CASE REPORT

Therapeutic Management of Acute Pancreatitis in Three Dogs

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The pancreas is a tubuloalveolar gland (Watson, 2015) situated in the right cranial quadrant caudal to the stomach, composed of a left limb or lobe, which lies behind the greater curvature of the stomach and adjacent to the cranial aspect of the transverse colon; a right limb or lobe which lies just medial to the proximal duodenum and a body between these two limbs. It is composed of two types of cells responsible for endocrine and exocrine functions. The major function of the exocrine pancreas is the production, storage, and secretion of digestive enzymes important for the degradation of ingested proteins, fats, and polysaccharides which are subsequently released into the stomach and/or small intestine as food reaches these organs. The digestive enzymes produced by the pancreatic acinar cells are stored until the pancreas is stimulated to secrete them into the duodenum. Acute pancreatitis typically presents as a sudden, sterile inflammation marked by necrosis and edema. This condition does not cause permanent damage to the pancreatic structure and is entirely reversible. It is believed that acute pancreatitis arises mainly due to the improper activation of zymogens within the pancreas, leading to autodigestion, inflammation, and tissue necrosis. This document reports successful therapeutic management of acute pancreatitis in three dogs

Case History and Observations

Case 1: A 1-year-old Mongrel dog was brought to the small animal referral unit of Veterinary College, Namakkal (TN) with a history of anorexia, dullness, vomiting, praying posture and melena since last week. On general clinical examination, praying posture (Fig. 1) was observed and the conjunctival mucous membrane was congested. The rectal temperature was 38.7 °C. Haematology report revealed neutrophilia (68%) with leucocytosis (24.6 $\times 10^3$/cumm). Serum biochemistry profile revealed the elevated level of BUN (38 mg/dL), serum amylase (1073.9 IU/L) and serum lipase (536.6 mg/dL) with hypokalemia (2.5 mEq/L) (Table 1). Ultrasonography revealed the enlarged right and left pancreatic lobes (Fig. 2).

Case 2: A 2-year old male Mongrel dog was brought with the history of anorexia, vomiting for past 3 days. On general clinical examination, animal was dull and depressed, mucous membrane was pink and palpation of abdomen evinced severe abdominal pain. The rectal temperature was 39.1 °C, haematology revealed leucocytosis (29$\times 10^3$/cumm) with neutrophilia (80 %) and serum biochemistry revealed a marked increase in the level of BUN (35 mg/dL), serum amylase (1100 IU/L), serum lipase (956 mg/dL), and SNAP canine pancreatic lipase (SNAP cpl) was weakly positive (Fig. 3). On ultrasonographic examination, both right and left lobes of pancreas were enlarged significantly.

Case 3: A 2-year old male German shepherd dog was brought with the history of anorexia, vomiting for past 5 days, occasionally praying posture noticed by owner. On general clinical examination, animal was dull and depressed, mucous membrane was pink and palpation of abdomen evinced severe abdominal pain. The rectal temperature was 39.3° C, haeamtology revealed leucocytosis (30.73 $\times 10^3$/cumm) with neutrophilia (77 %) and serum biochemistry revealed a marked increase in the level of BUN (31.7 mg/dL), serum amylase (1145 IU/L), and serum lipase was 877 u/L, and SNAP cpl was weakly positive (Fig. 3). On ultrasonographic examination, both right and left lobes of pancreas were enlarged significantly.

Treatment and Discussion

All the dogs were treated for 7 days with Inj. Ringers lactate @ 10 mL/kg b. wt., i/v, Inj. Metronidazole @ 15 mg/kg i/v, Inj. Enrofloxacin @ 20 mg/kg i/v, Inj. Pantoprazole @ 1 mg/kg i/v, Inj. Ondansetron @ 1 mg/kg i/v and Inj Butorphanol @ 0.2 mg/kg b. wt., i/m. The owners were advised to follow the gastro protectant diet. Ultrasonography and haemato-biochemical profile were re-assessed after 7 days of treatment, which revealed significant improvement (Table 1). All the three dogs recovered completely by two weeks after treatment.

Fig. 1: Praying posture of the animal.

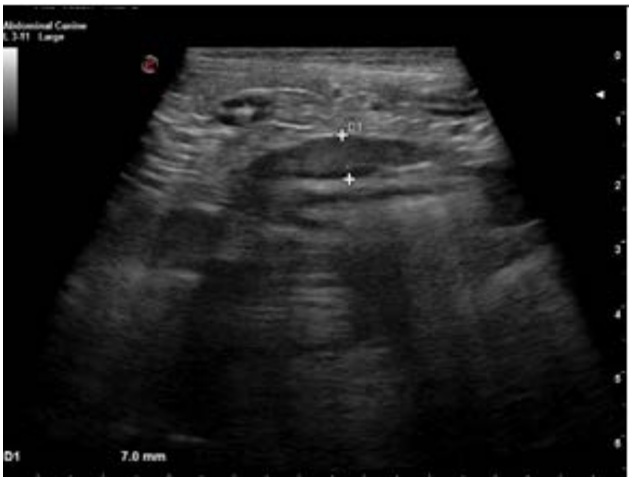

Fig. 2: Ultrasonography revealed the left lobe of pancreas

Fig. 3: Snap cpl weakly (a) and strongly (b) positive suggestive of pancreariti

Acute pancreatitis is the inflammation of the pancreas, it occurs as acute and chronic forms and both forms can occur in dogs. Acute pancreatitis a reversible condition doesn't disrupt the complete architecture of the pancreas. Inappropriate activation of zymogens mainly trypsin, within the pancreas, to their active form was the main reason of acute pancreatitis, which leads to autodigestion and necrosis of pancreatic tissue (Williams and Steiners, 2005). Ductal obstruction, oxidative stress, and hypotension are the major pathophysiology of acute pancreatits. Release of neutrophils in the circulation leads to systemic inflammatory responses and multiple organ dysfunction, *viz.*, acute kidney injury, and cardiac arrhythmia (Ettinger and Feldman, 2005). In the present study, based on history, clinical signs, haematology, serum biochemistry, SNAP-cpl and ultrasonography examination the cases were confirmed to have acute pancreatitis. The clinical signs especially the praying posture was noticed in case 1, whereas

Table 1: Haemato-biochemical profile of dogs affected with acute pancreatitis before and 7 days after treatment

Parameter	Dog 1		Dog 2		Dog 3	
	Before	After	Before	After	Before	After
Hb (g/dL)	11.7	13.1	14.0	13.7	15.8	16.0
PCV (%)	49.0	45.0	43.0	46.0	47.0	43.0
RBC (10^6/µL)	6.6	5.8	5.8	6.1	6.9	6.5
WBC (10^3/µL)	24.6	12.9	19.5	9.8	30.7	11.5
Granulocytes (%)	68	75	80	81	77	79
Lymphocytes (%)	28	20	16	15	20	17
Monocytes (%)	4	5	4	4	3	4
Thrombocytes (10^3/µL)	292	393	250	486	455	376
Total protein (g/dL)	6.5	6.6	6.9	6.3	7.8	6.9
Albumin (g/dL)	2.7	2.5	3.4	2.7	3.9	3.4
ALT (U/L)	64.0	34.0	83.0	45.0	48.6	25.0
SAP (U/L)	187	45	161	36	199	53
BUN (mg/dL)	38.0	20.0	35.0	17.0	31.7	15.0
Creatinine (mg/dL)	1.5	1.1	1.8	1.02	1.5	1.0
amylase (u/L)	1073	800	1100	700	1145	765
lipase (u/L)	980	660	956	650	877	480
triglycerides (mg/dL)	64	48	69	35	60	33
Potassium (mEq/L)	3.7	4.3	3.4	4.2	2.5	4.2
Sodium (mEq/L)	150	141	149	140	146	142

case 2 and case 3 displayed severe abdominal pain. In the present study both cases 2 & 3 had consistent neutrophilia and leucocytosis which could be due to local inflammatory reaction (Steiner, 2003).

An increased level of BUN in the serum biochemistry indicates the acute kidney injury (Hill and Van Winkle, 1993). In the present case the changes in BUN and Creatinine were minimal which came back to normal post-treatment. Serum lipase and amylase concentrations have been shown to increase in experimental and naturally occurring canine pancreatitis (Mansfield, 2013) which correlated with the present study. In case 2 & 3, SNAP - cpl was weakly positive, which was in accordance with the report of McCord *et al*. (2012) wherein they reported that specificity of pancreatic lipase (spec cPLTM and SNAP® cPLTM) to range from 80% to 97.5% thus confirming the case. Abdominal ultrasonographic examination in all three cases showed enlarged both right and left lobes and hypoechoic pancreas, as has been noticed by Mix and Jones (2006). Based on the above parameters, all three cases were diagnosed to have acute pancreatitis.

All three dogs were treated for 7 days with Inj. Ringers lactate @ 10 mL/kg b.wt., i/v for correcting the dehydration resulted from vomiting, anorexia and also prevent further activation of trypsin by reducing the pH (Bhoomagoud *et al*., 2009), Inj. Metronidazole @ 15 mg/kg i/v, Inj. Enrofloxacin @ 20 mg/kg i/v, Inj. Pantoprazole @ 1 mg/kg i/v for increasing pH, which further decreases the exocrine pancreatic stimulation (Bersenas *et al*. 2005). Inj. Ondansetron @ 1 mg/kg i/v was given to reduce the vomiting, Inj. Butorphanol @ 0.2 mg/kg i/m, synthetic opioid analgesic, used to reduce pain (Hess *et al*., 1998) and the owner was advised to follow the gastro protectant diet. Intravenous fluids therapy, antiemetics, antibiotics, antiulcer drugs, and analgesics were the line of treatment for acute pancreatitis. Dietary management was thought to be a main contributor for acute pancreatitis

In conclusion anorexia, vomiting, diarrhoea, melena, abdominal pain and praying posture were the major clinical signs of acute pancreatitis in dogs. Diagnosis was based on haematology, serum biochemistry, canine pancreas-specific lipase (cPLI), trypsin like immunoreactivity (cTLI), ultrasonography and pancreatic lipase immunoreactivity (PLI).

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