Periodontal disease in a 15 year old Jack Russel bitch: A Case Report

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J56/64630/2010

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ABSTRACT:

A 13 year old Jack Russell bitch was presented to the University of Nairobi Small Animal Clinic with a history of halitosis and a persistent cough. Physical examination of the patient revealed presence of dental plaque which had covered an extensive portion of the tooth crown in a majority of the teeth. Auscultation of the lungs revealed harsh lung sounds audible in the apical lobes. Thoracic lateral and dorso-ventral views showed slight increased radioopacity of the apical lobes. Lateral and oblique views of the head showed increased radioopacity of the teeth crowns with no attachment loss at the gingiva. The dog was admitted for treatment of trachea-bronchitis and dental tartar. Dental scaling was done under general anesthesia. Patient recovered and was discharged 4 days later.

INTRODUCTION

Periodontal disease is described as a multifactorial infection that results from the interaction of the host defense mechanism with plaque microorganisms. Periodontal disease refers to a group of inflammatory diseases caused by bacterial plaque in the periodontium. The disease can range from early stage gingivitis to an advances periodontitis (Albuquerque et al, 2012). Factors leading to progression of periodontal disease include; plaque, calculus, species, breed, genetics, home dental care, chewing behavior, saliva, local irritants, age and general health. The breed, increasing age and neutering are risk factors associated with periodontal disease. Periodontal disease has a higher incidence in small breeds, with the Toy Poodle having the highest relative risk of 3.8 and the Jack Russell having 1.8( Shearer P ).The primary cause is however dental
plaque. Other factors which contribute to the accumulation of plaque include: feeding of soft foods, absence of oral hygiene, malocclusions of the teeth (especially in brachycephalic breeds), decreased resistance to infectious disease, nutritional disturbances, immunodeficiency and overcrowding of teeth (Albuquerque et al, 2012). Calculus is mineralized dental plaque that adheres to the tooth surfaces and prosthetic dental materials. Accumulation of plaque is more on the buccal surface of the maxillary teeth with the most severely affected being the carnasial teeth. Dental plaque affects periodontal disease by aiding in the bacterial adherence near the gingival margin.
Fig 1. Lateral and oblique views of the head showing increased opacity of the teeth structures with no attachment loss of the periodontal membrane.
CASE HISTORY AND MANAGEMENT

A 10 kg 13 year old Jack Russell bitch (case no 36015) was presented to the University of Nairobi Small Animal Clinic with a history of halitosis and intermittent cough. Physical examination revealed that all vital parameters were within normal range. The de-worming and vaccination history were up to date. Examination of the buccal cavity revealed presence of dental plaque which had covered an extensive portion of the carnasial and molar teeth crown. The mouth breath was fetid. Auscultation of the lungs revealed harsh lung sounds in the apical lobes. Palpation of the trachea found the cough to be inducible. Thoracic lateral and dorso-ventral views showed slight increased radioopacity of the apical lobes lateral and oblique views the head showed increased opacity of the teeth affected by callus deposition. Sedation was achieved by 2% xylazine hydrochloride at a dose rate of 1mg per kilogram body weight and maintained with ketamine at a dose rate of 2mg per kilogram body weight (lower dosage was used due to the advanced age of the animal and compromised respiratory system). Scaling was done under light sedation due to the compromised respiratory status and the age of the animal making it a poor anesthetic risk. The teeth were scaled using hand held scalers and the gross callus broken down by use of extractors. The tooth area was cleaned with a 1:1 dilution of hydrogen peroxide which acts as an oxidizing agent and bleaching agent for the teeth. In addition the hydrogen peroxide acts as a germicide to kill the bacteria adhering to tooth surface. Chlorhexidin antiseptic was used to disinfect the wounded edges of the sub-gingival tissue.
Post operative management involved antibiotics such as metronidazole (Flagyl ® 200mg) at a dose rate of 25mg per kilogram body weight for 7 days (150mg bid, total dose of 2100mg per os). A pre-operative dose of amoxicillin trihydrate (Betamox®) 150mg and dexamethasone (Colvasone ®) 2mg was administered intramuscularly to cater for the tracheobronchitis infection. The patient recovered and was discharged 6 days thereafter.

**DISCUSSION**

The salivary glycoprotein covering the teeth acts as the nidus for plaque formation as bacteria adhere and become established in the pellicle. Plaque is an organic matrix of salivary glycoproteins, oral bacteria and extracellular polysaccharides (bacterial by-products) that attaches to the surface of the tooth. Polysaccharides and glycoproteins provide attachment for the plaque forming bacteria (Actinomyces sp., and streptococcus sp.) on the tooth surface. Inorganic components of the supragingival plaque matrix are provided mainly by foodstuffs and saliva (Logan E.). They include phosphorus and calcium with little amounts of magnesium, potassium and sodium. The total inorganic content of early plaque is very low but it gradually increases as the plaque is covered by calculus due to calcium deposition. Fluoride may also be incorporated into the plaque and is sourced from water, toothpaste, gels, food and other oral solutions. It may act in deterrent of plaque bacterial metabolism, kill bacteria and aid in the mineralization of enamel and dentin. Teeth act as a suitable surface to which bacteria can accumulate. Polysaccharides from bacterial by-products give plaque the characteristic ivory to yellowish to grayish appearance (Brook A.N). The proliferation of periodontopathogens leads to inflammation of the gingiva and may even cause irreversible damage to the gingiva. The
multiplying pathogens release toxins and enzymes which cause degradation of the connective tissue. This degradation may cause damage and lead to alveolar bone loss with subsequent tooth loss or systemic disease once the vasoactive substances from the bacteria enter the circulatory system (Shearer P).

Diagnosis of periodontal disease is made based on the presenting history, clinical signs exhibited and oral examination. Radiographic evaluation of the teeth is used to determine the extent of trauma and tooth pathology of structures beneath the gum. Dental radiography uses special dental films and dental X-ray machines with a small aperture for teeth. Normal sized radiograph machines may also be used but oblique views are preferred due to the superimposition of teeth onto each other (Logan E).

Common signs of periodontal disease include; gingivitis, plaque and calculus, purulent exudates, halitosis, ulcerations, loss of gingival stippling, gums that bleed easily when probed, loss of bone around teeth, gum recession, tooth mobility, tooth migration, tooth loss, change of architecture of gingival papillae, tooth extrusion and pocket formation around teeth (Shearer 2006).

The severity of the signs exhibited leads to the classification of periodontal disease into several categories (Albuquerque et al, 2012).

Stage 1 periodontal disease (gingivitis) this is characterized by gingivitis with significant calculus deposits and minimal gingival inflammation. Some cases may have profuse inflammation with little plaque and calculus present.

Stage 2 periodontal disease (early); there are initial signs of destructive periodontitis. Probing and radiographic examination may show signs of attachment loss.
Stage 3 periodontal disease (moderate); there is attachment loss of 25-50% of the root length. Probing and radiographic signs are more pronounced.

Stage 4 periodontal disease (severe); attachment loss is more than 50% with infra-bony pockets localized to single areas as deep palatal pockets in the maxillary teeth. Bone destruction due to plaque metabolites averages 1.5-2.5mm.

Other types of classification include pathobiological classification which categorizes periodontitis into Adult (AP), Rapidly progressive (RPP), localized juvenile (RJP), prepubertal (PP) and refractory rapidly progressive (RRPP) (Albuquerque et al, 2012).

Treatment of periodontitis is aimed at removal of plaque and calculus and subsequent prevention of recurrence. It can be divided into professional prophylaxis, antimicrobial therapies, periodontal surgeries, dental surgeries and home prophylaxis. The extent of treatment varies with the extent of periodontitis.

**CONCLUSION**

The occurrence of dental calculus in the small breed such as the Jack Russell as in the case report was due to several predisposing factors: breed, age and poor dietary supplementation. Whereas dental scaling offers a temporary relief of the periodontal disease, regular home care cleaning and change in the feeding types will be required for the long term management of the disease due to the predisposing factors encountered. The use of special formulated diets and chews and dental treats will prevent the accumulation of plaque of the tooth surface.
REFERENCES


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