

## Diagnosis and management of oral squamous cell carcinoma in an eight-year-old labrador retriever

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Received: 16.7.2025; Accepted: 7.8.2025

### ABSTRACT

Squamous cell carcinoma (SCC) is a malignant epithelial tumour originating from squamous cells and is among the most common oral neoplasms in dogs. It typically affects older animals and is known for its locally invasive behaviour, with variable potential for metastasis. This case report describes the clinical presentation, diagnosis and management of oral SCC in an eight-year-old male Labrador Retriever. The dog presented with a proliferative, ulcerated mass involving the gingiva of the right mandible, accompanied by halitosis, difficulty in mastication, drooling and intermittent bleeding. Clinical examination revealed a friable, haemorrhagic oral mass along with mandibular lymphadenopathy. The mass was surgically excised under general anaesthesia with help of electrocautery and submitted at Department of Veterinary Pathology, Bihar Veterinary College, Patna for histopathological examinations. Microscopic examination revealed invasive cords and islands of malignant squamous epithelial cells exhibiting marked nuclear atypia, keratin pearl formation and frequent mitotic figures, confirming a diagnosis of squamous cell carcinoma. Bleeding was ceased after surgical removal of tumour and starts normal feeding from next days. The animal was fully recovered without any complications after 3 days. Upon re-examination after three months, there was no evidence of recurrence. Present case emphasizes the importance of early detection and histopathological confirmation for appropriate therapeutic planning in canine oral tumours.

**Keywords:** General anaesthesia, nuclear pleomorphism, oral cavity, squamous cell carcinoma, surgical excision

Neoplastic diseases of the oral cavity in dogs represent a significant concern in veterinary oncology due to their clinical impact, potential for local invasiveness and implications for overall prognosis. Among these, squamous cell carcinoma (SCC) is one of the most frequently diagnosed malignant oral tumours in dogs accounting for approximately 17-25% of all canine oral neoplasms, second only to malignant melanoma in prevalence<sup>1</sup>. Oral SCC typically arises from the gingiva, tongue, tonsils or buccal mucosa and is characterized by locally aggressive behaviour with variable metastatic potential depending on tumour location<sup>2</sup>. The pathogenesis of SCC in dogs is multifocal, with chronic exposure to Ultraviolet light, lack of skin pigmentation, chronic inflammation and papillomavirus infection identified as key predisposing factors<sup>3,4</sup>. Breeds such as Labrador Retriever, Golden Retriever and Dalmatians are reportedly more susceptible to SCC particularly when tumours occur in sun exposed lightly pigmented regions<sup>5</sup>.

The biological behaviour of SCC varies markedly between non-tonsillar and tonsillar forms. Non-tonsillar SCCs commonly located on the gingiva or hard palate exhibit a relatively low metastatic rate (less than 20%) but are highly invasive to local bone and soft tissue<sup>6</sup>. In contrast, tonsillar and base of tongue SCCs demonstrate a much higher rate of regional and distant metastasis often presenting at an advanced clinical stage<sup>7</sup>. Clinical signs are often insidious and may include halitosis, oral bleeding, drooling, difficulty eating or a visible mass with diagnosis frequently delayed until the lesion is well advanced<sup>8</sup>. Histologically, oral SCCs are composed of invasive islands or cords of squamous epithelial cells with varying degrees of keratinization, nuclear atypia and mitotic activity<sup>9</sup>. Keratin pearl formation is a common feature although poorly differentiated variants may lack overt squamous differentiation<sup>10</sup>. Differentiation from other

**How to cite this article :** Sinha, V.K., Kumar, K., Kumar, D., Ali, I. and Kumar, R. 2026. Diagnosis and management of oral squamous cell carcinoma in an eight-year old labrador retriever. Indian J. Vet. Pathol., 50(1) : 64-67.

malignant oral tumours such as fibrosarcoma, melanoma or undifferentiated carcinomas is essential due to differences in biological behaviour, treatment strategies and prognosis<sup>11</sup>.

While oral SCCs are more frequently reported in medium to large-breed, older dogs (typically aged 8 years and above), breed predispositions have been documented in Labrador Retrievers, German Shepherds and Standard Poodles<sup>12</sup>. Treatment typically involves wide surgical excision with or without adjunctive radiotherapy or chemotherapy<sup>13</sup>. The overall prognosis depends on tumour

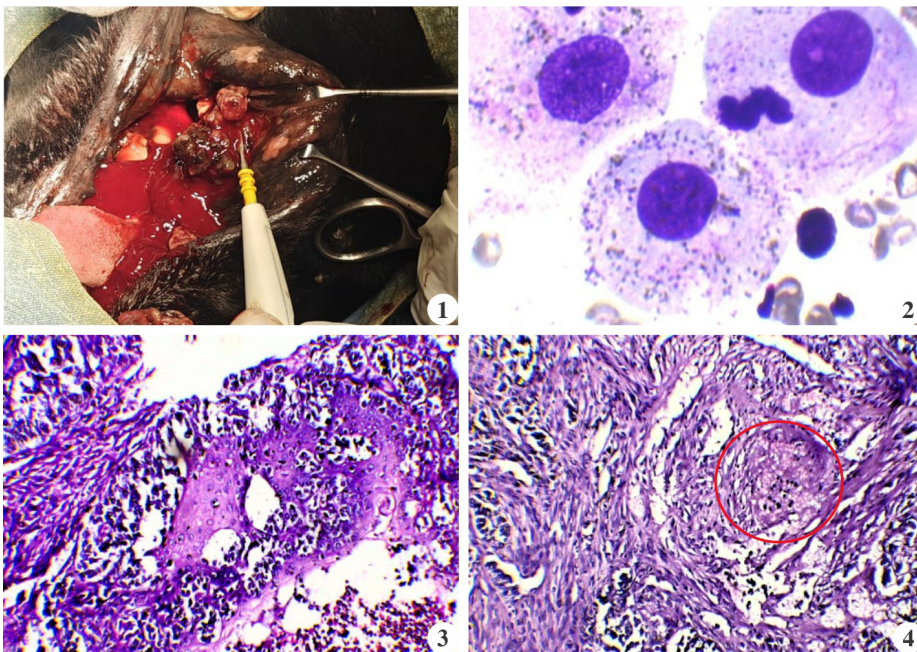
location, surgical margins, presence of metastasis and histological differentiation<sup>14</sup>. This clinical case report describes the spontaneous occurrence of SCC in the oral cavity of an 8-year-old male Labrador Retriever. The primary aim of the study is to document the clinical presentation, cytological findings and histopathological characteristics of this tumour. The report highlights the significance of early diagnosis and comprehensive histopathological evaluation in facilitating effective management and improving the prognosis in canine patients affected by oral SCC.

The present study was conducted on a clinical case of oral squamous cell carcinoma in an eight-year-old male Labrador Retriever dog reported to the Surgery OPD, Teaching Veterinary Clinical Complex, Bihar Veterinary College, Patna, Bihar, India with a history of halitosis, difficulty in mastication, drooling and intermittent bleeding from the oral cavity. On the day of presentation, bleeding was observed from oral cavity. Clinical examination revealed a tumorous mass at the level of the right maxillary canine tooth, adjacent to mucosa and upper lip. However, physiological parameters like rectal temperature, respiration rate and heart rate were within

normal limits. Radiographic examination of chest showed no signs of metastasis. Haematological parameters showed slight variations with neutropenia and anaemia.

Based on clinical examination, the lesion was tentatively diagnosed as a neoplasm and surgical excision was planned to save the life of animal. Surgery was performed under general anaesthesia. The animal was premeditated with atropine sulfate, butorphanol and diazepam followed by induction with propofol. After induction animal was intubated and maintained with isoflurane. The tumorous mass was excised with the help of electrocautery to minimise the bleeding (Fig. 1). The excised tumour mass was submitted for histopathological examination. Postoperatively, the animal was treated with injection Amoxicillin sodium-sulbactam sodium at 12-hour intervals for 7 days and analgesic agent injection Meloxicam 0.2 mg/kg body weight I/M for 3 days.

Bleeding stopped after surgical removal of tumour and the case started normal feeding from next day. The animal was fully recovered without any complications after 3 days. Upon re-examination after three months, there was no evidence of recurrence. Cytological examination of a canine oral tumour showed pleomorphic



**Fig. 1.** Intraoperative view showing excision of an ulcerated, proliferative oral mass from the right mandible of dog. Surgical resection was performed using electrocautery under general anaesthesia; **Fig. 2.** Cytology of a canine oral tumour (H&E 100x) showing pleomorphic epithelial cells with eosinophilic cytoplasm, hyperchromatic nuclei, anisocytosis, anisokaryosis and occasional multinucleation; **Fig. 3.** Histological section of a canine oral tumour (H&E 10x) revealing invasive nests and islands of neoplastic epithelial cells within a fibrous stroma. The tumour cells exhibit moderate pleomorphism, abundant eosinophilic cytoplasm and central to eccentric hyperchromatic nuclei. Areas of keratinization and stromal invasion are also evident; **Fig. 4.** Histological section of canine oral tumour (H&E 10x) showing well-differentiated squamous cell carcinoma characterized by concentric keratin pearl formation surrounded by malignant epithelial cells.

epithelial cells with eosinophilic cytoplasm, hyperchromatic nuclei, anisocytosis, anisokaryosis and occasional multinucleation (Fig. 2). Histopathological evaluation of the mandibular mass revealed classic features of a well differentiated squamous cell carcinoma. The neoplastic tissue was composed predominantly of irregular islands, cords and nests of atypical squamous epithelial cells invading the underlying submucosa and adjacent connective tissue. These tumour cells exhibited marked nuclear pleomorphism, hyperchromasia and prominent nucleoli with abundant eosinophilic cytoplasm (Fig. 3). Frequent mitotic figures were observed indicating moderate to high proliferative activity. Notably, concentric keratinized structures keratin pearls were visible which is a hallmark of differentiated SCC (Fig. 4). The tumour margins were infiltrative extending beyond the basement membrane and into adjacent muscle bundles

confirming the malignant and locally invasive nature of the lesion.

Multifocal areas of necrosis and chronic inflammatory infiltrates composed of lymphocytes and macrophages were also observed within and around the tumour tissue. There was no evidence of vascular invasion or metastatic spread in the submitted tissue sections. However, regional lymphadenopathy was clinically noted warranting further staging. SCC is a common malignant epithelial tumour in dogs particularly affecting the oral cavity, where it tends to behave aggressively at the local level with a relatively low rate of distant metastasis especially in non-tonsillar forms<sup>2</sup>. Although SCC is considered to have a low metastatic potential, the risk increases, when the tumour is located in high risk areas such as oral cavity, sublingual regions or tonsils<sup>15</sup>. In contrast, cutaneous SCC particularly those on sun exposed skin rarely metastasize but can cause local tissue destruction if not treated early<sup>5</sup>. Gingival and rostral oral SCCs such as the one in this case are known to be more amenable to surgical resection and have better long-term outcomes compared to caudal or tonsillar lesions<sup>1</sup>. The observed histological features such as keratinization, intercellular bridges and infiltrative growth are consistent with prior descriptions of canine oral SCC<sup>9,10</sup>.

The identification of keratin pearls and low to moderate mitotic activity in this case supports classification as a well differentiated variant which may carry a more favourable prognosis compared to poorly differentiated SCCs<sup>16</sup>. Nonetheless, the presence of local tissue invasion and mandibular bone involvement (confirmed radiographically) underscores the importance of early diagnosis and complete surgical excision with wide margins to prevent recurrence<sup>17</sup>. Adjunctive therapies such as radiation or chemotherapy may be considered in cases with incomplete resection, recurrence or confirmed metastasis<sup>13</sup>.

Oral SCCs are more commonly diagnosed in older dogs. The present study also reports an oral SCC in an eight-year-old Labrador Retriever, a breed that has been noted in several studies to exhibit a moderate predisposition to this tumour type<sup>5</sup>. Factors such as breed, age and tumour location play critical roles in therapeutic planning and determining the overall prognosis<sup>18</sup>. In the present case, the tumour was localized to the mandibular gingiva. Although it exhibited local invasiveness, there was no evidence of distant metastasis on imaging or histopathological examination. A definitive diagnosis of squamous cell carcinoma was established through histopathological evaluation, which remains the gold standard for differentiating SCC from other oral neoplasms such as fibrosarcoma, malignant melanoma or undifferentiated carcinomas. The identification of organized squamous differentiation, along with

the absence of melanocytic or mesenchymal features effectively ruled out these differential diagnoses.

Present case highlights the need for prompt veterinary evaluation of any oral masses in dogs especially given the subtlety of early clinical signs such as halitosis or difficulty chewing. Early diagnosis, staging and surgical management are essential to achieving a favourable outcome in oral SCC. Furthermore, histopathological confirmation not only aids in accurate diagnosis but also guides the selection of appropriate adjunctive therapies and helps predict biological behaviour.

## CONCLUSION

The present case report describes a locally invasive squamous cell carcinoma in the oral cavity of an eight-year-old male Labrador Retriever and its successful management. The tumour exhibited infiltrative growth of atypical squamous epithelial cells with keratin pearl formation and moderate mitotic activity, consistent with a diagnosis of well-differentiated squamous cell carcinoma. Clinical and histopathological evaluations confirmed the malignant nature of the lesion and its potential for local tissue destruction. The absence of distant metastasis and the tumour localization to the gingiva indicated a more favourable prognosis compared to caudal or tonsillar variants. Early detection and histopathological confirmation played a pivotal role in accurate diagnosis and formulation of an effective treatment strategy.

**Financial support & sponsorship:** None

**Conflicts of Interest:** None

**Use of Artificial Intelligence (AI)-Assisted Technology for manuscript preparation:** The authors confirm that there was no use of AI-assisted technology for assisting in the writing of the manuscript and no images were manipulated using AI.

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