

<Case Report>

Treatment of pancreatic pseudocyst with omentalization in a dog

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Abstract: The pathogenesis of pancreatic pseudocyst is still not understood. A 5-year-old, 24-kg intact female Shetland Sheepdog was presented with anorexia and vomiting. Diagnostic imaging tests revealed that the left limb of the pancreas was thickened and contained two cystic lesions ($6.3 \times 5.6 \times 4 \text{ cm}^3$ and $3.5 \times 4.6 \times 5.5 \text{ cm}^3$). During the laparotomy, lesions were opened with de-roofing of superabundant tissue, and omentalization was performed. The dog recovered uneventfully after surgery and was discharged on postoperative day 12. Histopathologically, it was diagnosed as chronic pancreatic pseudocyst. This case report describes the diagnosis and successful omentalization of pancreatic pseudocysts in a dog.

Keywords: dogs, omentalization, pancreas, pancreatic pseudocyst

A pancreatic pseudocyst is non-epithelialized fibrous tissue sac that contains pancreatic enzymes and debris from the pancreas [6, 12]. The pathogenesis of pancreatic pseudocyst is still not understood. One possibility is premature activation of digestive enzymes by pancreatitis, which can cause auto-digestion of the pancreatic parenchyma, leading to inflammation and necrosis along with formation of cystic structure [12]. Diagnosis of pancreatic pseudocyst is confirmed by the presence of fluid-filled lesion near the pancreas on diagnostic imaging and detection of increased concentrations of pancreatic enzymes in fluid aspirated from the lesion [2].

In human medicine, surgical intervention is indicated if a pancreatic pseudocyst increases in size and is associated with clinical signs of pancreatitis [7]. Several techniques have been described for internal or external surgical drainage of pancreatic pseudocyst. Internal drainage techniques include cystoduodenostomy, cystojejunostomy, cystogastrostomy, and omentalization [5, 12]. Complete resection and external drainage of a pancreatic pseudocyst have also been reported [4].

The omentum is a physiological source of immune response on angiogenesis, is involved in abdominal drainage, and can form adhesion [14]. Successful use of the omentum has been described in the treatments of perinephric pseudocysts, large non-healing wound, and prostatic abscess [3, 11, 14]. This report describes the diagnosis and successful omentalization of two pancreatic pseudocysts in a dog.

A 5-year-old, 24 kg intact female Shetland Sheepdog was presented with a history of vomiting 1–2 times daily, and anorexia of 2 weeks duration. Physical examination showed

Table 1. Serum biochemical findings in a dog with pancreatic pseudocyst

Variables	Preoperative day	Postoperative day 34	Reference range
AST (U/L)	147	14	15–43
ALT (U/L)	2004	45	19–70
ALKP (U/L)	6594	321	15–127
GGT (U/L)	145	5	0–12
Bilirubin (mg/dL)	2.3	0	0–0.4
Amylase (U/L)	820	593	185–700
Lipase (U/L)	87	48	0–180
Cholesterol (mg/dL)	768	362	135–345

AST, aspartate aminotransferase; ALT, alanine aminotransferase; ALKP, alkaline phosphatase; GGT, gamma-glutamyl transferase

upper abdominal pain and fever (39.7°C). Laboratory tests revealed leukocytosis ($16 \times 10^9/\text{L}$; reference, $5.2\text{--}13.9 \times 10^9/\text{L}$) and elevated levels of aspartate aminotransferase (AST; 147 U/L; reference, 15–43 U/L), alanine aminotransferase (ALT; 2004 U/L; reference, 19–70 U/L), alkaline phosphatase (ALKP; 6594 U/L; reference, 15–127 U/L), gamma-glutamyl transferase (GGT; 145 U/L; reference, 0–12 U/L), bilirubin (2.3 mg/dL; reference, 0–0.4 mg/dL), amylase (820 U/L; reference, 185–700 U/L), and cholesterol (768 mg/dL; reference, 135–345 mg/dL) (Table 1).

Two hypoechoic cystic lesions were detected in the pancreatic region on abdominal ultrasonography (Fig. 1). Com-

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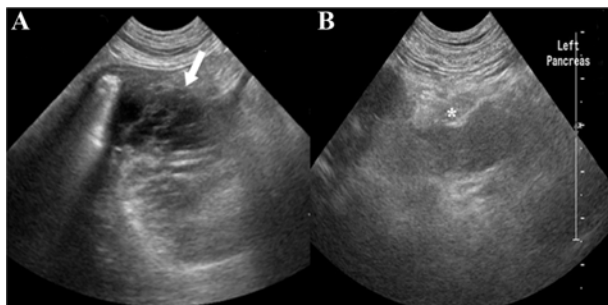


Fig. 1. Ultrasonographic image of the pancreas in a dog with two pancreatic pseudocysts. (A) The pancreatic pseudocyst (arrow) was identified before surgery. (B) Thirty-four days after surgical treatment, cystic lesion was not observed within the pancreas (*).

puted tomography revealed two cyst-like lesions ($6.3 \times 5.6 \times 4 \text{ cm}^3$ and $3.5 \times 4.6 \times 5.5 \text{ cm}^3$) in the left pancreatic limb and an increase in the size of the common bile duct to 6 mm.

A presumptive diagnosis of pancreatic cyst/pseudocyst or abscess was made based on the clinical signs of vomiting and abdominal pain, the hematologic results, and the presence of cyst-like lesions in the pancreas on diagnostic imaging.

Surgical intervention for the cyst-like lesions in the pancreas was planned. The plan was to drain the fluid from the cystic lesions to reduce their size and to prevent recurrence. During a laparotomy under general anesthesia, two firm cysts were identified in the region of the left pancreatic limb. Fluid was drained from the center of the lesion using a 22-G needle and submitted for cytologic examination. Each cystic lesion was incised and a section of the cystic wall was resected, samples of which were submitted for histopathology. After resection, lavage of each cavity was performed. The omentum was packed into each cystic lesion and then loosely sutured to the wall of each cysts with 3-0 monofilament polyglyconate sutures (Maxon Monofilament Absorbable Sutures; Covidien, USA; Fig. 2).

Examination of fluid from the cystic lesions revealed an amylase level of 865 U/L, a lipase level of 1222 U/L, and no bacteria. A histopathological diagnosis of pancreatic pseudocyst was made.

Postoperative analgesia was provided by a transdermal fentanyl patch (75 $\mu\text{g/h}$; Daewoong Pharmaceuticals, Korea) and intravenous infusion of remifentanyl (0.1–0.3 $\mu\text{g/kg/h}$; Hana Pharm, Korea). There was no postoperative vomiting and the dog was discharged 12 days after surgery.

At follow-up 34 days postoperatively, the owner reported that the dog was clinically normal. Laboratory tests revealed that the liver and pancreatic enzyme levels had returned to normal except slightly elevated ALKP level (Table 1). Follow-up ultrasonographic examination revealed no evidence of pseudocystic lesions within the pancreas (Fig. 1).

This report describes a case of successful diagnosis and omentalization of pancreatic pseudocyst with no postopera-

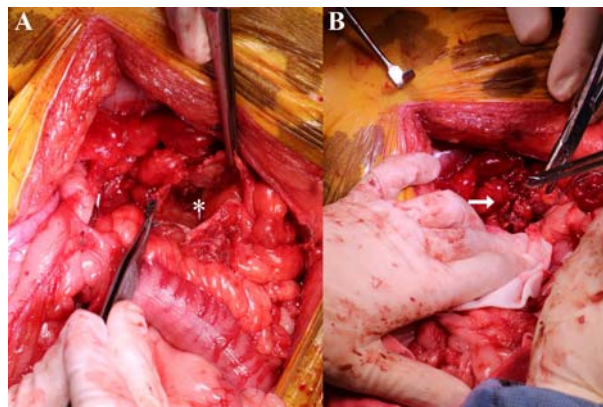


Fig. 2. Intraoperative photographs of omentalization of pancreatic pseudocyst in a dog. (A) The pancreatic pseudocysts in the left pancreatic limb were opened (*) with de-roofed superabundant tissue. (B) The omentum was packed into each cystic lesion (arrow) and then sutured to the wall of the cyst.

tive complications.

In human medicine, the diagnosis of pancreatic pseudocyst is to find a cystic-like lesion in the pancreas using ultrasonography or computed tomography and definitely diagnosed with histopathology [6]. Analysis of fluid from the cyst could help to make the diagnosis. Previous study in humans have shown that cystic fluid amylase and lipase content were variable but were generally high in pseudocyst and low in cystic tumor. The concentration of amylase enzyme was high in seven of seven pseudocysts (mean, 13,132 U/L) but was variable in cystic tumors (range, 33–288,830 U/L) and lipase level was high in most pseudocysts (mean, 15,730 U/L) and were low in cystic tumors [1, 8, 10]. In our case, the diagnosis of pancreatic pseudocyst was secured on the basis of cystic fluid and histopathologic examinations. There were no inflammatory cells or bacteria in the cystic fluid, and cytology revealed high amylase (865 U/L) and lipase (1,222 U/L) activity. Histopathologic examination revealed that the pancreatic tissue contained granulation tissue with chronic fibrosis.

There is limited information on drainage of a pancreatic pseudocyst in the veterinary literature. In human medicine, the recommendations for drainage of a pancreatic pseudocyst are as follows: (1) after 4–6 weeks of evaluation with abdominal ultrasonography, a regular follow-up is recommended if the size of a cyst is less than 6 cm and the patient is asymptomatic or the size of cyst decreases; and (2) a treatment is indicated if the patient is symptomatic when the size of the cyst is more than 6 cm or the cyst is infected [13]. The dog described here had worsening clinical signs and the lesion was 6 cm that is a point of criteria for an intervention, for pancreatic pseudocyst in human medicine. Therefore, a surgical drainage with the omentalization was performed and the postoperative course was uneventful.

The omentum is useful surgical tool because of its ability

to form new blood vessels and adhesions, drain lymphatic vessels, participate in immune function, and store fat [9, 11, 15]. In this case, omentalization allowed continuous drainage of secretions from the pancreatic parenchyma, create adhesion, and helped to protect against bacterial infection.

In summary, this report describes the diagnosis and treatment of a pancreatic pseudocyst. The diagnosis was made on imaging examinations, cytology of cystic fluid, and histopathologic examination. The omentalization of pancreatic pseudocyst showed improvement in clinical signs and no postoperative complications.

Acknowledgments

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