

Scientific Report

Surgical management of extensive oral tumors by bilateral rostral mandibulectomy in two dogs

Shafiuza, M.¹; Sabarish Babu, M. S.^{2*}; Krishnaveni, N.²; Manoj Prabhakar, P.²; Hemalatha, S.³ and Souza, N. J. D.⁴

¹Department of Veterinary Surgery and Radiology, Madras Veterinary College, TANUVAS, Vepery, Chennai-600007, India; ²MVSc Scholar in Veterinary Surgery and Radiology, Department of Veterinary Surgery and Radiology, Madras Veterinary College, TANUVAS, Vepery, Chennai-600007, India; ³Centralised University Laboratory, TANUVAS, Madhavaram, Chennai-600051, India; ⁴Ph.D. Scholar in Veterinary Surgery and Radiology, Department of Veterinary Surgery and Radiology, Madras Veterinary College, TANUVAS, Vepery, Chennai-600007, India

***Correspondence:** M. S. Sabarish Babu, MVSc Scholar in Veterinary Surgery and Radiology, Department of Veterinary Surgery and Radiology, Madras Veterinary College, Tamilnadu Veterinary and Animal Sciences University (TANUVAS), Vepery, Chennai-600007, India (current address). E-mail: sabanary@gmail.com

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Summary

Two dogs of different age groups were presented with the history of oral growth, bleeding, excessive salivation, bad breath, inappetence and dysphagia. Physical examination revealed cauliflower like reddish growth in the gingiva enclosing the mandibular incisors and canine tooth. Haematology and serum biochemical profiles were within the normal range. Plain radiography revealed extensive growth involving the lower mandible and gingiva. Hence rostral mandibulectomy was performed to excise the tumor mass. The dogs recovered uneventfully after surgery with no difficulty in feeding liquid and semisolid diet. The post operative prognosis for dogs with oral neoplasia depends on type of tumor and extent of disease at the time of surgery. In the above two cases the tumors were benign and rostral mandibulectomy provided excellent prognosis and recovery with no recurrence of tumor.

Key words: Dog, Extensive oral tumors, Rostral mandibulectomy

Introduction

Oral tumors are the tumors arising from gingiva, buccal mucosa, labial mucosa, tongue, tonsils and dental elements (Stephen, 2000). The oral cavity is the fourth most common site of neoplasia and accounts for 5% (dogs) to 7% (cats) of all malignant tumors in these species. Oral tumors occur 2.6 times more often in dogs than cats (Fossum *et al.*, 2002). Cocker spaniel, Poodle, German shepherd, German shorthaired pointer, Weimaraner, golden retriever, and boxer are the breeds, which are at greater risk of developing oral tumors (Todoroff and Brodey, 1979). The successful treatment of oral tumors in dogs was reported by White (1991) in mandibulectomy and maxillectomy in the dog: long term survival in 100 cases and by Verstraete (2005) in mandibulectomy and maxillectomy.

Case description

Two dogs (non-descript, male and spitz, female) of different age groups (8 years and 5 years) with the history of oral growth, gradually increasing in size, were presented to SAC-OP-Surgery Unit of Madras Veterinary College Teaching Hospital. Physical examination revealed reddish, firm, irregular, cauliflower like growth on the lower mandible and gingiva, enclosing the incisors and canine tooth (Fig. 1A). In

another case, the mass was hard and calcified (Fig. 1B). Plain radiography revealed aggressive growth of the tumor mass in the gingiva involving the mandible. The tumor samples were collected after surgery in 10% formalin and sent for histopathological examination. The samples were sectioned using microtome and stained by haematoxylin and eosin. The microscopic slides were viewed under 100 X and 400 X power of compound microscope.

Pre-operative antibiotics and analgesics were administered. The dogs were premedicated with Diazepam[®] 0.2 mg/kg BW (Lori, Neon Laboratories, Mumbai) and Butorphanol tartrate[®] 0.2 mg/kg B.W (Butodol-2, Neon Laboratories, Mumbai). General anaesthesia was induced with Propofol[®] 4 mg/kg B.W (Neorof, Neon Laboratories, Mumbai) and maintained with Isoflurane[®] 2.5% (Forane, Abbott Pharmaceuticals, India) in oxygen using Boyles anesthetic apparatus. The dogs (Figs. 1A and B) were placed on dorsal recumbency with the mouth wide open. The buccal mucosa of the lower lip from the frenulum labii was incised 1 to 2 cm of the normal tissue and bone on all borders (Fig. 2A). The muscles surrounding the lower mandible were elevated and transected. Using an oscillating saw, the ramus of mandible was transected, the symphysis was separated and the tumor mass was excised (Figs. 3A-B, and 2B). The ostectomy sites were contoured with bone rongeurs to remove sharp bone edges. Bleeding from the

bone was arrested by use of bone wax.

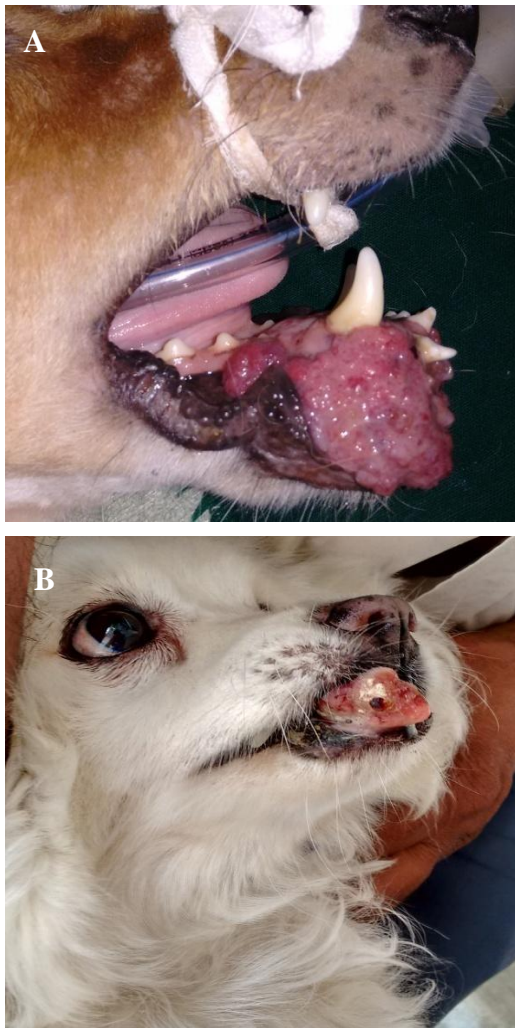


Fig. 1: Pre-operative picture of oral tumors. (A) Case 1: Squamous Papilloma-gingival mucosa. (B) Case 2: Chondroma in the lower mandible

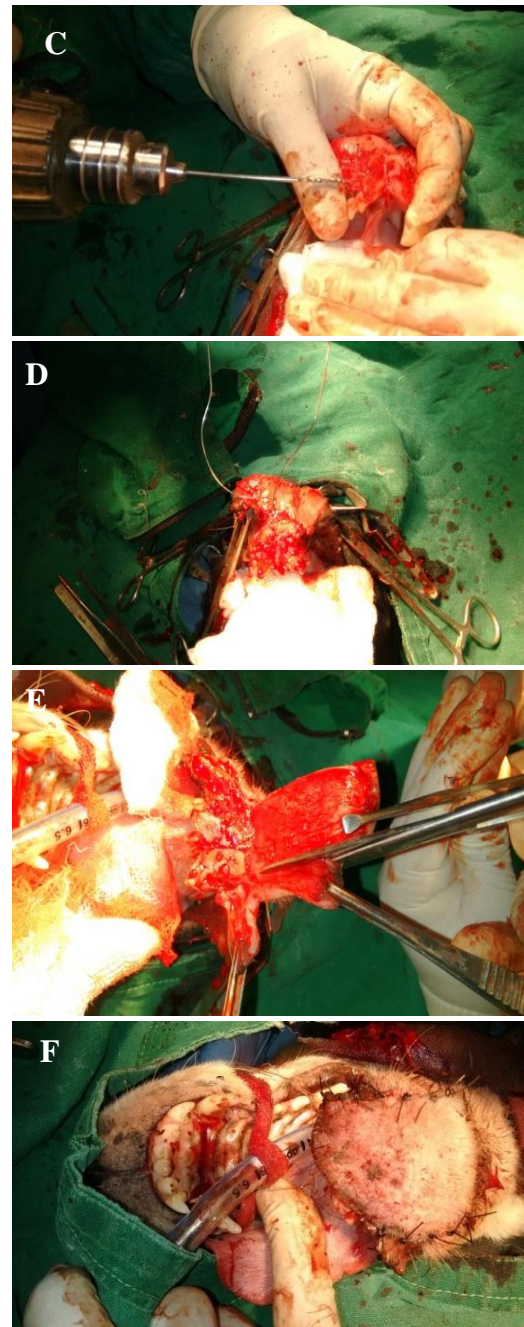
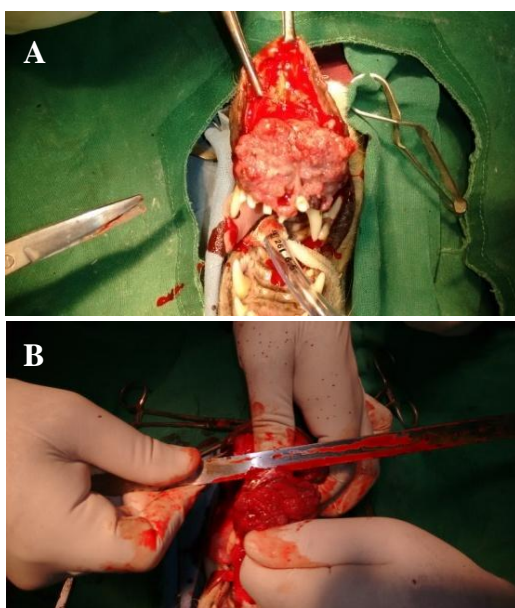


Fig. 2: Surgical procedure. (A) Buccal mucosa of the lower lip from frenulum labii was incised. (B) Excision of tumor mass by transaction of the ramus of mandible with hack saw. (C) Drilling of ramus of mandible for passage of orthopaedic wire. (D) Orthopaedic wiring done to secure the ramus in position. (E) Excision of triangular flap of labii bilaterally to aid in apposition of buccal and gingival mucosa. (F) Post operative appearance of lower lip after reconstruction



In case 1, with the help of power drill and 2.5 mm drill bit, a hole was drilled in the mandibular ramus bilaterally and an orthopaedic wire was passed through the hole to secure both the ramus in position (Figs. 2C-D). In case 2, there was no separation of ramus after excision of tumor mass. The labial and sublingual mucosa in both cases were apposed with PGA0 suture material in a simple interrupted pattern after en bloc

excision of the tumor mass. Triangular flap of labial mucosa was excised, to appose the mucosal surfaces without any tension (Figs. 2E-F). Post operative antibiotic Ceftriaxone[®] 10 mg/kg B.W (C-Tri, Intas Pharmaceuticals, Ahmedabad, India) and Tramadol[®] 2 mg/kg B.W (Supridol, Neon Laboratories, Mumbai) was administered for 5 days. The owner was advised to feed liquid diet for 3 days following surgery and semisolid diet by hand feeding the dog thereafter throughout the life avoiding solid food. Post-operative plain radiographs (skull-lateral and ventro-dorsal view) were taken (Figs. 4A and B). The dogs recovered well without any complications and no difficulty in food intake was noticed.

Results

Case 1 - (Squamous Papilloma) – microscopically multiple finger like exophytic growth lined by outer keratin layer and consisting of hyperplastic squamous epithelial cells supported by moderated fibrovascular-stroma were seen (Fig. 5A). Neoplastic cells were polygonal with eosinophilic or vacuolated cytoplasm and central to eccentric nuclei and multiple nucleoli. Mitotic figures were 4-5/high power field. Majority of cells in

superficial layers of a few fronds were necrotic and infiltrated with numerous neutrophils. A few areas showed hemorrhages.



Fig. 4: Radiographic pictures. (A) Case 1: Post operative plain radiograph, skull lateral view. (B) Case 2: Post operative plain radiograph, skull lateral view

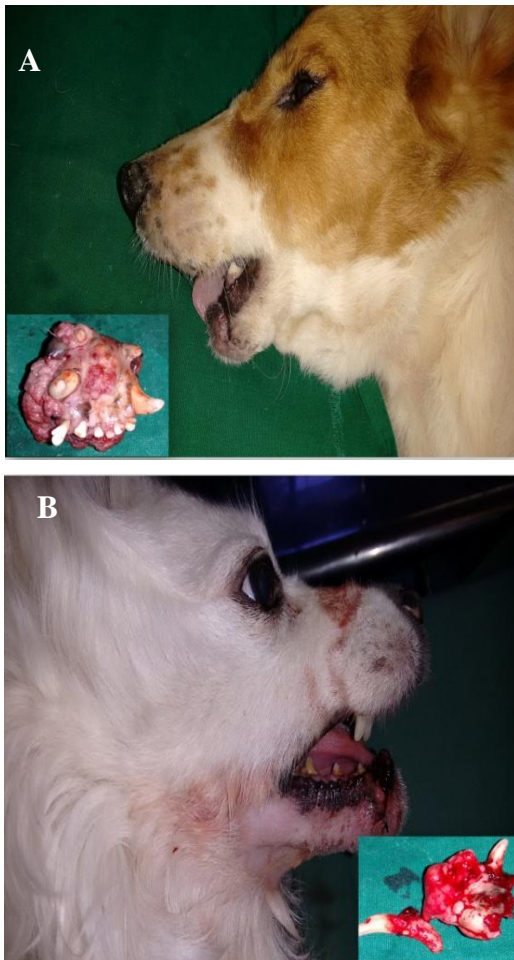


Fig. 3: Enbloc excision of oral tumors. (A) Post operative day 15. (B) Post operative day 15

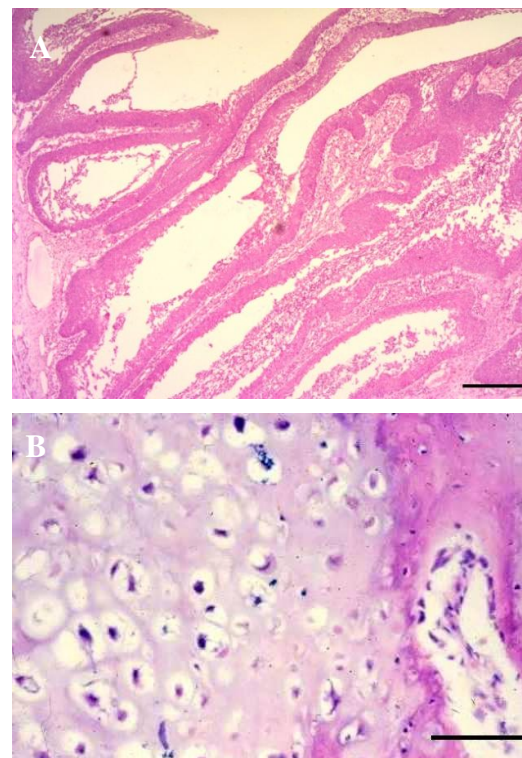


Fig. 5: Histopathology photos. (A) Case 1: Finger like projections and hyperplastic squamous epithelial cells, (H&E stain, $\times 100$, scale bar 200 μm). (B) Case 2: Pulpish extracellular matrix with round to stellate shaped cells, (H&E stain, $\times 400$, scale bar 20 μm)

Case 2 - (chondroma)- purplish extracellular matrix with round to stellate shaped cells were seen. Hyperchromasia, pleomorphism, irregular nuclear contours and increased nuclear to cytoplasmic ratio was seen (Fig. 5B).

Discussion

The most common non-odontogenic tumors of the oral cavity include melanoma, fibrosarcoma and squamous cell carcinoma which are malignant and the benign types include papilloma, fibroma and chondroma (Baker *et al.*, 1993; Gardner and Baker, 1993). The common odontogenic tumors of the canine oral cavity are epulides, odontoma and ameloblastoma (Dorn and Priester, 1976). The tumors located in the rostral position carry more favourable prognosis than tumors located in the caudal maxilla and mandible. Rostral mandibulectomy is performed for tumors of the most rostral aspect of the mandible (Penwick and Nunamaker, 1987). The more caudal locations of the tumor, tend to be larger and invasive before they are found and surgical excision with adequate margins becomes more difficult in these locations (Heidi, 2003). When performing a rostral mandibulectomy, the caudal segments of the mandibular bodies should be secured together with intramedullary pin or orthopaedic wire and this fixation should be done prior to making the cuts in the mandible, so as to achieve proper alignment of the jaw with little effort. The most common complications associated with extensive rostral mandibulectomy include swelling of face and lips which resolve within a week after surgery, ranula, subcutaneous emphysema and mild nasal hemorrhage (Salisbury and Lantz, 1988).

The treatment protocols for the oral tumors are based on the tumor type, site, extent, the patient's age, health and treatment limitations. Extensive and invasive gingival oral tumors, require aggressive therapy like mandibulectomy and maxillectomy before metastasis, for better chance of success. If ostectomy is performed caudal to second premolar bilaterally, prehensile

dysfunction and drooping of tongue may occur after bilateral rostral mandibulectomy, which is due to lack of support at the base of tongue. The dogs should be hand fed post-operatively to adapt themselves to the new prehensile function of the tongue. An uneventful recovery of the above two cases after surgery, without any major complications was noted.

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