

## Catheterization of the Pancreatic Duct

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Catheterization of the pancreatic duct is indicated in studies in which sampling of the pancreatic exocrine secretions are required. The pancreas has a tendency towards developing pancreatitis when it is surgically manipulated. Total diversion of the pancreatic secretions from the duodenum will result in dietary deficiencies and intestinal dysfunction within a week. Consequently, cannulation of the pancreatic duct is performed with caution and either the experiments are short term or the duct is cannulated in such a manner that at least a portion of the pancreatic secretions continue to flow into the duodenum. Replacement pancreatic enzymes may also be administered orally.<sup>1-4</sup>

### Anatomy

The pig pancreas is similar in function to the human in that it has more extensive cholinergic innervation than other species. It also shares important neuroanatomic and physiologic features. The islet cells have similar function to humans and diabetics extensively utilized porcine insulin derived from slaughterhouse collections for many years.<sup>1-4</sup>

The pancreas is large and the tail follows the curve of the proximal duodenum and the gastroepiploic artery extending along the lesser curvature of the stomach. The tail of the pancreas is partially retroperitoneal and the body of the pancreas encircles the cranial mesenteric and portal vessels. The intrapancreatic ducts of the tail and body bifurcate into a single common duct, which corresponds to the accessory pancreatic duct in humans. This duct enters the duodenum separate from and distal to the bile duct. The duct can be identified readily as a firm whitish structure. However, the pancreatic papilla within the duodenum is indistinct. When the duct is surgically manipulated it is at the site of entrance into the duodenum.<sup>1-4</sup>

### Surgical Procedures

The celiotomy incision is made from the xiphoid to the umbilicus and self-retaining retractors and wetted laparotomy packs are used to isolate the region of the pancreatic duct.<sup>1,3</sup> Careful dissection of the pancreas along the duct and away from the duodenum is required to avoid damage to the organ resulting in subsequent leakage of the pancreatic enzymes into the abdomen.

Elastic vessel loops are used to encircle the duct proximal and distal to the site of the surgical incision into the duct. A wetted gauze sponge is positioned under the duct to absorb any leakage of pancreatic enzymes. A small incision is made halfway through the duct and a vessel pick is used to open the lumen.

The procedure for cannulation of the pancreatic duct and the catheter designs are similar to the description for cannulation of the common bile duct, which is located on this website. The catheter and collection device or port is advanced into the abdomen from the right cranial paramedian area of the abdomen because gravity will be important in the collection of samples.

If the procedure is to involve total diversion of the pancreatic excretions, then a 3-5 Fr catheter with suture retention beads is placed retrograde into the duct and tied in place with circumferential non-absorbable sutures. If the procedure involves reentry catheterization of the duodenum, then two choices are available. A T-tube catheter is placed, first distally, then proximally into the pancreatic duct. It is sutured in place with proximal and distal circumferential sutures. The likelihood of retrograde infections from the duodenum is increased when the tip of the catheter is placed beyond the papilla. The second technique involves having the catheter from the pancreatic duct pass into a collection port on the exterior of the abdominal wall and then reentry of the abdomen with a duodenal

## Catheterization of the Pancreatic Duct (cont'd)

catheter. The duodenal catheter is inserted into the duodenum slight distal to the pancreatic duct region to avoid irritation of the catheterization site. The duodenal catheter is sutured in place with a pursestring suture and a silicone flange sutured to the serosa. With reentry catheterization techniques only a partial or periodic sampling of the pancreatic excretions is possible. However, this technique avoids the complications of total loss of pancreatic exocrine function, as described above.

Postoperative care is intense for chronic models. The collection device may be a bag, tube or subcutaneous access port. If the device is sutured to the exterior of the skin, then a circumferential bandage must be placed on the animal to protect the collection device.<sup>1</sup> Preemptive and postoperative analgesia should be administered and iv fluid administration continued for the first day. Electrolyte imbalances of bicarbonate, chloride, potassium, calcium and magnesium ions are possible.<sup>2</sup> Signs of acute abdominal pain and gastrointestinal distress are indications that the animal may have pancreatitis, either due to tissue trauma from the procedure or ascending infection. Prior to performing this procedure as a chronic model, veterinary consultation is advised.