was a small indurated area in the head of the pancreas which I thought explained the persistent jaundice, and as I found that a bougie passed freely from the common duct into the duodenum I concluded that no stone was present, but I was rather uncertain whether the induration in the head of the pancreas was malignant or inflammatory. During convalescence further colic occurred, and I reopened the abdomen and found with great difficulty a small stone in the ampulla.

From this case I learnt one lesson—namely, that a good-sized bougie may pass through the papilla into the duodenum by the side of a calculus in the extreme lower part of the common duct. This reminiscence of the past was brought home to me by the fact that the same patient came to see me for another matter quite recently, when his medical adviser was kind enough to send me all my letters written in 1904.

May I recall yet another mistake, for it is by our mistakes that we learn most?

In a patient who had long been jaundiced and from whom I had removed a single stone in the gall bladder, a very hard mass the size of the thumb existed in the head of the pancreas around the common duct. Fully under the impression that the condition was carcinoma I did cystenterostomy. The patient died from secondary haemorrhage a week later, when necropsy showed that the condition was not malignant but inflammatory.

Yet a third instructive mistake:

The patient, a male aged 60, deeply jaundiced, wasted, with marked evidence in his stools of failure of pancreatic digestion, with a much distended gall bladder, and a palpable mass in the region of the pancreas, had been diagnosed as suffering from carcinoma of that organ. My own reason for doubting the diagnosis was that the patient had experienced occasionally rather severe attacks of pain almost amounting to colic, and I concluded that exploration was required. At the operation the existence of a distended gall bladder was verified, no stone was found in the gall bladder or bile ducts, but a massive nodular enlargement was felt in the head of the pancreas and was regarded as certainly malignant. The patient died two weeks later, and the necropsy revealed in the middle of the pancreatic mass, quite deep from the surface and about half an inch from the ampulla, a pancreatic stone the size of the tip of the little finger.

If I had incised at the time of the operation I might well have detected this stone, but I was strongly impressed with the belief that the thickening was a growth, and I am always chary of incising the pancreas without very good reason, because of the risk of escape of pancreatic secretion into the abdomen or through the wound, with troublesome digestion of skin, etc. This case is also of interest from the point of view of diagnosis, because it is one of the exceptional cases with deep and persistent jaundice and a largely distended gall bladder not due to malignant disease. If an incision is made in the head of the pancreas great respect should be entertained for the arterial supply through the pancreaticoduodenal vessels. I have seen one fatal duodenal fistula result from the division of these vessels in exploring for stone supposed to exist in a small dense induration in the head.

The last observation I permit myself is with reference to the condition which occurs not infrequently in young people and which is spoken of as catarrhal jaundice and is ascribed to plugging of the common duct by inspissated mucus. I believe the condition which really explains the jaundice is inflammation of the head of the pancreas compressing the common bile duct.

REFERENCES.

¹ Brit. Journ. of Surgery, January, 1923. ² Quart. Journ. of Medicine, vol. xiv, p. 57.