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A YEARBOOK OF DIAGNOSIS AND TREATMENT FOR THE GENERAL PRACTITIONER

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PREFACE

THE 1962 *Modern Treatment Yearbook* covers in its twenty-nine chapters a wide range of diseases and conditions, providing information which should prove of real value to the practitioner and the senior student.

No branches of medicine are static to-day, new drugs, new techniques and new treatments are always being produced, and there have been spectacular advances made in recent years in medicine and in surgery, in anæsthetics, in gynæcology and in obstetrics.

All these advances in methods of treatment have been recorded in the various volumes of the *Yearbook*, and great these advances have been. The development of new techniques has been matched by the extraordinary developments that have taken place in chemotherapy. It is difficult to realize, in this year which has seen the development of a new and singularly effective oral penicillin by the Beecham Laboratories, that when the first volume of the Series appeared 27 years ago penicillin had never been heard of and the first of the sulphonamides had yet to be introduced to the medical profession in Great Britain.

This new volume contains a wealth of material which is of the utmost importance to all who are interested in the diagnosis and treatment of disease.

CECIL WAKELEY

73 Portland Place,
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LIST OF CHAPTERS AND CONTRIBUTORS

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Chapter 1

TREATMENT OF MALIGNANT TUMOURS OF THE HEAD OF THE PANCREAS AND THE PERIAMPULLARY AREA

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THE commonest sites for cancer of the pancreas are the head of the gland and the ampulla of Vater (75 per cent.), and growths in these situations account for 2 per cent. of all carcinomas. These lesions usually occur between the ages of forty and seventy-five, the peak-age incidence being about sixty. The disease is twice as common in the male as it is in the female. The proportion of carcinoma of the head of the pancreas to periampullary carcinoma is approximately 3 to 1.

Periampullary carcinoma may take one of three forms: either (1) a small hard pea-like growth of the papilla or ampulla of Vater; (2) an ulcer of typically malignant appearance situated in the wall of the duodenum near the papilla, or (3) a growth which involves the last 5 mm. or so of the choledochus.

Cancer of the head of the pancreas usually arises close to the intrapancreatic portion of the choledochus, and in the past, many tumours of this portion of the common bile duct were wrongly diagnosed as instances of carcinoma of the head of the gland.

Malignant lesions in the narrow confines of the pancreaticoduodenal region offer a rich soil for the development of carcinoma. Periampullar cancers are usually tardy in growth and in their spread to adjacent tissues; metastatic implants in the regional lymph nodes and in the liver appear at a relatively late

stage in the disease, and, owing to the situation of these tumours, they block the terminal portion of the bile duct and accordingly are often diagnosed relatively early. Owing to these factors, and others not fully understood at the present time, the prognosis of periampullary carcinoma is distinctly more favourable, on pathological and surgical grounds, than the rapidly growing invasive lethal lesions of the head of the pancreas proper.

Thus, a study of recent statistical figures (including a personal series of 42 resectable cases) show that the hospital mortality following pancreatoduodenectomy for cancer of the head of the pancreas is about 20 per cent., whereas for carcinoma ampullary of Vater it is approximately 8 per cent.

Again, the five year survival rates for the radical operation are:

(1) for carcinoma of the head of the pancreas, 8 per cent;
(2) for ampullary cancer, 40 per cent.

While only about 10 per cent. of carcinomas of the head of the pancreas are resectable, no fewer than 50 per cent. of malignant lesions of the ampulla of Vater lend themselves to radical excision.

The data presented may be tabulated as follows:

TABLE I. PROGNOSIS

A Comparison between Carcinoma of the Head of the Pancreas and of Carcinoma of the Ampulla of Vater

	Position of Tumour	
	Carcinoma of the Head %	*Carcinoma of the Ampulla* %
Resectability rate	10	50
Operative mortality	20	7–9
Five-year survival rate following radical surgery	8	40–45

Whereas the prognosis following pancreatoduodenectomy for carcinoma of the ampulla of Vater is most encouraging, it should, nevertheless, be noted that the outlook following

resection for the "true" periampullary malignant growths, such as cancer of the second portion of the duodenum, the lower end of the common bile duct, etc., is decidedly less favourable.

For these latter tumours the resectability rate is approximately 30 per cent., the hospital mortality 12 per cent., and the five-year survival rate is about 20–25 per cent.

The classical hallmark of the diseases under discussion, namely a palpable gall-bladder in the presence of painless jaundice, is observed in only 30 per cent. of the operable cases.

The possibility of cancer in these regions should not, therefore, be excluded merely because the gall-bladder cannot be felt. Likewise, inability to palpate the gall-bladder does not mean that the biliary tree is not distended, for at operation the gall-bladder and the bile ducts are dilated in almost all instances (98 per cent.). It should be remembered that epigastric pain and extension of pain to the back is noted in fully 50 per cent. of cases of cancer of the head of the pancreas, but is observed less frequently in patients with carcinoma of the ampulla.

Operative Treatment

This is best discussed under the following headings:

A. Preoperative Treatment
B. Operative Treatment
  (1) *Radical Procedures*
    (*a*) Total pancreatectomy.
    (*b*) Pancreatoduodenectomy.
      (i) In two stages.
      (ii) In one stage.
    (*c*) Transduodenal resection of a tumour of the ampulla of Vater.
  (2) *Palliative Procedures*
    (*a*) Cholecystojejunostomy by the
      (i) Antecolic jejunal loop method and combined with a side-tracking jejunojejunostomy, or
      (ii) The Roux-Y technique.
    (*b*) Cholecystogastrostomy; Cholecystoduodenostomy.
    (*c*) Choledocho—or Hepaticojejunostomy combined with entero-anastomosis.

The objects of these palliative short-circuiting procedures are, of course, to relieve jaundice and itching.

Anterior gastrojejunostomy should be carried out as a complementary procedure to forestall duodenal obstruction, more especially where the duodenum appears to be narrow or invaded by the malignant process. Again, in some instances, side-to-side anastomosis of the dilated duct of Wirsung to the first loop of jejunum may be indicated to overcome the evil effects of prolonged steatorrhœa.

Preoperative Treatment

The majority of these patients are in poor condition with varying degrees of renal and hepatic dysfunction when they are referred to the surgeon for treatment. As a rule they complain of anorexia, nausea, attacks of epigastric pain, diarrhœa, weakness, loss of weight, generalized pruritus and insomnia.

Preoperative treatment should be short but intensive, and should include a high protein, high carbohydrate and low fat diet, vitamins B, C and K, the vitamin K being injected intramuscularly to replenish the prothrombin store; iron, liver and pancreatic extracts should also be prescribed. Blood transfusions are given before and during operation as a routine measure.

A brief course of antibiotic therapy is in order. Dehydration as well as electrolyte imbalance are controlled by intravenous infusions of water, salt, sugar and other agents when these are deemed desirable.

In patients with marked anorexia it may be wise to institute feeding through an indwelling stomach tube for some days before operation. In all cases a Ryle tube is passed into the stomach to be used for suction both during and after operation.

Radical operations. I do not believe that *total pancreatectomy* will prove any more curative for carcinoma of the head of the pancreas than pancreatoduodenectomy. The reason for this is that the spread of growth is through the lymph nodes around and behind the head of the gland, the vascular channels and the perineural sheaths, and the removal of the tail and adjacent body will, in my estimation, not improve the chances of cure.

Again, the results of total pancreatectomy have not justified the hopes of the advocates of this procedure. The operative mortality is higher, the physiological disturbances are profound, and the ultimate salvage has been most discouraging.

Transduodenal excision of the ampulla of Vater. This operation is not to be recommended for a localized nodular growth of this structure except perhaps in elderly poor-risk jaundiced patients suffering from hepatic insufficiency. The immediate results may appear to be flattering, but the late results show that over 80 per cent. of patients thus treated die of local or widespread recurrences within a period of eighteen months following this relatively minor procedure.

Pancreatoduodenectomy. This is the operation of choice for patients who are suitable for radical surgery. In this operation the distal half of the stomach, the entire duodenum, the first six inches of the proximal jejunum, the head, the neck and a variable portion of the body of the pancreas, together with the related lymph nodes and the distal end of the common bile duct are removed *en bloc*. The reconstruction entails end-to-end choledochojejunostomy, side-to-side pancreatojejunostomy (the main pancreatic duct being anastomosed to the medial border of the antecolic limb of the proximal jejunum) and, finally, side-to-side gastrojejunostomy. The chances of the patient developing an anastomotic ulcer subsequently are greatly reduced as the alkaline juices constantly bathe the gastro-enteric stoma. Vagotomy completes the operation (Plate I).

On occasion, the duct of Wirsung is anastomosed to the posterior aspect of the gastric pouch.

Under no condition should the proximal end of the pancreatic stump be ligated or oversewn as this procedure not only deprives the intestines of the beneficient effects of the ferment-laden alkaline pancreatic juice, but may lead to a series of grave complications, such as steatorrhœa, pancreatic fistula, pseudo-cyst, subphrenic abscess, pancreatic necrosis and so forth.

Implantation and invagination of the pancreatic stump into the open mouth of the jejunum or into the side of the gut is not recommended, as leakage at the suture line in the early post-operative phase and a progressive stenosis of the duct of Wirsung are not infrequently observed.

Pancreatoduodenectomy is now usually carried out as a

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one-stage operation. Careful preoperative treatment and evaluation of the patient have made this possible.

When it is anticipated that the procedure will be done in *two stages*, it is important that the exploration be limited and no peritoneal cleavage planes are opened. On the whole, the best decompressive (first stage) operations are simple cholecystostomy or cholecystoduodenostomy.

Since the prognosis following resection for carcinoma of the head of the pancreas is so bleak, the limits of operability should not be pushed too far in these cases. Any obvious extension of growth beyond the confines of the head of the gland, and any adherence of the malignant process along the portal vein, superior mesenteric vessels, or inferior vena cava, spells inoperability. On the other hand, with malignant lesions of the periampullary area, where the late results following resection are highly satisfactory, radical pancreatoduodenectomy should be enjoined whenever local and general conditions permit, and even in borderline cases.

One-stage Radical Resection

A right epigastric muscle-splitting incision is employed in preference to a transverse or subcostal incision. A methodical abdominal exploration is conducted, after which a few regional lymph nodes are removed and submitted to immediate microscopical investigation. Biopsy of the head of the gland itself is not advisable in the majority of the patients unless the surgeon chooses to use a Vim-Silverman needle. This method of biopsy is of absolute value only when a frozen section analysis for cancer is obtained.

When the diagnosis is established, the next step is to determine the feasibility of radical excision. It should be noted that in almost all cases of carcinoma of the head of the pancreas the duct of Wirsung and the biliary passages are markedly dilated. The gastro-colic omentum is divided and the adhesions which exist between the posterior aspect of the mesocolon and the inferior surface of the pyloric portion of the stomach are freed, thus exposing the middle colic vessels. The peritoneal incision is next continued laterally, liberating the hepatic flexure and the right half of the transverse colon, and displacing the large bowel downward and medially out of the field of operation.

A good view is now obtained of the anterior surface of the pancreas. The peritoneum is then incised at the inferior border of the gland in order to display the superior mesenteric vessels. The inferior pancreaticoduodenal artery is next isolated, ligated and divided. The peritoneum lateral to the duodenum is incised and the head of the pancreas and the duodenum are liberally mobilized and turned over towards the middle line. The spermatic or ovarian vessels and the ureter are visualized and a long segment of the inferior vena cava is bared. The gastrohepatic omentum is incised, the right gastric artery is ligated and divided, after which the course of the hepatic artery is determined. The gastroduodenal artery is identified where it springs from the hepatic artery. This artery is tied with strong silk mounted on an aneurysm needle and divided.

The common bile duct is then dissected free and the point of entry of the cystic duct noted. A piece of tape is passed around the common bile duct and the ends of the tape clamped with a hæmostat. By applying outward traction on the tape sling, the portal vein will be brought into view. The index finger of the left hand can then be passed under the neck of the pancreas on top of the portal vein so as to emerge below the body of the gland anterior to the superior mesenteric vein.

This is an excellent method of ascertaining if the portal or superior mesenteric veins are adherent to the growth. If the cancerous lesion is not adherent to these large vessels, the common bile duct should be doubly clamped, transected, and the distal end of the duct ligated with stout silk. The body of the stomach is then divided between Payr clamps which are held apart while the neck or body of the pancreas is lifted upward on the finger and a point selected for transection of the body. Hæmostatic suture-ligatures are inserted on the superior and inferior aspects of the pancreas to control the corresponding longitudinal pancreatic arteries. These suture-ligatures are placed in the distal part of the pancreas near the line of transection.

The pancreas is then divided and hæmorrhage controlled from the proximal side with three or four Babcock forceps.

The duct of Wirsung is identified and dissected out before division and left to project from the cut surface of the body of the pancreas. The portal vein, the superior mesenteric vein, the

splenic vein, and the superior mesenteric artery are exposed by the division of the gland. The distal raw surface of the pancreas is next closed with a series of interrupted mattress sutures of silk or cotton, leaving the duct of Wirsung projecting for one-third of an inch (8.47 mm.) from it.

The proximal portion of the pancreas is drawn across to the right to display the posterior aspect of the head and neck of the gland. Numerous thin-walled vessels emerge from the neck and head of the pancreas and enter and drain into the right margin of the superior mesenteric vein. These should be isolated individually, underrun with an aneurysm needle and ligated with fine silk or catgut. They are carefully divided between the ligatures, and care is taken not to injure the superior mesenteric vein.

The transverse colon is drawn vertically upward and a point selected for division of the proximal jejenum about six inches (15.24 cm.) distal to the ligament of Treitz. This ligament is divided, opening up a way through into the retroperitoneal tissues and exposing the third part of the duodenum.

The mesentery of the proximal jejunum is cut through with scissors and the blood vessels are secured. The jejunum is clamped with two Kocher forceps and the bowel is transected, after which the proximal end of the jejunum is ligated with tape or floss silk and the clamp is removed. The ends of the ligature are kept long to act as a tractor. The clamp on the distal jejunum is not removed at this stage, as it also serves as a useful tractor.

The distal portion of the duodenum and the short segment of proximal jejunum are freed by blunt dissection beneath the superior mesenteric vessels and the liberated intestine is drawn through to the right and away from the overhanging vascular mesenteric root. The portal vein, the splenic vein, the superior mesenteric vein and the superior mesenteric artery can now be clearly seen as they lie slightly to the right of the pulsating aorta and in the centre of the operative field, between the ends of the pancreatic stumps.

By elevating the duodenum and the head of the pancreas, the uncinate process can be freed up posteriorly. By firmly raising the distal end of the stomach, head of the pancreas and duodenum, the short branches of the superior mesenteric vein

which go to the head of the pancreas, and the uncinate process can be divided between fine hæmostats, thereby permitting delivery of the specimen. This is the most difficult part of the operative procedure.

After removal of the specimen and confirming that hæmostasis is complete, the reconstruction of the pancreatic, biliary and gastro-intestinal tracts is carried out. The opening in the mesocolon is closed with a running silk stitch, and a generous loop of proximal jejunum is drawn upward and over the transverse colon for anastomosis to the common bile duct, the duct of Wirsung and the stomach.

Antecolic anastomoses are preferred to the retrocolic unions because the recurrence rate following this radical resection is high and invasion of the stomas by growth do not appear to occur as rapidly if they are performed in front of, rather than behind, the colon.

The steps of the reconstruction are described under the following headings: choledochojejunostomy, pancreatojejunostomy, gastrojejunostomy.

1. *Choledochojejunostomy.* The end of the proximal jejunal limb, embraced by a Kocher forceps, is brought anterior to the transverse colon for anastomosis to the cut end of the bile duct. The end of the jejunum is closed and inverted after which the duct is anastomosed (with six to eight through-and-through all coats sutures of 000 chromic catgut) to the anterior wall of the jejunum as depicted in Plate IA.

2. *Pancreatojejunostomy.* When the biliary-enteric anastomosis is completed, a portion of the jejunum about two to three inches (5 to 7.6 cm.) below the biliary-enteric stoma is selected for the next reconstruction procedure. The posterior edge of the pancreatic stump is sutured to the jejunal wall; a small length of polythene tubing is passed into the main pancreatic duct for a distance of about three inches; a minute stab incision is made in the wall of the jejunum opposite the divided end of the duct of Wirsung; the polythene tube is passed through this small hole in the gut in a downward direction for four inches or so, and the anterior edge of the pancreatic stump is then sutured to the wall of the jejunum to ensure firm anchorage, isolation of the stoma and approximation of mucosal surfaces.

If, on the other hand, the main pancreatic duct is grossly

dilated it can be satisfactorily anastomosed to the lateral wall of the jejunum as is well shown in Plate Ib.

3. *Gastrojejunostomy.* The final anastomosis is made between the cut end of the stomach and the side of the jejunal limb a few inches distally. This union is carried out as in the operation of gastrojejunostomy. By Cattell's plan a longer limb of proximal jejunum is fashioned and brought across the colon; the open end of the jejunum is anastomosed to the mouth of the gastric pouch, and, after completing the pancreatic and biliary anastomoses, the operation is completed by performing a sidetracking jejunojejunostomy. Vagotomy should be a routine procedure.

At the completion of this radical resection drainage is provided, and, in closing the abdominal incision, steps are taken to guard against the possibility of disruption of the abdominal wound.

Post-operative Treatment

Gastric aspiration. The Ryle or Levin tube which was passed into the stomach before operation is used for gastric decompression until flatus is passed. It is important not only to keep the stomach deflated but to guard against any dilatation of the proximal jejunal loop which is anastomosed to the pancreas. This anastomosis is the only vulnerable one in the reconstruction, and its breaking down is the most serious complication of the operation.

Fluid and electrolyte balance. Fluid, nutritional and electrolyte requirements are supplied by the administration of blood, glucose and saline solutions supplemented by potassium chloride as required. As soon as the bowels are induced to work in a satisfactory manner, the diet is rapidly increased and proteins and pancreatic extracts are given generously.

Antibiotic therapy. Penicillin and streptomycin are given in adequate doses for five or six days after operation.

Vitamins. Vitamins B, C and K are administered daily for at least fourteen days.

Comments on Palliative Procedures

The prognosis following palliative operations for the relief of jaundice and itching in cases of irremovable cancer of the head

of the pancreas or of periampullary carcinoma is, of course, hopeless. The hospital mortality is about 10 per cent. and the majority of patients subjected to any palliative short-circuiting procedure are dead within seven or eight months.

Jaundice frequently recurs after a lapse of five months; wasting is extreme, and ascites may develop and call for repeated paracentesis.

If a patient with a suspected cancer in these situations had been subjected to a palliative procedure, and is alive and well after fourteen months, it is highly probable that the original diagnosis was wrong. In some 10 per cent. of cases it is impossible to differentiate cancer from chronic pancreatitis or diffuse inflammatory lesions of the head of the gland during exploratory operation.

Needle biopsy, employing a Vim-Silverman needle proves helpful if cancer cells are detected in the biopsy specimens, but a report from the pathologist supporting a diagnosis of chronic pancreatitis is frequently misleading.

The surgeon should not perform any type of short-circuiting procedure if there are massive secondary deposits in the liver; if there is ascites; if metastatic implants are found in the peritoneal cavity and pelvic shelf; or where the portal fissure is obliterated with matted, hardened lymph nodes.

The diagnosis of cancer of the ampulla of Vater is sometimes difficult to establish where the gall bladder is full of stones and calculi crowd the common duct. In such instances, through a duodenotomy incision, the button-like tumour of the papilla should be excised, and the specimen should be submitted to immediate pathological inquiry. The subsequent steps of the operation will depend on the report of the frozen sections, the condition of the patient and any visible and palpable extension of growth.

If there is no pathological confirmation of carcinoma the treatment is simple, namely, cholecystectomy, exploration of the bile passages, sphincterotomy and T-tube drainage of the common duct. The best palliative operation for irremovable carcinomas in the periampullary area and head of the pancreas is antecolic cholecystojejunostomy combined with entero-anastomosis, provided, of course, that the cystic duct is not compressed or in any way compromised by the extension of the

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