

Duodenoscopic appraisal of duodenal ulcer in dogs

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Abstract

Aim: To assess the usefulness of duodenoscopy in the diagnosis of duodenal ulcers in dogs.

Materials and Methods: Sick dogs with chronic gastrointestinal problems were physically examined and samples were collected for haematology, biochemistry and faecal examination. Duodenal biopsies, duodenal contents and brush cytology were obtained via duodenoscopy.

Results: Seven duodenal ulcers cases were recorded, higher incidences was recorded in Labrador retriever, 2-4 years of aged male dogs. Significantly decreased Hb (9.10 ± 0.25 g/dl), RBCs (4.39 ± 0.19 mill/cu.mm) and albumin ($2.343b \pm 0.13$ g/dl) level were noticed. Hyperaemia with ulceration of duodenal mucosa was observed.

Conclusion: Duodenoscopy is very much useful for detection of duodenal ulceration and provided a sensitive technique for early diagnosis of mucosal lesions and ulceration.

Key words: Dog, Duodenal ulcer, Duodenoscopy

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Introduction

A chronic small intestinal disorder of dog is the major contributor to canine gastrointestinal disorders. The majority of small intestinal disorders are occurring in the duodenum such as ulcer, inflammatory bowel disease (IBD) and small intestinal bacterial overgrowth (SIBO) [1]. Factors like ulcerogenic drugs, stress factors, neurological disease, entrogastric reflux, renal disease, hepatic disease, mucosal ischemia, primary gastroduodenal neoplasia, mastocytoma and gastrinoma were associated with development of gastroduodenal ulceration and erosions [2]. Duodenal ulcers are difficult to identify clinically because of the non-specific symptoms. They may or may not be identifiable through routine radiographic, ultrasonographic or laboratory evaluation methods, because many diseases of duodenum primarily involve the mucosal surface [3].

Endoscopic examination of the upper gastrointestinal tract has been used increasingly as a diagnostic tool in small animal practice. Use of this procedure has led to an early diagnosis of chronic gastrointestinal disease and better understanding of their pathophysiology [4]. Duodenoscopy is an efficient

way of identifying the abnormalities of proximal small intestinal mucosa including mucosal irregularities, distortion, ulceration, neoplasia, inflammation and other mucosal disorders of the duodenum [5]. Duodenoscopy is also useful for obtaining mucosal biopsy and duodenal juice for routine histopathological and bacteriological studies [6]. The aim of the study was to assess the usefulness of duodenoscopy in the diagnosis of duodenal ulcer in dogs.

Materials and Methods

The study has been conducted in clinical cases and no such experimental model has been created / used in this study. The endoscopic procedure and collection of biopsy, cytology and duodenal contents were done aseptically following standard procedure as per CPCSEA norms.

The study was conducted at the Department of Veterinary Clinical Medicine, Ethics and Jurisprudence, Madras Veterinary College Teaching Hospital, Chennai. Apparently healthy dogs submitted for routine clinical examinations were randomly selected to obtain normal data for the parameters under study. Dogs with

Table-1. Mean \pm SE of Haemato- biochemical and Bacterial colony counts in healthy and diseased animals

Parameters	Healthy	Duodenal ulcer
Hb g/ dl	12.33 ^a \pm 0.61	9.10 ^b \pm 0.25**
PCV %	39.83 \pm 0.53	36.143 \pm 3.27
RBC (mill/cu.mm)	6.48 ^a \pm 0.26	4.39 ^b \pm 0.19**
MCV (fl)	61.29 \pm 2.31	58.84 \pm 0.007
MCH (pg)	17.90 \pm 1.89	20.24 \pm 0.79
MCHC (%)	32.29 \pm 1.61	27.82 \pm 2.83
Platelets X 10 ⁵ / μ l	1.984 \pm 0.09	1.42 \pm 0.03
BUN (mg/dl)	20.68 \pm 1.82	22.28 \pm 2.85
Creatinine (mg/dl)	0.823 \pm 0.06	1.16 \pm 0.22
ALT (IU/L)	44.973 \pm 6.92	45.379 \pm 7.01
ALP (IU/L)	64.24 \pm 7.57	68.64 \pm 3.80
Total Protein (g/dl)	6.17 \pm 0.26	6.54 \pm 0.48
Albumin (g/dl)	3.00 ^a \pm 0.21	2.343 ^b \pm 0.13*
Globulin (g/dl)	3.142 \pm 0.11	4.197 \pm 0.53
Bacterial counts x 10 ⁵ cfu/ml	0.98 \pm 0.03	0.96 \pm 0.04

Means showing the same superscript in the column do not differ significantly ** - Highly Significant. ($P \leq 0.01$) * - significant ($P \leq 0.05$)

clinical signs persistent/ chronic intermittent vomiting, diarrhoea, haematemesis and melena (for more than three days) suggestive of gastrointestinal disease were physically examined and samples taken for hematology, biochemistry and fecal examination. Duodenal biopsies, duodenal contents and brush cytology were obtained via gastroduodenoscopy.

Duodenoscopic study was conducted with Video endoscope, Karl Storz type No. 60914 PKS (Germany), with an outer diameter of 9.8 mm, biopsies channel diameter of 2.8 mm and endoscopic images were captured digitally by using the software of IMIMO. Preparation and restraining of the patient was done as suggested by Zoran [3] and Tams [7]. Four to six representative biopsy samples were taken by using pinch biopsy forceps [8] and samples were processed for histopathological examination as per Sancho *et al.* [9] and interpretation as per Day *et al.* [10].

Brush cytology smears were collected by cytology brushes enclosed in a plastic protective sheath and the smear stained with Giemsa. About 0.25 ml to 1.0 ml of duodenal contents was collected in a sterile test tube by a sterile plastic catheter inserted through an endoscope operating channel [11]. The collected duodenal contents (0.1ml) were serially diluted up to 10⁶ for aerobic culture and 0.1ml of each dilution transferred to nutrient agar plates and incubated at 35°C for 24 hrs and bacterial colonies were counted with colony counter [12]. The collected duodenal contents were cultured for isolation and quantification of bacteria. Faecal samples were also collected and subjected to gross and microscopic examination as per Broussard [13]. The data obtained in this study were

analysed by using Independent sample test [14].

Results and Discussion

Total number of dogs brought to Madras Veterinary College Teaching Hospital irrespective of nature of diseases were 22,240 during the course of the study (two semesters). 3610 (16.8 %) dogs had gastro intestinal disorders and 7 cases (0.19 %) had duodenal ulcers. In the present study male dogs had more incidence and most of the duodenal ulcers were found in 2-4 years of age. There was no apparent sex predilection in duodenal ulcer [15]. Breed wise Labrador Retrievers (57 %) followed by mongrels (29%) and Boxer (14%). Breeds commonly affected with duodenal ulcer were mixed breeds [15], Labrador Retriever, Rottweiler and Doberman [16].

All the seven dogs showed vomiting as a predominant clinical sign followed by anorexia (57%), weight loss and abdominal pain (43% each), lethargy and haematemesis (28 %each). Diarrhoea, dehydration anaemia, melena, smell in faeces and previous treatment of Non-steroid anti-inflammatory drugs (14 % each) were also recorded in duodenal ulcers. These findings were similar to the observations of various authors who documented clinical signs such as vomiting, weight loss and abdominal pain [15], haematemesis, anaemia and abdominal pain [17]. Leib and Matz [18] stated that these signs were because of gastrointestinal haemorrhage due to ulceration.

The mean \pm SE of haematology, serum biochemical and bacterial count values are given in Table-1. Highly significant decrease in haemoglobin and red blood cell count were noticed. Normocytic



Figure-1. Ulceration in proximal portion of duodenum



Figure-1a. Ulceration in descending portion of duodenum

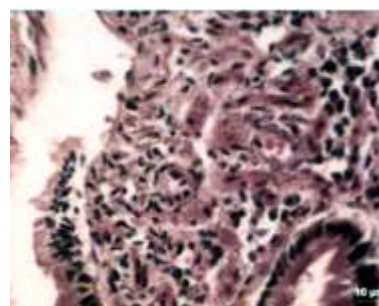


Figure-2. Discontinuity in villus mucosa with moderat MNC infiltration H&E Bar=10µm

normochromic anaemia observed in dogs with duodenal ulcer could be due to short term gastro intestinal blood loss [19].

A significant decrease in the albumin value (Table-1) was noticed. Jergens *et al.* [15] stated that hypoalbumina in duodenal ulcer might be due to blood loss, ulceration and malabsorption of nutrients.

The endoscopic appearance of duodenum in healthy animals showed velvety or slightly grainy, smooth and uniform pink color. Endoscopic findings of duodenal ulcer showed hyperemic mucosa and duodenal ulceration in all the seven dogs (Fig. 1 & 1a), followed by 29 % of the dogs had friable duodenal mucosa. Dowdle *et al.* [20] opined that duodenoscopy was more accurate for detecting sub clinical gastroduodenal ulceration and provided a sensitive technique for early diagnosis of mucosal lesions and ulceration in the gastroduodenal area. Richter [21] described that endoscopic appearance of duodenal ulcer appeared as deep or shallow crater and demarcated with the surrounding mucosa. Leib [22] observed that endoscopic appearance of duodenal mucosa was hyperemic and ulcerated in duodenal ulceration cases and had increased friability and granularity in non ulcerated duodenitis.

Histopathologically, all the animals revealed mucosal ulceration, loss of epithelium (Fig. 2), followed by neutrophilic and monocytic infiltration (71 %) and necrosis of duodenal epithelium (43 %) of the cases. These findings correlated with Dowdle *et al.* [20] who stated that infiltration of neutrophil and macrophages indicated inflammation, disruption of mucosal lining and haemorrhage into the mucosa. Leib and Matz [18] reported that endoscopic examination was the best way to diagnose duodenal ulcer and multiple biopsy samples should be collected from the edges of ulcers to eliminate the presence of neoplasia.

In the present study, cytological examination revealed normal cluster of epithelial cells in healthy

animals and vacuolar degeneration of epithelial cells with mononuclear cell (MNC) infiltration in duodenal ulcer. Jergen *et al.* [23] reported that cytologic examination of exfoliative specimen obtained during endoscopy was a useful and reliable adjunct to histologic examination of biopsy specimen in gastro intestinal tract disease. There were no significant changes in bacterial counts. In faecal examination no parasites were seen.

Conclusion

Duodenal ulcer can be successfully managed if diagnosed and treated earlier. Duodenoscopy is very much useful for detecting duodenal ulceration and provided a sensitive technique for early diagnosis of mucosal lesions and ulceration.

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Competing interest

Authors declare that they have no competing interest.

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