

SUCCESSFUL RESECTION OF THE HEAD OF THE PANCREAS FOR CARCINOMA

Report of a Case

GEORGE CRILE, JR., M.D.

Until 1935 when Whipple, Parsons, and Mullins¹ described the radical two-stage operation for carcinoma of the ampulla of Vater, the surgical treatment of carcinomas in the region of the head of the pancreas had met with consistent failure. Later, in April, 1938, Whipple² collected 11 cases in which resections of the head of the pancreas had been performed for carcinoma. One additional case³ has been reported, but only six of these 12 patients have survived the operation.

In the case reported here, the patient was suffering from a carcinoma of the head of the pancreas and has made a satisfactory convalescence following radical resection of the head of the pancreas and duodenum.

REPORT OF CASE

The patient was a man, 37 years of age, whose chief complaint was jaundice. Five months before entry, he had noticed sluggishness, nervousness, and easy fatigability. This was followed in two months by painless jaundice associated with marked pruritis. Thirty pounds in weight had been lost.

Examination showed deep jaundice, a smooth, firm enlargement of the liver extending two fingers' breadth beneath the costal margins, and a large tense rounded mass in the region of the gallbladder.

The icterus index was 100 units and the coagulation time of the blood was one hour. The blood phosphatase was 6.6 units. Roentgen examination of the duodenum showed no evidences of a tumor in the region of the ampulla of Vater. A plain film of the gallbladder region failed to demonstrate any opaque biliary calculi. There was a moderate secondary anemia, the red blood cells numbering 3,780,000 and the level of the hemoglobin being 61 per cent. The level of the blood urea was 24 mg. per 100 cc. and urinalysis was negative except for a trace of albumin, a few hyaline casts, and a great deal of bile.

A diagnosis of carcinoma of the head of the pancreas was made and exploration was advised.

The patient was given a low fat, high carbohydrate diet, 1000 cc. of a 10 per cent solution of glucose intravenously, and 10 cc. of a 10 per cent solution of calcium gluconate daily for 3 days. A transfusion of 500 cc. of whole blood was then given and the abdomen was explored under spinal anesthesia through a right rectus incision. The gall-

SUCCESSFUL RESECTION OF HEAD OF PANCREAS FOR CARCINOMA

bladder and common duct were found to be enormously dilated. The common duct easily admitted the index finger which was passed downward, encountering a hard mass in the region of the head of the pancreas. This mass was about one and one-half inches in diameter and appeared to be movable. There were no metastases in the liver and there was no enlargement of the regional lymph nodes. The remainder of the pancreas felt tense and cystic. A cholecystogastrostomy was performed, a stoma well over an inch in diameter being made. After operation a second blood transfusion was given.

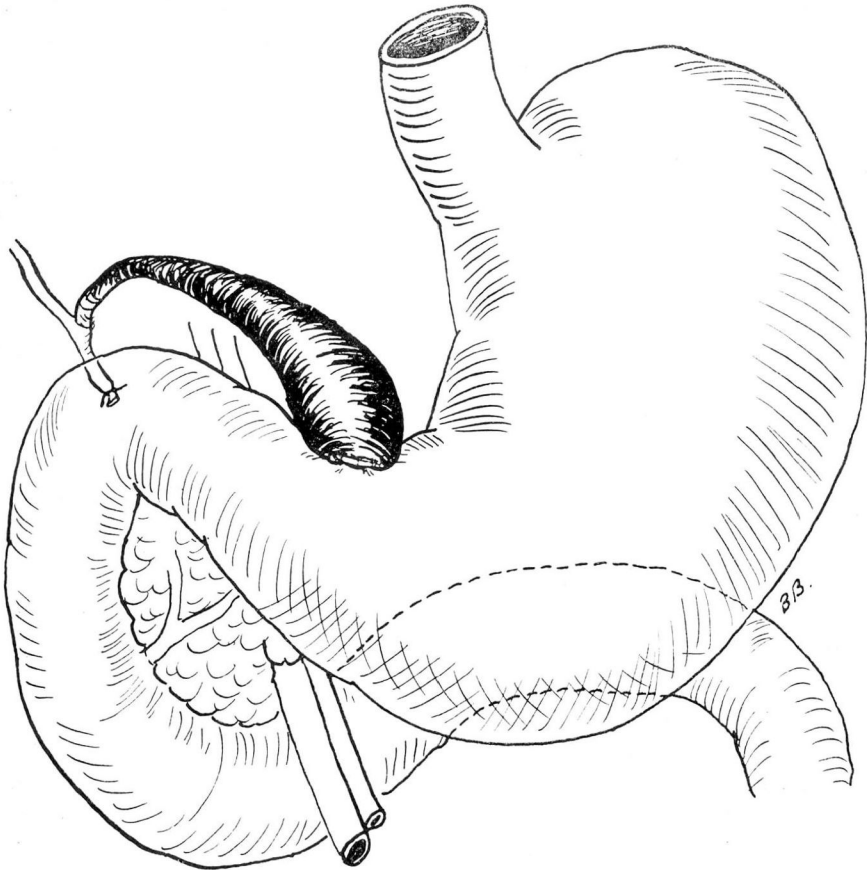


FIGURE 1: First stage of radical resection of the head of the pancreas. Figure shows common duct ligated and gallbladder anastomosed to the stomach.

Convalescence from this procedure was complicated on the second postoperative day by a secondary hemorrhage from a tiny subcutaneous blood vessel. The vessel was easily caught and tied. Two more transfusions of 500 cc. each were given. On the fourth postoperative day, the patient became very pale, the blood pressure fell to 70, and the level

of the hemoglobin to 35 per cent. A large tarry stool was passed. Several more blood transfusions were given immediately and the following day another transfusion was given. A total of 4500 cc. of blood had been administered by the seventh postoperative day and the bleeding had apparently stopped. The bleeding and clotting time were then within normal limits and the icterus index had fallen to 30 units. From the fourteenth to the eighteenth postoperative days, there was an irregular elevation of the temperature to as high as 101.2°F. It was thought that this was the result of a mild cholangitis. The patient was discharged from the hospital and returned to his home to recuperate. He was instructed to return at the end of three weeks for removal of the head of the pancreas.

The convalescence at home was complicated for the first few weeks by a persistence of the cholangitis, the temperature rising on several occasions to 104° F. The temperature then returned to normal and the patient rapidly regained his strength and gained 10 pounds in weight. The jaundice cleared up completely.

On his return to the hospital a little more than two months after the original operation, the icterus index had fallen to 10 units and the level of the hemoglobin was 81 per cent. The bleeding and clotting time were now normal.

In view of the excellent progress that had been made, it was decided to resect the head of the pancreas. Under spinal anesthesia, a transverse abdominal incision was made and the peritoneal cavity was opened. Dissection was rendered difficult by numerous adhesions. There had been no appreciable change in the size of the tumor in the head of the pancreas or in its mobility. In order to expose the pancreas, the gastrocolic omentum was divided along the greater curvature of the stomach. The duodenum was then divided just distal to the pylorus and the proximal end was inverted with two layers of continuous catgut sutures reinforced with interrupted silk sutures. The gastroduodenal artery was ligated and the common duct was isolated and ligated with a silk tie. The duodenum was mobilized from its lateral border and was again severed, this time in its third portion and the distal end inverted. The hand could then be inserted behind the head of the pancreas which was firmly adherent to the duodenum. A finger was placed beneath the neck of the pancreas well distal to the tumor and the pancreas was cut across. The pancreatic duct was dilated to the size of the index finger and this made the entire organ feel tense and fluctuant. The cut end of the pancreas including the dilated duct was closed with three mattress sutures of alloy steel wire. Upon section of the pancreas, the portal vein was exposed at the site of its formation from the splenic and superior mesenteric veins. The head of the pancreas was dissected

SUCCESSFUL RESECTION OF HEAD OF PANCREAS FOR CARCINOMA

from the superior mesenteric and portal veins, and the entire head of the pancreas, the duodenum, and the surrounding areolar and lymph gland bearing tissues were removed in a single block. There was some

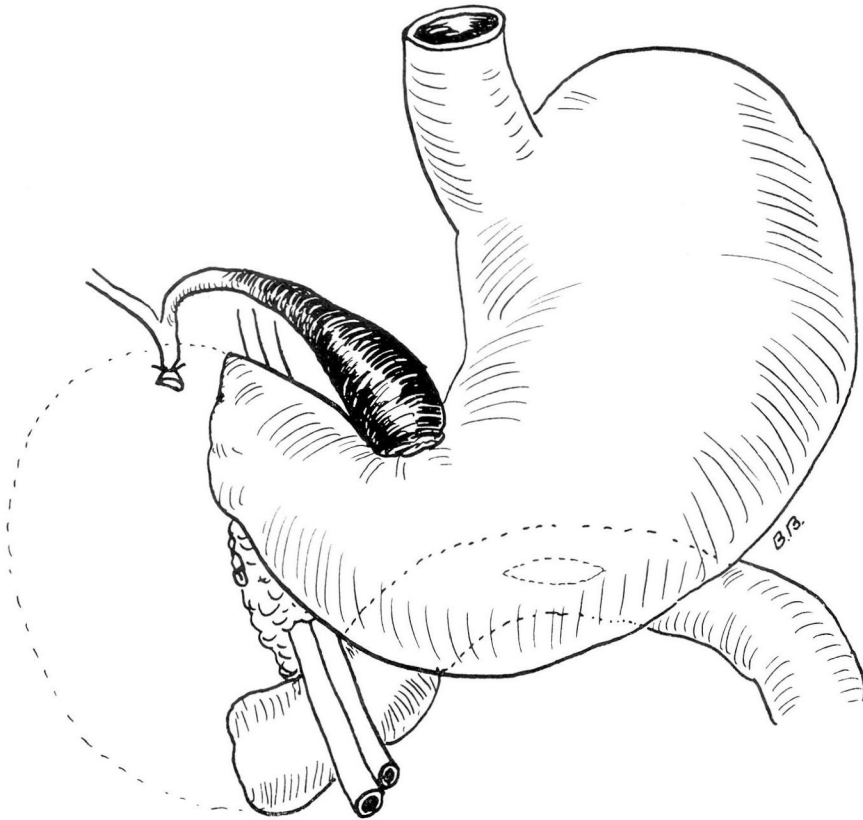


FIGURE 2: Second stage of radical resection of the head of the pancreas. Figure shows ligated common duct and cholecystogastrostomy performed at the first stage. In addition, the stomach has been severed at the pylorus and the proximal end inverted. The duodenum and head of the pancreas have been removed and the distal end of the duodenum has been inverted. A posterior gastroenterostomy has been performed.

troublesome oozing from small branches of the superior mesenteric vein which apparently entered the pancreas directly but this was easily controlled with a small amount of packing. During the course of the operation, the patient received 500 cc. of blood and 1000 cc. of 10 per cent glucose solution. The blood pressure at the close of the procedure was 100 systolic, 65 diastolic and the pulse rate was 115. Four cigarette drains were placed in the pancreatic bed and the abdomen was closed with continuous catgut sutures in the peritoneum and interrupted alloy steel wire sutures in the fascia.

On the night of the operation, the patient's temperature rose to 106° F.,

but his pulse remained of good quality and his general condition appeared to be remarkably good. By the second postoperative day, the temperature had fallen to normal but the patient then experienced a chill and the temperature again rose to 105° F. The icterus index rose to 25 units and it was thought that the febrile reaction represented a recurrence of the previous cholangitis. A blood culture, made just after a chill, was positive for *B. coli*. All the drains were removed by the fifth day. On the ninth postoperative day, bile appeared in the drainage from the wound and dye taken by mouth promptly appeared on the dressing, indicating that the fistula was in all probability from the distal end of the stomach. On the eleventh postoperative day, profuse bleeding into the fistulous tract occurred and a large hematoma formed in the abdominal wall. Several transfusions were given and the bleeding stopped spontaneously. On the fifteenth postoperative day the hematoma, which had become infected, was evacuated and the temperature and pulse rate fell to normal and remained so. A total of 3500 cc. of blood had been given at this hospitalization and the level of hemoglobin was now maintained at 70 per cent, the icterus index was 10 units, and the patient was eating well.

The fistula was quite small and drainage was easily controlled by a small amount of packing. By the thirty-second postoperative day, the fistula was nearly closed and the patient was discharged from the hospital. At the time of discharge there was no excess of fat in the stool and the digestion of the food was normal in every respect. Sugar did not appear in the urine and there was no significant alteration in the blood sugar levels.

Two months after operation, the patient is able to return to work. He has gained in strength and weight and he reports that the fistula has closed.

Examination of the specimen removed was as follows:

Gross: Specimen consists of the duodenum and head of the pancreas weighing 100 grams (Fig. 3). The head of the pancreas is adherent to the duodenum over an area about 4 to 5 cm. in diameter. The head of the pancreas which measures approximately 4.5 x 4 x 2.5 cm. is quite hard, indurated, and appears to be diffusely involved by a neoplastic process. Sections through the pancreas show relatively little normal pancreatic tissue but a white, somewhat granular neoplasm with considerable stroma is present. The pancreatic ducts at the site of the division of the pancreas are quite markedly dilated and thick walled. The distal end of the common duct passes through the mass and a probe cannot be passed through the duct. There is a small amount of fat around the pancreas in which there are a few lymph nodes, some of which appear to be involved by the tumor.

SUCCESSFUL RESECTION OF HEAD OF PANCREAS FOR CARCINOMA

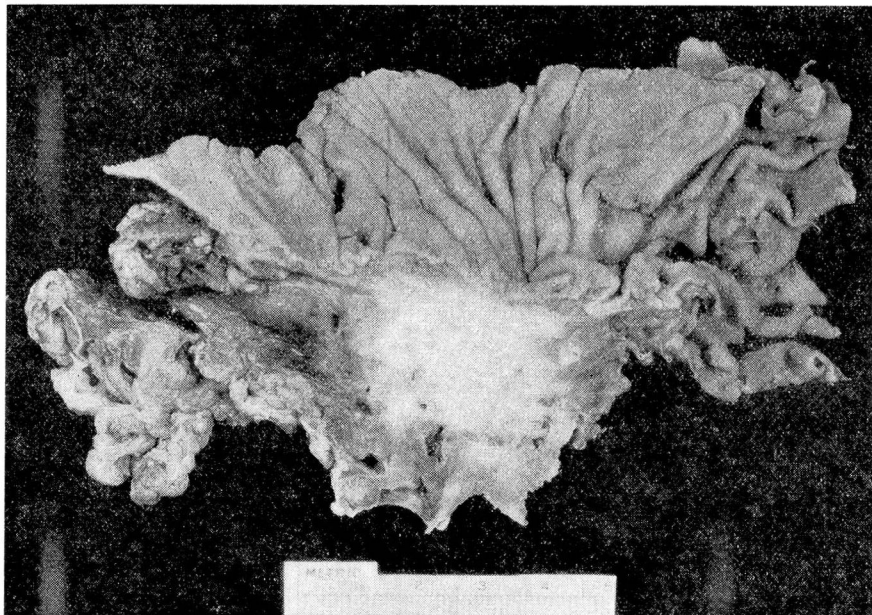


FIGURE 3: Photograph of gross specimen cut to show carcinoma in head of pancreas.

Microscopical: A section through the duodenum and the head of the pancreas in the region of the papilla shows an intact intestinal mucosa with a mild inflammatory reaction but no neoplastic involvement of the epithelial coat. In the head of the pancreas there is an adenocarcinomatous growth (Fig. 4) of ductal type quite well differentiated and consisting of small and large irregular spaces lined by single and multiple layers of cuboidal and columnar mucus-secreting epithelial cells with a few mitotic figures present. There is marked atrophy and fibrosis of pancreatic tissue and the tumor extends through the muscular and submucous coats of the intestine. From its histological characteristics, the tumor probably originated from the pancreatic ducts or possibly from the common bile duct but the involvement is too diffuse to determine which. A section of a lymph node shows no metastasis.

Pathological diagnosis: Ductal carcinoma head of pancreas.

COMMENT

In this case the tumor was highly differentiated and was of a relatively low grade of malignancy. There was no evidence of metastasis to the regional lymph nodes and examination of the gross specimen indicated that the tumor had been completely removed. The prognosis should therefore be favorable.

Eight autopsies have been performed at the Cleveland Clinic hos-

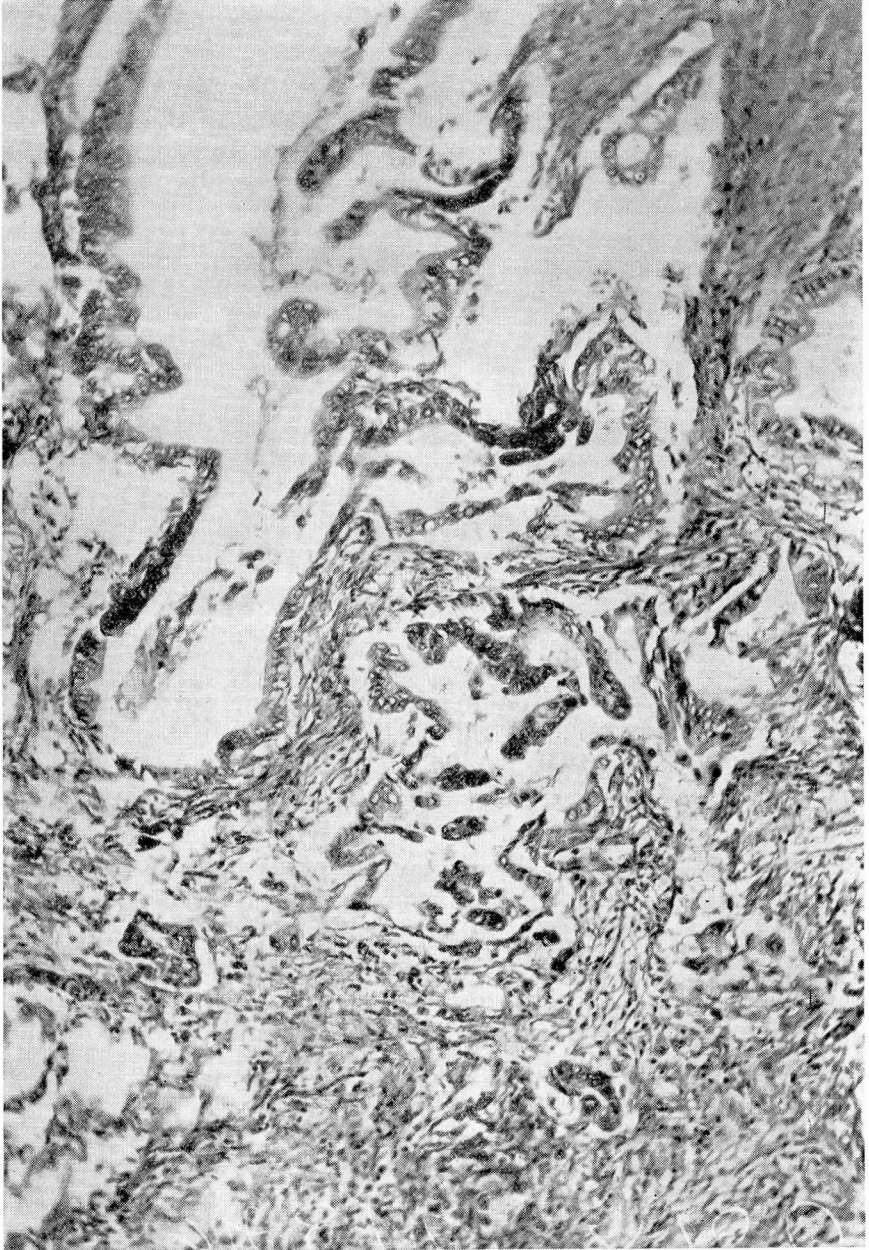


FIGURE 4: Photomicrograph of carcinoma of head of pancreas.

pital on patients who have died following exploratory or palliative operations for carcinoma of the head of the pancreas. In six of these eight cases, the tumor was limited to the area resectable by radical oper-

SUCCESSFUL RESECTION OF HEAD OF PANCREAS FOR CARCINOMA

ation. The autopsy studies of Rives, Romano, and Sandifer⁴ have shown that in 10 per cent of their cases, the carcinoma had not metastasized at the time of the patient's death. In 60 per cent of their surgical cases there was no apparent metastasis at the time of operation. Ransom's⁵ autopsy figures do not show so high an incidence of localized lesions in the head of the pancreas but indicate that primary carcinoma of the bile ducts and of the ampulla of Vater are actually more common than primary carcinomas of the head of the pancreas and that many of these tumors are localized and resectable at the time of the patient's death.

These considerations, coupled with the well known fact that a stone in the common duct can cause jaundice without pain, should influence us to give a more hopeful prognosis to patients with painless jaundice. With the recent technical advances in the surgery of the head of the pancreas, it is now possible to offer patients with carcinoma a chance for permanent cure. As surgeons develop greater skill in this field, the mortality rate will be lowered and the percentage of cures will increase. It is now clear that every patient with persistent, painless jaundice of the obstructive type should have the benefit of an exploratory operation and of resection of the tumor if it is operable.

To Whipple belongs the credit for devising the radical two-stage operation for carcinoma in the region of the ampulla of Vater and the head of the pancreas. Applying his experimental work, he demonstrated that the external secretion of the pancreas was not necessary to life or well being and simplified pancreatic surgery by advising simple ligation of the pancreatic duct rather than attempting to reimplant it into the intestinal tract. In the past, Whipple has performed the gastroenterostomy at the first stage of his operation, but in his latest publication he states that he is now planning to limit the first stage to an antecolic cholecystojejunostomy on the Roux principle. I believe that any step tending to shorten the first operation and diminish the tendency to cholangitis will be an advance. The greatest danger of the operation, as demonstrated by the case reported here, is internal hemorrhage following the first stage. When the jaundice has cleared, when the liver has regained its function, and when the bleeding and clotting time have returned to normal, the patient is in good condition to withstand an extensive operation.

The value of blood transfusion in the control of the tendency to bleed must be remembered. The continuous intravenous administration of from 4000 to 5000 cc. of 10 per cent glucose solution daily is of unquestionable value in supporting the function of the failing liver. I have seen several delirious patients with rising icterus indices and the typical syndrome of liver failure regain consciousness and return

to a normal state after glucose had been administered intravenously for 24 hours.

SUMMARY

1. A radical two-stage resection of the head of the pancreas and duodenum was successfully accomplished in a patient with carcinoma of the head of the pancreas.

2. In a large percentage of all patients with carcinoma in the region of the common duct, ampulla of Vater, and head of the pancreas, the tumor is localized and resectable at the time of the patient's death.

3. Recent advances in the surgery of the pancreas should encourage more radical attacks on carcinoma in this region.

REFERENCES

- 1 Whipple, A. O., Parsons, W. B., and Mullins, C. R.: Treatment of carcinoma of the ampulla of Vater, *Ann. Surg.*, 102:763-779, (October) 1935.
2. Whipple, A. O.: Surgical treatment of carcinoma of the ampullary region and head of the pancreas, *Am. J. Surg.*, 40:260-263, (April) 1938.
3. Thomason, G.: Pancreatic surgery, *California & West. Med.*, 46:164-169, (March) 1937.
4. Rives, J. D., Romano, S. A., and Sandifer, F. M., Jr.: Carcinoma of the pancreas, *Surg., Gynec. & Obst.*, 65:164-177, (August) 1937.
5. Ransom, H. K.: Carcinoma of the pancreas and extrahepatic bile ducts, *Am. J. Surg.*, 40:264-281, (April) 1938.