

An unusual squamous cell carcinoma in a sheep: a case report

Abdul Rasool Namjoo · Sarang Soroori · Mahdi Farid ·
Hosein Nourani

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Abstract Squamous cell carcinoma (SCC) is a tumour consisting of squamous epithelial cells. This tumour is common in horses, cows, cats and dogs, but relatively uncommon in sheep, goats and pigs. In this study, we discuss gross, radiological and histopathological features of an oral SCC in a female sheep. A 3-year-old ewe with a progressive mass located in the intraoral cavity and with a history of reduced appetite, weight loss, salivation and halitosis was referred to the veterinary clinic. At clinical examination, a mass was located in the floor of the mouth, its surfaces showed signs of ulceration and haemorrhage. Lateral radiograph of the mandible region near the tumour showed bone destructive changes. Biopsy specimen was taken and histopathologic examination showed moderately differentiated oral SCC.

Keywords Oral · Moderately differentiated squamous cell carcinoma · Sheep · Case report · Histopathology

A. R. Namjoo (✉)
Department of Pathobiology, Faculty of Veterinary Medicine,
Islamic Azad University,
Shahrekord Branch, P.O. Box 166, Shahrekord, Iran
e-mail: namjoo_ar@iaushk.ac.ir

S. Soroori
Department of Clinical Sciences, Faculty of Veterinary Medicine,
University of Tehran,
Tehran, Iran

M. Farid
Department of Clinical Sciences, Faculty of Veterinary Medicine,
Islamic Azad University,
Shahrekord Branch,
Shahrekord, Iran

H. Nourani
Department of Pathobiology, Faculty of Veterinary Medicine,
Shahrekord University,
Shahrekord, Iran

Introduction

Oral squamous cell carcinoma (SCC), a primary malignant neoplasm of the stratified squamous epithelium of the oral cavity and pharynx can occur in any species (Gelberg 1997). It has a high incidence rate and has been reported in all species of domestic animals but with a higher frequency in horses, dogs and cats (Gelberg 2007) especially in adults and old animals (Stannard and Pulley 1978). Oral SCC is a common malignancy of the oral cavity in cats (Gelberg 2007; Munday et al. 2009) and dogs (Gelberg 1997) but is rare in sheep (Ridler and West 2007). Squamous cell carcinoma may involve the epithelium of the tonsillar crypts, the gingival or ventrolateral surface margins of the tongue (Gelberg 1997) and the floor of the mouth, lower lip and soft palate (Mark et al. 2005). Anatomical regions such as the ears, eyes, nose, perineum and areas deprived of wool and pigmentation are especially affected (Del Fava et al. 2001; Ladds and Entwistle 1977). SCC in sheep has been reported in Australia (Vandegraaff 1976; Hawkins et al. 1981; Ladds and Entwistle 1977), South Africa (Tustin et al. 1982), Saudi Arabia (Ramadan et al. 1991) and France (Del Fava et al. 2001). In Brazil, an outbreak was reported at Rio Grande do Sul State (Del Fava et al. 2001). Only one SCC of the oral cavity has been reported in the sheep (Foreyt et al. 1991). The aetiology of this tumour is unknown but it was suggested that the papillomavirus is associated with the progression of SCC in feline gingival epithelial cells (Munday et al. 2009) and the perineum of sheep. Tilbrook et al. (1992) further demonstrated that ovine papillomavirus was more closely related to bovine papillomavirus type 2 than to bovine papillomavirus type 1 (Trenfield et al. 1990). The characteristic histological features help in achieving an accurate diagnosis that may be misdiagnosed as acanthomatous epulis of the periodon-

tium, oral papillomas (Jones et al. 1997), basal cell tumour (when ulcerated) and various granulomas (infectious, foreign body) (Scott 2007). The purpose of the case report was to describe the gross, histopathological and radiological characteristics of naturally occurring oral SCC in a sheep from the Chahar Mahal and Bakhtiari Province.

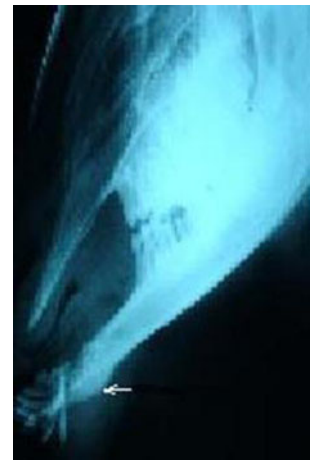
Case history

A 3-year-old Lori-Bakhtiari ewe with a whitish large swelling, involving the floor of the mouth, with a history of reduced appetite, weight loss, halitosis and salivation was referred to the veterinary clinic of Islamic Azad University of Shahrekord. Under clinical examination, body temperature, heart rate and respiratory rate were normal. Intraoral clinical examination revealed an exophytic mass consisting of hyperplastic granulation tissue which was located in the floor of the mouth at the back of the incisor teeth which had caused displacement of the left second intermediated and corner incisors (Fig. 1). The ulcerated mass, measuring almost 4.5×2.5 cm, was irregular and had a raised surface, firm in consistency and extremely painful upon palpation. The surface of the neoplasm was ulcerated with a severe superficial purulent inflammation (approximately 1.2 mm deep). The submandibular lymph nodes were normal in size of about 2.5 cm. They were tender and not adhered to the underlying structures. Gross examination and evaluation of the abnormal tissue X-ray of the mandible were performed and a surgical biopsy was taken under local anaesthesia. Lateral radiograph of the mandibular region adjacent to the mass revealed bone-destructive changes as moth-eaten lysis with the destruction of mandible cortex and also bone proliferation changes on the cortices (Fig. 2). These radiographic signs could be associated with aggressive lesions. The thoracic radiography for the evaluation of metastatic lesions in pulmonary parenchyma did not show any abnormality. For histopathological examination, a

Fig. 1 Oral squamous cell carcinoma



Fig. 2 Lateral radiograph of the mandibular region adjacent to the mass



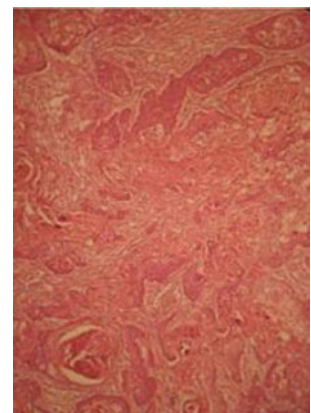
biopsy was performed and immediately fixed in 10% neutral buffered formalin, embedded in paraffin wax, sections cut at 5 μm and stained with haematoxylin and eosin.

Histological examination of the excision biopsy showed irregular cords and a significant number of clusters of pleomorphic neoplastic cells that proliferated downward. Tumour cells were large and pleomorphic and nuclei were oval and stippled or vesiculated with an increased nuclear-to-cytoplasmic ratio. Nucleoli were rather prominent and islands of tumour cells often separated by a fibroreticular stroma mixed with chronic inflammatory cells. Morphological features of individual cells showed keratinization, occasionally keratin pearls, necrosis, haemorrhage, numerous mitotic figures and apoptotic bodies were observed in some sections. The gross and histopathological characteristics of the tumour resulted in a diagnosis of a moderately differentiated oral SCC (Figs. 1, 2, 3).

Discussion

Oral SCC is a relatively uncommon malignancy in sheep, but often seen in horses, dogs and cats (Gelberg 2001;

Fig. 3 Histopathologic evaluation showing irregular cords and a significant number of clusters of pleomorphic neoplastic cells (H&E×100)



Ridler and West 2007). SCC occasionally occurs with invasion in to the surrounding tissues (Ridler and West 2007). Usually, the SCC arises from the gums and causes interference with mastication. They occur most commonly in aged animals and probably arise from alveolar epithelium after periodontitis has caused chronic hyperplasia (Radostits et al. 2000). Also, gross lesions of oral SCC may resemble basal cell tumours and various granulomas (Scott 2007). Surgical biopsy is the standard method for the diagnosis of suspected lesions of the oral cavity (Mehrotra et al. 2006) and assessment of bone involvement by tumour diagnosed by clinical examination and radiographic studies (El-Mofty et al. 2009).

SCC has been divided into subtypes based on the cytological finding and degree of keratinization (Elsheikh et al. 2009). On the basis of cytologic findings and degree of keratinization, SCCs were classified as: well differentiated (Brown et al. 2006), moderately differentiated (Schuh 1986) and poorly differentiated (Brown et al. 2006). Well-differentiated tumours have frequent individual cell keratinization and prominent lamellated keratin pearls appear concentrically (Brown et al. 2006). The moderately differentiated neoplasms present large nuclei with irregular nuclear membranes and frequent individual cell keratinization occasional keratin pearls and intercellular bridges are occasionally observed (Schuh 1986). Poorly differentiated SCC had infrequent individual cell keratinization, large prominent nucleoli and numerous mitotic figures are seen (Brown et al. 2006; Schuh 1986). In the present study, a moderately differentiated oral SCC was confirmed; the involvement of the mandible by SCC is an additional important finding. SCCs, grow locally, are invasive and cause severe destruction of the adjacent tissue including periodontal structures and secondary tooth loss similar to the present case (Head et al. 2002). In this case, radiographic features showed that the oral SCC can cause bone-destructive lesions with cortical interruption. In the present case, oral-swelling mass and salivation with blood were the main clinical finding.

One week later, the ewe was euthanised by the owner due to emaciation, inability to graze, pain and extensive oral cavity lesion and its condition began to deteriorate. Therefore, accurate information on the involvement of other organs is not clear. We did not find any metastatic lesions in the pulmonary parenchyma via X-ray photography and cannot exclude the possibility of metastatic lesions in other organs such as the lymph nodes. Metastases on the left retropharyngeal lymph node and the lung have been reported in an aged pig (Kleinschmidt et al. 2006). Only 5–10% of canine gingival SCC will metastasize into regional lymph nodes and only 3% to distant sites (Head et al. 2002). According to our knowledge, only one SCC of the gum has been reported in a sheep (Foreyt et al. 1991).

In this case, the animal had poorer clinical conditions, and without surgical intervention, we could not record it through the tumour–lymph node–metastasis system.

The exact aetiology of oral SCCs remains unidentified but some authors believe that risk factors for oral cancer can be generally classified into several categories (El-Mofty et al. 2009) including prolong exposure to ultraviolet light, a combination of management and environment factors, viral infectious as well as age, genetic predisposition, feeding habits and immunodeficiency status (Goldschmidt and Hendrick 2002; Ladds and Entwistle 1977; Mendez et al. 1997; yager et al. 1993). In conclusion, oral SCC has been reported to have poorer prognosis compared to SCC in other organs because of the site and position of the lesion.

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