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Biomarkers and Acute Phase Proteins in Dogs with Gastro Intestinal Emergencies

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Abstract

Acute abdomen is a sudden onset of abdominal pain which develop due to multiple etiologies. Among those etiologies gastrointestinal emergencies are considered to be common cause of acute abdomen in dogs. Seventeen dogs had gastrointestinal emergencies which included gastric dilatation and volvulus, foreign body, intussusception and acute pancreatitis. Parameters like haematology, biochemistry, blood gas analysis and acute phase proteins and biomarkers were collected and analysed statistically. Biomarkers were analysed in both survivor and non survivor dogs. The findings highlighted the significance of acute phase proteins and biomarker in predicting the outcome of survivor in acute abdomen dogs with gastrointestinal emergencies.

Keywords: Acute abdomen, GI emergencies, Biomarkers, Predictor

Gastrointestinal emergencies constitute a large and clinically important among acute abdominal syndrome in dogs. Common GI emergencies include gastric-dilatation and volvulus, intussusception, gastrointestinal perforation and acute pancreatitis (Mazzaferro, 2003). Blood lactate concentration is widely used as a marker of tissue hypoperfusion and hence serves as a predictor for outcome in dogs with shock, GDV, sepsis and other severe abdominal emergencies, serial evaluation of lactate help to assess treatment response and ocutcome of acute abdomen dogs (Mooney *et al.,* 2014). This study reports the usefulness of acute phase protein and biomarkers in predicting the outcome of the patient.

The study was conducted in the clinical cases presented to the critical care unit of Department of Veterinary Clinical medicine of Madras Veterinary College for a period of one year. The total of 6 apparently healthy dogs were included under Group I (control group) and 17 dogs with acute gastrointestinal emergencies were included under Group II. Dogs in both groups were subjected to detailed clinical, physical examination, haematology, serum biochemistry, blood gas analysis, radiography and ultrasonography. General and detailed physical examination were done as guided by Heeren *et al*. (2004). All the vital parameters like temperature, heart rate, respiratory rate, CMM, CRT, STT were recorded. SpO_2 and ECG were recorded in acute abdomen dogs. Blood gas analysis was analysed in epoc® blood analysis system and acute phase proteins like CRP, procalcitonin, Interleukin-6 and biomarkers like D-dimer were analysed using i-chroma III analyser with the principle of Fluorescence immune assay. Abdomen lateral radiography and abdominal ultrasonography using basic ultrasound scanner (Aeroscan CD 25) were performed as per standard protocol. All the patients were initially stabilised and were treated based on aetiology.

Seventeen dogs with gastrointestinal emergencies were grouped into GDV (35.29 %, 6 cases) acute pancreatitis (23.52 %, 4 cases), foreign body (17.65 %, 3 cases), intussusception (17.67%, 3 cases) and haemorrhagic enteritis (5.88 %, 1 case) (Fig.1). Deep chested breed such as Great Dane, Saint Bernard, Dobermann and German Shepherd (one case each) were presented with GDV as reported by Brockman *et al*. (1995). The predominant clinical signs noticed were respiratory distress (77.78 %, 28 cases) and pain on abdominal palpation (72.22 %, 26 cases). Distended abdomen and abnormal posture were recorded in (each 55.55%, 20 cases). Other signs observed were vomiting (69.44 %, 25 cases), diarrhoea (41.66 %, 15 cases), and melena (38.89 %, 14 cases). Less common signs observed were haematemesis (13.88 %, 5 cases), haematochezia (8.33 %, 3 cases) and oliguria (8.33%, 3 cases). There was significant increase in plasma lactate concentration in dogs with acute abdomen and was in agreement with report of Manosalva *et al*., (2022) who observed similar changes. Mooney *et al*. (2014) found that high serum lactate concentration have been identified as a strong predictor for survival of patients with acute abdomen. There was highly significant increase in serum CRP concentration in dogs with acute

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abdomen in the present study. According to Manosalva *et al*. (2010), CRP concentration increased in cases like GI perforation, peritonitis, pancreatitis or splenic torsion.. There was significant increase in level of procalcitonin in acute abdomen dogs with gastrointestinal disease when compared to other causes of acute abdomen and was in agreement with the reports of Giunti *et al.* (2010). The ultrasonographic changes observed in acute pancreatitis were hypoechoic pancreatic parenchyma and hyperechoic peripancreatic fat. Xenoulis (2015) also recorded similar ultrasonographic finding in acute pancreatitis dogs. In summary, in the present study the acute phase proteins and biomarkers such as CRP, procalcitonin, lactate, interleukin-6 and D-dimer concentration were remarkably higher in non-survivors than survivor.

Table. 1 Biomarkers (Mean ± S.E value) in dogs with acute abdomen

Parameters	Group I Control group n = 6	Group II Dogs with GI emergencies n= 17	t value	F value
Lactate (mmol/L)	0.65 ± 0.11	4.83 ± 0.73	-3.31	0.00*
C- Reactive Protein (mg/L)	4.78 ± 0.44	58.45 ± 6.31	-4.96	0.00*
D- dimer (µg/dl)	0.15 ± 0.02	0.50 ± 0.06	-3.21	0.00*
Interleukin – 6 (pg/mL)	5.65 ± 0.50	101.07 ± 11.15	-5.00	0.00*
Procalcitonin (pg/mL)	19.20 ± 0.94	70.02 ± 6.80	-4.36	0.00*

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