



NEOPLASTIC DISEASE: REVIEW ARTICLE

Canine Gastric Pathology: A Review

I. Amorim^{*,†,‡}, M. A. Taulescu[§], M. J. Day^{||}, C. Catoi[§], C. A. Reis^{*,†,‡,¶},
F. Carneiro^{*,‡,¶,#} and F. Gärtner^{*,†,‡}

**Instituto de Investigação e Inovação em Saúde, Universidade do Porto, †IPATIMUP – Institute of Molecular Pathology and Immunology of the University of Porto, Rua Rua Júlio Amaral de Carvalho nr. 45, ‡Institute of Biomedical Sciences Abel Salazar (ICBAS), University of Porto, Rua Jorge Viterbo Ferreira nr. 228, Porto, Portugal, §Pathology Department, Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania, ||School of Veterinary Sciences, University of Bristol, Langford, Bristol, UK, ¶Faculty of Medicine, University of Porto, Alameda Prof. Hernâni Monteiro and #Department of Pathology, Centro Hospitalar de São João, Porto, Portugal*

Summary

Gastric disorders are common in dogs and are a major reason for veterinary consultation. In human medicine, the classification of gastric diseases based on histological features, genotypes and molecular phenotypes helps to better understand the characteristics of each subtype, and to improve early diagnosis, prevention and treatment. Canine gastric lesions often show strong histological similarities to their human counterparts. However, such conditions in the canine stomach are poorly studied and their cellular and molecular features are largely unknown. This article reviews the histopathological classification of inflammatory and neoplastic lesions of the canine stomach and provides an update on the application of molecular techniques within the field of canine gastric pathology. The canine disorders are compared with current knowledge of the equivalent human diseases.

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Correspondence to: M. Taulescu (e-mail: taulescumarian@yahoo.com).

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Introduction

Canine gastric disease is typically the result of inflammation, including ulceration, obstruction or neoplasia. Canine gastritis is categorized and graded subjectively according to the nature of the predominant cellular infiltrate and the presence of architectural abnormalities (Day *et al.*, 2008). By contrast, the term ‘gastropathy’ is used to refer to a non-specific injury pattern of the gastric mucosa, with minimal or no inflammatory cell infiltration (Dixon *et al.*, 1996). In man, the development of gastric carcinoma often involves a sequence of events, starting with mild non-atrophic gastritis and progressing through stages of chronic atrophic gastritis (CAG), intestinal metaplasia, dysplasia and, ultimately, gastric adenocarcinoma. This sequence of events has been described as the ‘Correa model’ (Correa, 1992). In veterinary medicine such sequential pathogenesis is not yet defined, although metaplastic and dysplastic changes are also recognized in the canine stomach (Head *et al.*, 2003). Canine gastric neoplasia has been well described and is now beginning to be explored at the molecular level. The purpose of this report is to review the classification, pathophysiology and gross and histopathological findings of the most common canine gastric lesions.

Acute Gastritis

Gastritis is defined as inflammation of the stomach. In pathological terms this usually involves the mucosa. It is, however, a term often used loosely for clinical conditions associated with any upper gastrointestinal (GI) manifestations without specific clinical or radiological changes. In dogs, the sudden onset of vomiting suspected to be associated with gastric mucosal injury or inflammation is generally referred to as ‘acute gastritis’. The cause is commonly inferred from the clinical history, but the diagnosis is rarely confirmed

by biopsy and the treatment is mainly symptomatic and supportive, rather than disease specific (Simpson, 2013).

Generally, acute gastritis is associated with long-term intake of some drugs (e.g. non-steroidal anti-inflammatory drugs [NSAIDs]), severe stress (e.g. trauma, surgery), ischaemia and shock, systemic infections and mechanical trauma (e.g. intubation-associated mucosal lesions). There is little evidence to support a role for any infectious agent in acute gastritis (Brown *et al.*, 2007; Simpson, 2013).

Gastric foreign bodies are very common in dogs and tend to be seen in younger animals (Sullivan and Yool, 1998). If the foreign body becomes lodged in the pylorus, the animal will present with acute onset clinical signs. However, in many cases, the object will remain in the body of the stomach where it may cause mucosal injury (Sullivan and Yool, 1998; Wilcock, 2013).

The International Gastrointestinal Standardization Group of the World Small Animal Veterinary Association (WSAVA) has provided guidelines for the normal histology of the stomach (Day *et al.*, 2008). The guidelines suggest that neutrophils should not be present in the normal canine gastric mucosa, so their presence generally suggests an acute inflammatory process, which may or may not involve mucosal ulceration.

Chronic Gastritis

Chronic gastritis (CG) is defined clinically as intermittent vomiting with duration of more than 1–2 weeks (Dowdle *et al.*, 2003). The diagnosis is confirmed by microscopical examination of gastric biopsy samples and is subclassified according to the histopathological changes and aetiology. For the histological diagnosis of gastritis, an increase in mucosal leucocytes accompanied by other evidence of inflammation such as hyperaemia, oedema and

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