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Squamous cell carcinoma

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Abstract

Squamous cell carcinoma (SCC) is a relatively prevalent and highly aggressive canine neoplasm, frequently occurring in areas like the eyelids, digits, lips, and oral cavity. This study employed cytological and histopathological techniques for tumour diagnosis, utilizing Fine Needle Aspiration Cytology (FNAC) and impression smears for both palpable and non-palpable masses. A total of 58 samples from various dog breeds were examined, revealing Squamous cell carcinoma in 8.62% of cases. Cytological analysis identified characteristic tadpole cells, keratinized cells, and nuclei with anisocytosis. Histological examination displayed keratinized neoplastic squamous cells, keratin pearls, and nests, accompanied by anisokaryosis and mitotic figures. Given the potential severity of SCC, early detection and intervention are imperative due to the cancer's malignant nature and potential damage to sensitive organs.

Keywords: Squamous cell carcinoma, cytology, histopathology, neoplasm, FNAC

1. Introduction

Squamous cell carcinoma is a prevalent and aggressive neoplasm in dogs, characterized by swift metastatic dissemination. Its occurrence spans various age groups, typically affecting individuals between 2 to 14 years, with frequent sites of manifestation including the gum and mammary gland, digits, and eyelids. Grossly, these tumours exhibit diverse sizes and present as round, ovoid, irregular, or cauliflower-like masses, often displaying superficial necrosis and ulcerations. Chandrashekaraiyah *et al.* (2011) [1],

Cytopathology assumes a pivotal role in identifying squamous cell carcinoma (SCC) in canines, offering a swift and efficient method for diagnosis. This non-intrusive diagnostic approach allows for the scrutiny of cellular features, aiding in the differentiation between benign and malignant conditions. The significance of cytopathology in diagnosing SCC in dogs lies in its capacity to facilitate early detection, guide treatment decisions, and enhance overall patient outcomes. (Manesh *et al.*, 2014) [7].

2. Material and Method

2.1 Source and Collection of Samples: The investigation transpired at the Department of Veterinary Pathology, Post Graduate Institute of Veterinary Education and Research, Jaipur, during the period from August 2020 to February 2021. The research material encompassed specimens acquired from 58 naturally occurring tumour masses, sourced from dogs of diverse breeds and ages, spanning both genders. Samples for the study were procured from the Government Veterinary Polyclinic (Department of Animal Husbandry), the Department of Veterinary Surgery and Radiology, the Department of Veterinary Pathology at PGIVER, Jaipur, and the Veterinary Hospital (Help in Suffering/HIS, Jaipur).

2.2 Gross Examination: Preceding surgical interventions, a thorough macroscopic evaluation was conducted on all tumours. The tumour masses were assessed for indications of ulceration and their specific anatomical locations. Subsequent to surgical excision, various parameters, including size (measured in centimeters), shape (round, oval, irregular, multilobulated, etc.), weight (in grams), consistency (soft, hard, firm, cystic, etc.), and the color of the cut surface of the tumour, were meticulously scrutinized.

2.3 Cytological Examination: Cytological evaluations were conducted through the utilization of fine needle aspiration cytology (FNAC) and impression smear/touch imprint cytology (Cowell and Valenciano, 2014) [2].

2.4 Histopathological Examination: The dissected tissue samples were immersed in a 10 percent buffered formalin solution and subjected to staining using the hematoxylin and eosin method for histopathological evaluation (Luna, 1960; Culling, 1974) [5, 3].

3. Results and Discussion

3.1 Incidence of Squamous cell carcinoma:

Five cases of squamous cell carcinoma were identified, indicating an incidence of 8.62%. The current findings closely resemble those reported by Khan (2019) [4] and Naraghi *et al.* (2005) [8], who documented incidences of 7.89% and 8.8%, respectively.

3.2 Gross morphology, Cytology and Histopathology of Squamous cell carcinoma

Grossly, the tumours exhibited an ovoid to irregular shape, a soft consistency, and a pink to light brown cut surface (Fig. 1). These neoplastic growths were collected from various anatomical sites, including the eyelid, digit, lips, and oral cavity. The observed dimensions of the masses ranged from 2 x 1 x 1 to 3 x 2 x 1 cm, with weights varying between 10 and 19g. These gross morphological findings closely align with the observations of Chandrashekaraiyah *et al.* (2011) [1], who described squamous cell carcinoma as round, ovoid, irregular, or cauliflower-like masses with superficial necrosis and ulcerations. The present results also exhibit similarities with the findings of Manesh *et al.* (2014a) [6].

Aspirate smears revealed characteristic tadpole cells with round to caudate-shaped cells. Keratinized cells displayed deeply basophilic cytoplasm with angular borders. Single large nuclei with one to two different-sized nucleoli were noted (Fig. 2). Impression smears of the tumour masses showed anisocytosis, anisokaryosis, coarse chromatin with polymorphonuclear cells, and mitotic figures (Fig. 3). These cytological findings are in concordance with those reported by Manesh *et al.* (2014a) [6] and Webb *et al.* (2009) [10], who described immature (basal-type) squamous cells as small, round to cuboidal cells with scant glassy, basophilic cytoplasm. The findings also align with Chandrashekaraiyah *et al.* (2011) [1], who observed a large number of cells with angulate borders, homogeneous cytoplasm, and centrally placed nuclei.

Microscopic examinations of tissue sections revealed concentric layers of irregular masses of neoplastic squamous cells invading into the dermis, displaying variable degrees of keratinization towards the centers, forming keratin pearls and cell nests (Fig. 4). The proliferating cells exhibited moderate to prominent cellular pleomorphism and eosinophilic cytoplasm (Fig. 5). Anisokaryosis, large spherical to ovoid nuclei with 1 to 2 prominent nucleoli, binucleated cells, tadpole cells, and numerous mitotic figures were observed (Fig. 6). These microscopic findings align with those reported by Pigatto *et al.* (2010) [9] and Manesh *et al.* (2014a) [6]. Additionally, they closely resemble the observations of

Chandrashekaraiyah *et al.* (2011) [1], who noted nests of proliferating immature polyhedral cells at the periphery and eosinophilic lamellated keratin pearls at the center.

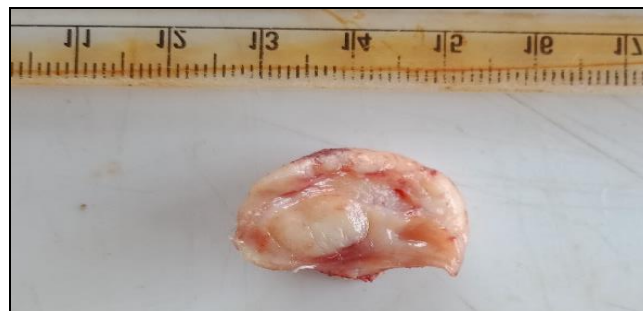


Fig 1: Macroscopic image displaying an oval to irregular cut surface with shades of pink to light brown in squamous cell carcinoma

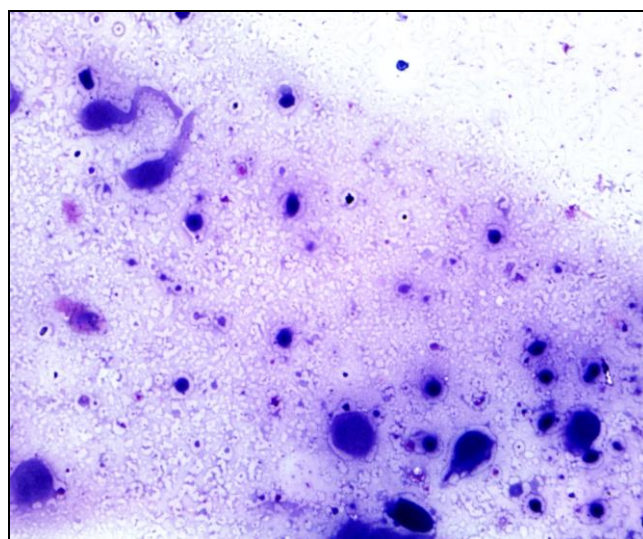


Fig 2: Illustrating cells with round to caudate shapes, tadpole-like structures, keratinized cells exhibiting basophilic cytoplasm and angular borders. Giemsa stain, 400x

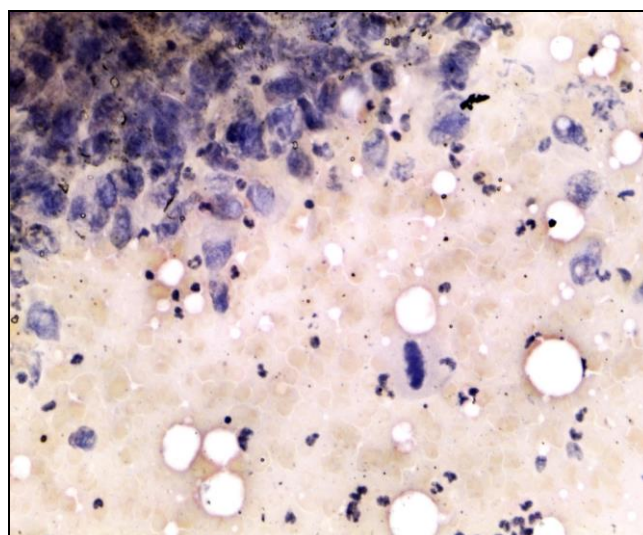


Fig 3: Photomicrograph of impression smear revealing anisocytosis, anisokaryosis, coarse chromatin, polymorphic nuclei and mitotic figure. Giemsa stain, 400x

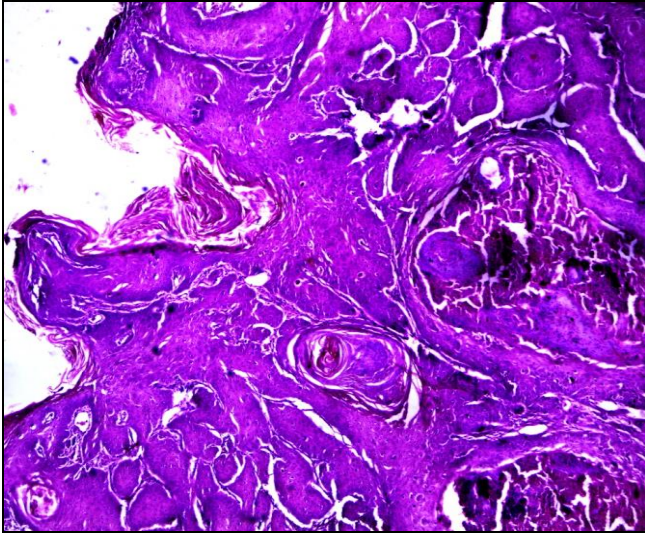


Fig 4: Photomicrograph illustrating neoplastic squamous cells, concentric layers of irregular masses, keratin pearls, or cell nests. H & E stain, 40x

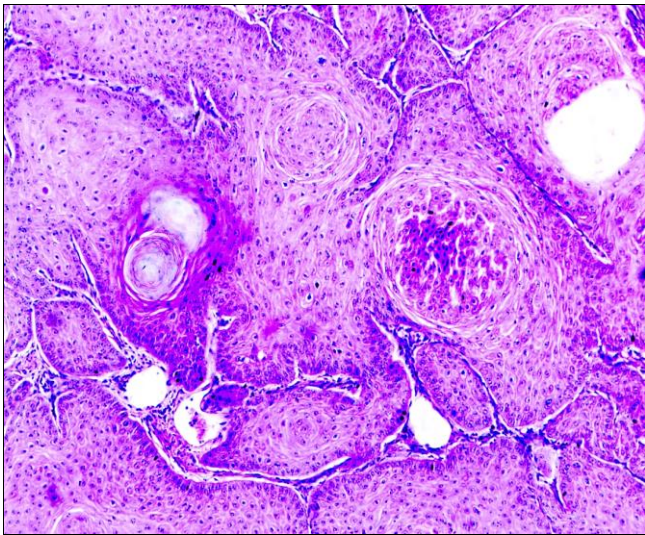


Fig 5: Photomicrograph displaying clusters of proliferating pleomorphic cells with eosinophilic cytoplasm. H & E stain, 100x

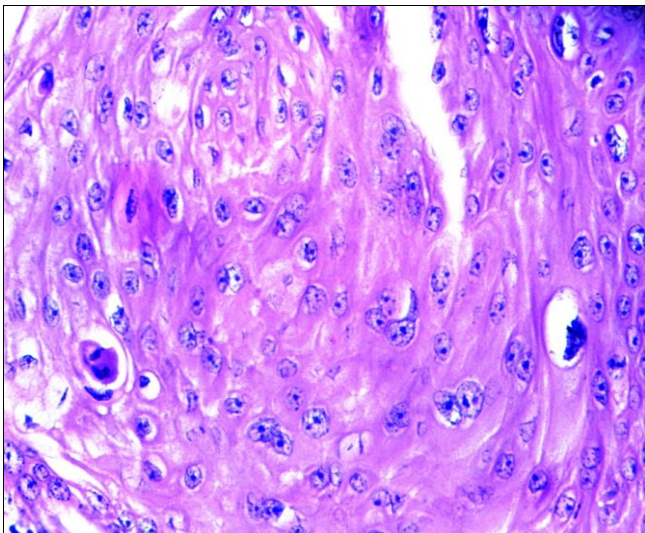


Fig 6: Photomicrograph image revealing variations in nuclear size, large spherical to ovoid nuclei, binucleated cells, tadpole cells, and mitotic figures. H & E stain, 400x

4. Conclusions

This study highlights the importance of utilizing both cytological and histopathological methods for diagnosing Squamous Cell Carcinoma (SCC) in canines. Through Fine Needle Aspiration Cytology (FNAC) and impression smears, the research examined 58 dog samples, identifying SCC in 8.62% of cases. Cytological analysis revealed characteristic features, including tadpole cells and anisocytosis, while histological examination showcased keratinized neoplastic squamous cells with anisokaryosis. Early detection is crucial due to SCC's aggressive nature and potential harm to vital organs. The study underscores the significance of cytopathology, particularly FNAC and impression smears, in ensuring timely and accurate diagnoses for effective management of SCC in dogs.

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