CYTOLOGICAL AND PATHOLOGICAL DIAGNOSIS OF ACANTHOMATOUS AMELOBLASTOMA IN LABRADOR DOG

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A three year female Labrador dog was presented to the Teaching Veterinary Clinical Complex, Akola, with history of hyporexia and rostral mandibular swelling. Oral examination revealed a pale mass at rostral mandible pressing against lower incisors. Fine needle aspiration cytology indicated a neoplasm of epithelial origin. The mass was surgically excised and histopathologically diagnosed as canine acanthomatous ameloblastoma (CAA) with atypical features. Histological examination showed multifocal ameloblastic islands within a dense proliferating epithelial layer, with irregular epithelial stratification at the basal layer. Intercellular bridging and nuclear polymorphism were also noted, confirming the diagnosis of CAA with atypical histomorphology.

Keywords: Ameloblastoma, Cytology, Histomorphology.

Epulis is a non-specific, clinical designation used to describe localized, exophytic, nonneoplastic and neoplastic gingival growths (Costa *et al.,* 2021). Epulides are generally classified as fibromatous, ossifying and giant cell types among which fibromatous epulides are occurring most frequently. Fibromatous, ossifying, and giant cell epulides are thought to be developmental, inflammatory and/or hyperplastic in origin and often develop in association with chronic inflammation (periodontal disease) whereas acanthomatous ameloblastomas are generally occur in animals with milder dental plaque and inflammation. Canine acanthomatous ameloblastoma (CAA) is a locally invasive tumor with rare metastasis, originates from odontogenic epithelium remnants within the submucosa and periodontal ligament of the oral cavity (Goldsschmidt *et al.,* 2017). CAAs are characterized by their destructive behavior, often leading to alveolar bone lysis, tooth loss, and irregular verrucous growths adjacent to teeth. Due to their infiltrative nature, incomplete excision frequently results in local recurrence, and surgical interventions such as maxillectomy or mandibulectomy are typically recommended for effective management (Tsugawa *et al.,* 2022). CAA exhibits a range of histomorphological features that can resemble other neoplasms, including variants of human ameloblastomas, often complicating diagnosis. Microscopically, CAAs typically present as proliferative islands and cords of odontogenic cells in the gingival mucosa, bordered by characteristic ameloblastic cells; however, these features may vary across cases, challenging accurate histopathological identification. Although CAAs are histologically benign, their propensity for local invasiveness frequently contributes to recurrence after surgical excision (Ferreira *et al.,* 2024). This study reports on the clinical, cytologic, and histologic characteristics of CAAs, enhancing our understanding of their diagnostic and therapeutic implications.

Materials and Methods

A three year female Labrador dog was presented to the Teaching Veterinary Clinical Complex, Post Graduate Institute of Veterinary and Animal Sciences, Akola. The

dog had a swelling at lower jaw for several days. Upon examination of the oral cavity, a firm gingival mass was observed at rostral mandible. Initially fine needle aspiration cytology (FNAC) of the mass was performed. Cytology smears were stained with Leishman's stain and examined under an oil immersion objective of microscope. The dog was premedicated and placed under general anesthesia for surgical excision. The mass was cleanly excised following standard surgical procedures. Postoperative care and medication were administered, and follow-up observations were conducted for four months to monitor for any signs of recurrence. The excised mass was fixed in 10% neutral buffered formalin and processed for histopathological examination in the Department of Veterinary Pathology. Paraffin-embedded tissue sections (5 µm thick) were stained with Hematoxylin and Eosin (H&E) and were examined under both low and high power magnification.

Results and Discussion

The affected dog presented with a clinical history of sialorrhea, halitosis, hyporexia, occasional oral bleeding, and swelling of the lower jaw. A pale pink, slightly nodular, exophytic growth was observed at the rostral mandible gingiva, pressing against the incisors (Fig. 1). Cytology revealed small clusters of round to oval basaloid cells with scant, slightly basophilic cytoplasm, along with a few squamous epithelial cells (Fig. 2).Epithelial cells had mild anisocytosis and anisokaryosis, round nuclei with finely stippled chromatin, no prominent nucleoli, high N:C ratios, and low amounts of pale basophilic cytoplasm. Histopathological examination of the gingival mass revealed marked thickening of the stratum spinosum (acanthosis) and anastomosing rete ridges extending deeply into the connective tissue stroma. Proliferation of squamous-type epithelial cells formed distinct sheets and cords. Multifocal islands and trabeculae of ameloblastic cells were observed within the epithelial overgrowth, supported by a subepithelial connective tissue stroma composed of stellate-shaped cells with oval to elongated nuclei (Figs. 3 and 4). Additionally, the epithelial islands were bordered by multiple layers of palisading columnar to polyhedral cells with reverse nuclear polarity (Fig. 4). Intercellular bridges between odontogenic epithelial cells suggested extensive cellular proliferation, along with the presence of a few atypical cells (Fig. 5). A high degree of vascularization was evident within the epithelial overgrowth, with polyhedral cells invading the capillary walls. Postoperative clinical observations for the period of 04 months revealed no reoccurrence.

These findings are consistent with canine acanthomatous ameloblastoma (CAA), a locally aggressive odontogenic tumor that commonly invades the deep layers of gingival tissue as also recorded by Ferreira *et al.,* 2024. The cytological findings of present case were in agreement with the earlier reports of Palic *et al.,* 2022. The thickened epithelial layer, cord-like projections, and ameloblastic cell proliferation observed in this case align with the typical features of CAA as also reported by Ferreira *et al.,* 2024. Other notable features, including intercellular bridging, nuclear polymorphism, a high nuclear-cytoplasmic ratio, and hyperchromatic nuclei, further support the diagnosis of CAA as also mentioned by Ferreira *et al.,* 2024. However, the differentiation from fibromatous epulis of periodontal ligament origin (FEPL) can be challenging due to overlapping histological characteristics. Despite the resemblance to typical CAA, the presence of irregular epithelial stratification in this case was atypical. These findings may indicate a variant form or a different developmental stage of the tumor, which warrants further investigation through histochemical and molecular studies. Postoperative follow-up revealed no recurrence after four months, indicating a favorable short-term prognosis. Complete surgical excision remains the most effective treatment for preventing recurrence

in cases of CAA. Close monitoring will be essential to detect any signs of recurrence over time.

Figure 1: Pale pink, slightly nodular exhophytic tumorus mass at rostral mandible pressing incisors outside

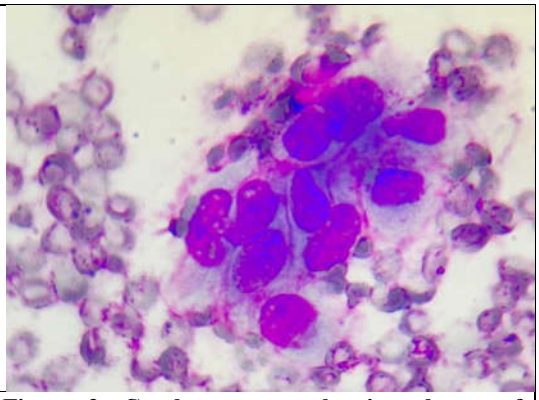

Figure 2: Cytology smear showing cluster of basaloid cells with higher nucleus to cytoplasma ratio (Leishman's stain, 1000x)

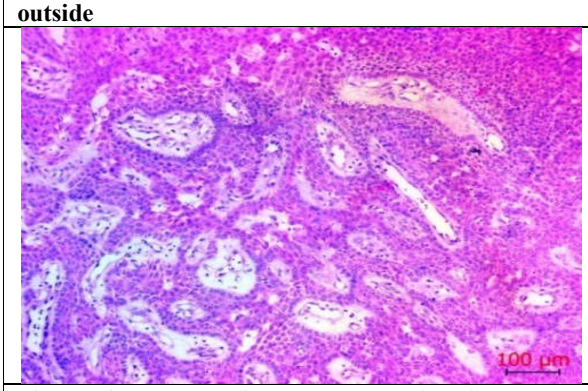

Figure 3: Photomicrograph showing islands and cords of proliferating neoplastic cells with presence of pallisidating ameloblasts at the basal layer effacing subepithelial connective tissue and stellate shape cell with oval to elongated nuclei in the connective tissue (H&E, 100x)

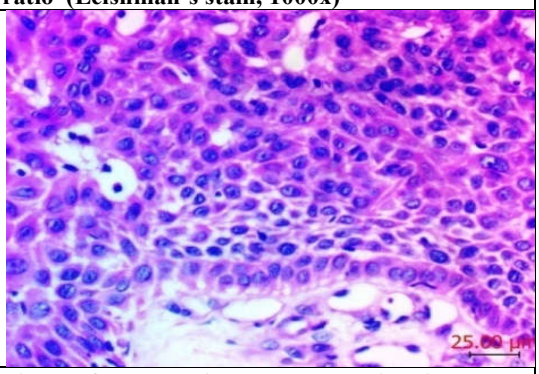

Figure 4: Photomicrograph showing irregular epithelial stratification at the peripheri of neoplastic island. Note reverese nuclear polarity of the columanar cells visible at the border of connective tissue stroma (H&E, 400x)

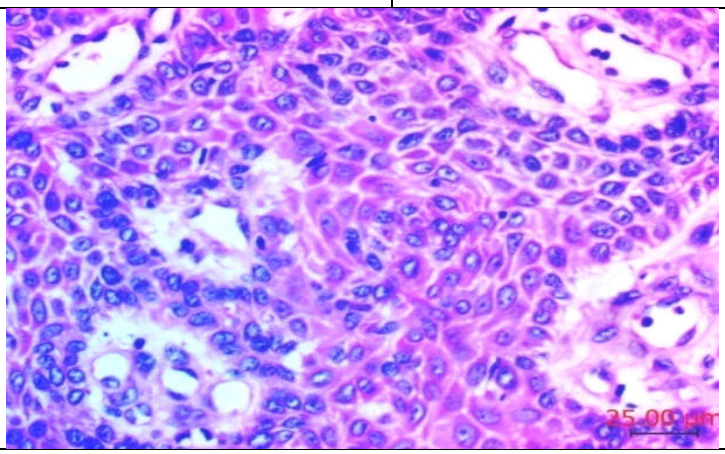

Figure 5: Sheets of ameloblastic epithelium showing prominent intercellular bridges, nuclear polymorphism, a high nuclear-cytoplasmic ratio, and hyperchromatic nuclei, and few atypical cells in cell nests (H&E, 400x)

Conclusion

In conclusion, the histomorphological examination of the gingival mass revealed features consistent with canine acanthomatous ameloblastoma (CAA), including acanthosis, cord-like epithelial projections, and ameloblastic cell proliferation. However, atypical findings such as multilayered basal cells and irregular epithelial stratification suggest a potential variant of CAA, indicating further histochemical and molecular studies for better understanding.

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