Intubation of the Pancreatic Duct in the Human.* (18404)

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The inaccessibility of the human pancreas and its ducts has restricted direct surgical attack on the diseased gland and thus our knowledge of the physiology of its external secretion is limited. On the other hand, drainage of the biliary tract by means of a T-tube has, incidental to its therapeutic use, increased our knowledge of the variations in hepatic bile secretion. In addition, cholangiographic studies through the T-tube has become an established procedure both in the treatment of biliary tract disease and for studies of the physiologic anatomy of the biliary tract. The few observations on uncontaminated pancreatic juice through the accidental formation of a fistula, have been limited by the difficulty of collecting the juice and by the lack of quantitative studies from the whole gland. Any operative procedure which would enable us to collect human pancreatic juice at will should be of value not only for therapy but also for investigative purposes.

A fortuitious circumstance in a patient with diffuse inflammation of the pancreas in whom drainage of the pancreatic duct was deemed advisable, led to the development of a method herewith described. This procedure is safe and of therapeutic and prognostic value. Furthermore, information concerning the flow and composition of pure human pancreatic juice under various conditions can be obtained.

In the surgical treatment of recurrent pancreatitis by transduodenal section of the sphincter of Oddi, the opening of the duct of Wirung can be found on the posterior wall of the ampulla of Vater which is laid open by this procedure. If not easily discernible the pancreatic duct can be located by the rapid flow of pancreatic juice which is produced by injecting secretin intravenously. A fine polyvinyl tube about 50 cm long is then inserted into the duct for a distance of 8-10 cm. The size of the tube will vary with the diameter of the opening of the pancreatic duct. It should enter freely without occluding the opening. We have been able to insert tubes varying from 1.3 to 1.7 mm in outside diameter.† The other end of the tube is then threaded up the common bile duct and passed through the previously made incision in the bile duct. The end is threaded into the lower arm of an appropriate T-tube and out through a fine opening just above the base of the long arm of the T-tube. The T-tube is inserted into position in the common duct, and the polyvinyl tube pulled carefully until the free loop in the duodenum is fully taken up. Several encircling silk sutures are then tied to hold the polyvinyl tube firmly against the T-tube without undue compression (Fig. 1).

The opening in the anterior wall of the duodenum is closed and the operation completed. Two bottles are attached to the dressing and bile and pancreatic juice are collected separately. The pancreatic juice passes partly through the tube and partly around it into the duodenum. On the fourth postoperative day, the T-tube is tied. The hub of a No. 18 hypodermic needle is broken off, and the blunt end of the needle inserted into the polyvinyl tube. The sharp end is then inserted into the T-tube, so that the pancreatic juice flows down the common bile and into the duodenum.

Samples of pure pancreatic juice, not activated by contact with the duodenal mucosa can be collected at will by pulling the needle out of the T-tube. When a total quantitive collection is required a small dose of morphine (10 mg) is administered subcutane-

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† Transflex tubing no. 20 and 22, Irvington Varnish and Insulator Co.

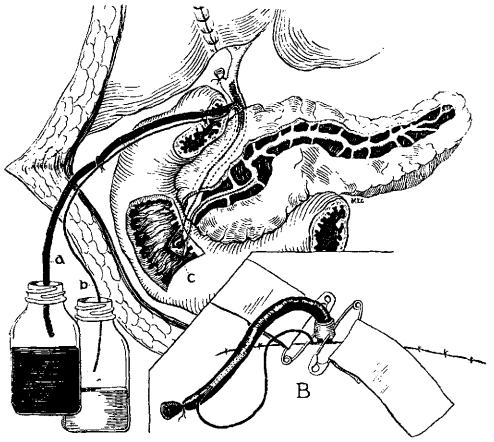

FIG. 1.
The polyvinyl tube (b) passes alongside the T-tube (a), through the lower end of the T lying in the common duct, through the cut sphincter of Oddi (c), and up the pancreatic duct. Bile and pancreatic juice are collected separately. After 4 days the T-tube is tied and the polyvinyl tube inserted into it by means of a needle (inset B), allowing the pancreatic juice to circulate back into the duodenum.

ously. This increases the tonus of the duodenal wall and causes it to contract around the polyvinyl tube lying in the pancreatic duct. This prevents passage of pancreatic juice around the tube into the duodenum and diverts it completely into the collection bottle. A 300 mm length of fine tubing attached to polyvinyl tube produces adequate siphonage to draw all the pancreatic juice from the ducts. The effect of the morphine lasts at least one hour.

Similarly, and most important from a diagnostic and prognostic standpoint, pancreatographic studies can be made by injecting 70% diodrast through the polyvinyl tube. Complete filling of the pancreatic duct system can be attained by giving the patient 10 mg of morphine 5 minutes previous to the injection (Fig. 2).

When the gland appears to be normal both by pancreatographic studies and by analysing the juice for enzymes, the T-tube is removed and along with it the polyvinyl tube. Results of these studies will be reported later.

Summary. A technique is described for intubating the duct of Wirung in the human during the operative procedure of transduodenal sphincterotomy. Through this tube the pancreatic duct can be drained and also visualized roentgenographically. Quantitative studies of the composition of the pancreatic juice under various conditions can be carried out at will.

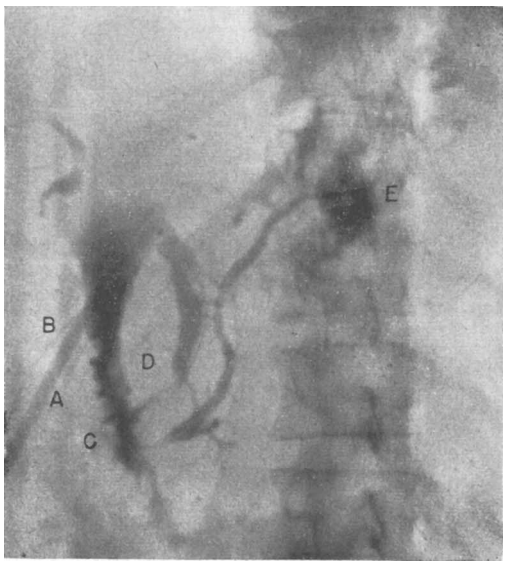

FIG. 2.
Pancreatogram taken one week after operation. Diodrast (70%) was injected into the polyvinyl tube (B), lying alongside the T-tube (A). Its course can be visualized as it curves down the common duct into the duodenum, through the sectioned sphincter of Oddi (C). The pancreatic duct is completely visualized including the accessory duct (D). The tissue of the inflamed tail of the pancreas (E) is rendered opaque by permeation of the Diodrast.

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