SHORT COMMUNICATION
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CYTOLOGICAL DIAGNOSIS OF SUPERFICIAL TUMOURS IN DOGS

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ABSTRACT

Cutaneous tumours are the most common neoplasms seen in dogs. Time bound diagnosis of these tumours is very important for surgical or medical intervention. Though histopathology is considered as the gold standard for the diagnosis of these tumours, it is a time consuming procedure and it is in such contexts that the use of cytology assumes significance. Cytological diagnoses of 14 cases of superficial masses forms the content of the present communication. Among these 14 cases, 11 were round cell tumours that were predominantly lymphoma (seven cases), followed by one case each of mast cell tumour, histiocytoma, extragenital form of transmissible venereal tumour (TVT) and melanoma. Two epithelial tumours namely squamous cell carcinoma and hepatoid gland tumour and one mesenchymal tumour namely liposarcoma were also included in this cohort. This paper deals with the use of a rapid diagnostic technique like cytology for detecting superficial masses in canines.

Keywords: Canine, Cytology, Round cell tumour, Epithelial tumour

INTRODUCTION

Cytological examination has gained popularity and is widely used now a days because it helps in gaining results within a short period of time and requires only very limited facilities when compared to histopathology. At the same time, this technique has certain limitations too. As tissue structure is not discernible in cytological examination, it is difficult to determine the interrelations and arrangement of cells in relation to tumour stroma (Volkan *et al*., 2021). In diagnosis of superficial masses, cytological examination was reported to have a sensitivity and specificity of 68.62 and 77.22 per cent,

respectively (Wang *et al*., 2014). Cancer is considered as the second leading cause of death worldwide in humans (Bray *et al*., 2024). Among the various tumours, cutaneous tumours constitute nearly one third and one fourth of canine and feline tumours, respectively. These tumours are the most encountered neoplasms among dogs and second to haemolymphatic tumours in cats (Wang *et al*., 2014). The incidence of canine cutaneous tumours was reported to be 728 cases per 1,00,000 dogs per year (Kaldrimydou *et al*., 2002). Increased incidence of skin tumours could be associated with the likely exposure of the skin to physical and chemical factors that contribute to the development of cancer (Pakhrin *et al*., 2007) A wide range of neoplasms originate from the skin, subcutis and adnexa and can be classified as epithelial, mesenchymal and round cell types based on the tissue of origin. Fine needle aspiration biopsy and Romanowsky staining are considered as an easy and rapid method for lymph node sampling that can aid in diagnosis of various lymphadenopathies (Thangapandiyan and Balachandran, 2010). Cytological interpretation is based on various factors like tissue of origin, type of lesion (neoplastic or inflammatory), cell morphology and features of malignancy. The samples that do not contain any specific cells belonging to mesenchymal, epithelial or round cell type could be categorised into inflammatory type or non-diagnosable sample. The present communication reports on the features of some common superficial malignancies diagnosed by cytological examination.

MATERIALS AND METHODS

Fine needle aspiration samples/ impression smears collected from dogs presented with superficial masses or enlargement of the lymph node, that were submitted to Department of Veterinary Pathology for cytological examination formed the study material. Smears were fixed in methanol and air dried followed by staining with Field stain B and Field stain A each for 30 seconds. Cytomorphological diagnosis was made by light microscopy with oil immersion objective. A total of 14 samples collected from cutaneous masses/ lesions and lymph node formed the study material. Smears were examined for cellularity and staining characteristics of nucleus and cytoplasm. The identification of morphological type of the tumour was done based on cell shape, size, arrangement, shape of nuclei, density of chromatin, number, size and distribution of nucleoli, volume and basophilia of cytoplasm, cytoplasmic vacuolation, nuclear cytoplasmic ratio and presence of mitotic figures. Special staining technique like Toluidine blue staining was employed for the demonstration of mast cells (Sridharan and Shankar, 2012)

RESULTS AND DISCUSSION

Cytological examination of smears identified different types of tumours based on the criteria mentioned above. Most common cytologically diagnosed tumour was lymphoma. Squamous cell carcinoma, mast cell tumour, histiocytoma, hepatoid gland tumour, liposarcoma extra-genital form of TVT and melanoma were also observed. Among 14 cases, majority of the superficial malignancies were observed in dogs that were above five years of age (nine out of fourteen) . Five animals were below five years of age and none of them were aged below one year. Among the fourteen dogs, ten were male and four were female. The above findings were concordant with that of Subapriya *et al.* (2021) wherein a higher incidence of cutaneous tumours in dogs between six to 10 years of age and a male predominance with regard to the occurrence of cutaneous neoplasms were reported.

Epithelial tumours

Among epithelial tumours, squamous cell carcinoma was diagnosed in a smear taken from an ulcerated skin lesion. The neoplastic cells, arranged either individually or as small clumps, were oval to polyhedral in shape with basophilic cytoplasm and with round to oval nuclei. Marked anisocytosis and anisokaryosis were evident. A few tadpole- like cells and

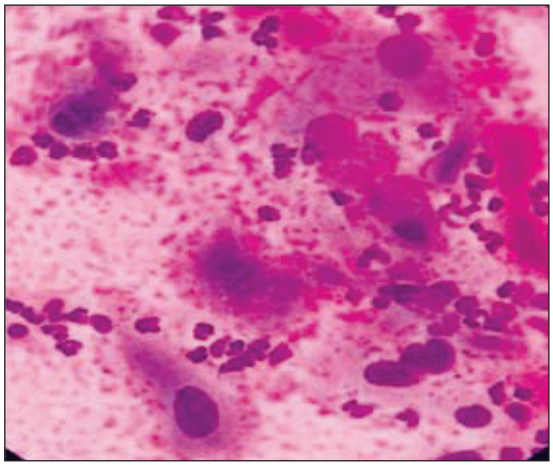

Fig 1: Squamous cell carcinoma: Tadpole cells

a large number of neutrophils were also observed (Fig. 1). Begum *et al*. (2023) also reported similar cytological features for squamous cell carcinoma.

Fine needle aspirate taken from a perianal ulcerated mass showed cytological features of hepatoid gland adenoma or perianal adenoma. Cytology revealed the presence of hepatoid or large cuboidal cells arranged in clusters resembling a glandular pattern. The cells had round nuclei with a moderate amount of cytoplasm and a higher nuclear to cytoplasmic ratio. In these cells, only minimal anisocytosis and anisokaryosis were observed. Basaloid reserve cells without any malignant features were also present. These features could be correlated with the description given by Yumusak *et al.* (2016) (Fig.2). Hepatoid gland tumours could be histomorphologically classified into three namely, adenoma, carcinoma and hepatoid gland epithelioma. As per Vail *et*

al. (1990), the surface of these tumours would mostly be ulcerated and presented with haemorrhages similar to that observed in the present study.

Mesenchymal tumour

A single case of liposarcoma was diagnosed based on characteristic findings. Cells with single large lipid droplet displacing the nucleus to the periphery and flattened cells indicative of mature adipocytes were present. Spindle shaped cells having a few lipid vacuoles or without any evidence of lipid storage and marked anisokaryosis were scattered throughout the smear (Fig. 3). Lipoma is the most common mesenchymal tumour in dogs, located in the subcutaneous tissues and their malignant counterparts are usually rare. Cytological features obtained in the present study were in concordance with the observations of Piseddu *et al*. (2011).

Round cell tumours

Lymphomas were identified in seven cases. Cytologically, smears consisted of predominantly large lymphoblast cells with scanty basophilic cytoplasm and round nuclei having single to multiple nucleoli with high nuclear cytoplasmic ratio. Numerous small basophilic round cytoplasmic remnants with irregular borders known as lymphoglandular bodies were evident. Mitotic figures were also observed

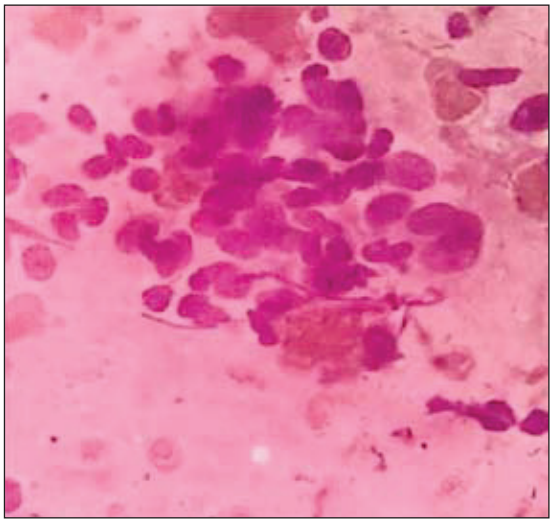

Fig 2: Hepatoid gland tumor

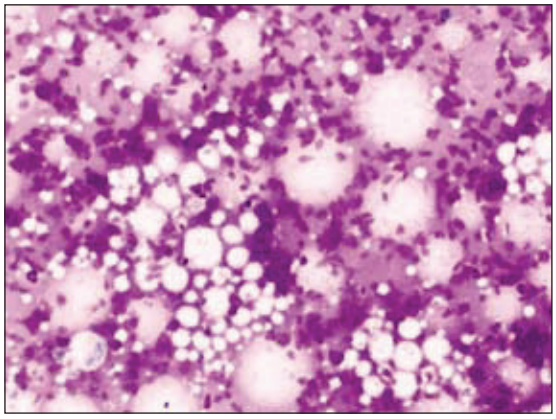

Fig 3: Liposarcoma

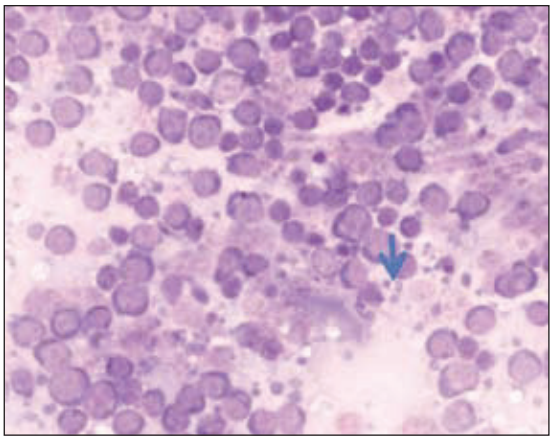

Fig 4: Lymphoma: Lymphoglandular bodies (arrow)

(Fig.4). The cytological features were comparable with those of previous reports (Thangapandiyan and Balachandran, 2010; Devi *et al*., 2020).

Other than lymphoma, round cell tumours like mast cell tumour, histiocytoma and TVT were also diagnosed. They were differentiated based on their characteristic features as described by Krithiga *et al*. (2005).Round cells with round nuclei and cytoplasm containing metachromatic granules were suggestive of a well differentiated variant of mast cell tumour (Fig.5). Metachromatic granules appeared as purple coloured on toluidine blue staining (Fig.6). In histiocytoma, cytology revealed presence of large round cells with pale basophilic cytoplasm and round nuclei without much pleomorphism (Fig.7). Extra genital form of TVT was also diagnosed from a nasal mass characterised by the presence of round cells having basophilic cytoplasm with vacuolations and eccentric nuclei indicative of plasmacytoid variant of TVT (Fig. 8). A case of melanocytic tumour was diagnosed based on cytologic features. Rounded cells of variable size having round nuclei with vesicular chromatin pattern and cytoplasm containing black granular pigments could be identified (Fig. 9). Kaur *et al*.(2021) reported that cytology could be effectively used in the diagnosis of round cell tumours as these tumours were characterised by higher degrees

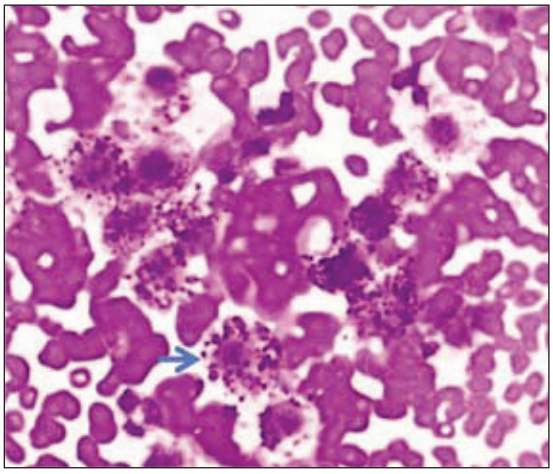

Fig 5: Mast cell tumor: Metachromatic granules (arrow)

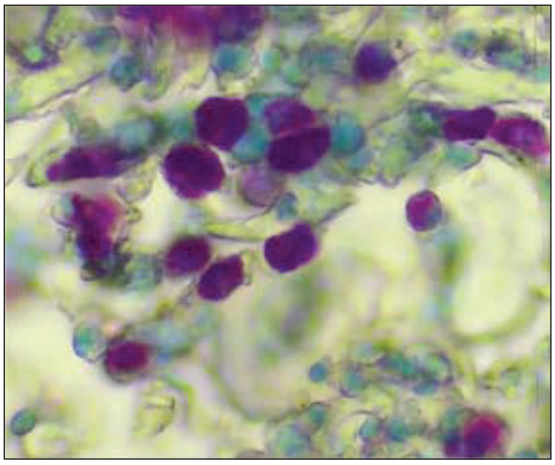

Fig 6: Mast cell tumor: Toludine blue staining

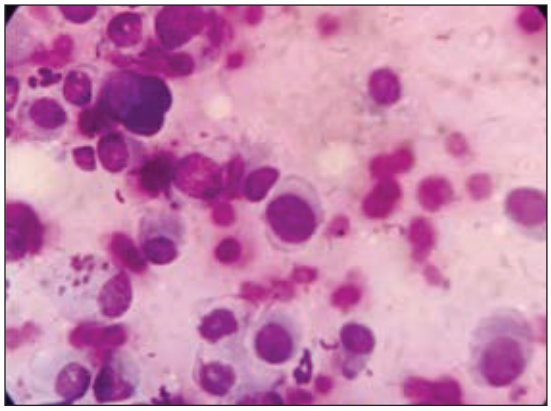

Fig 7: Histiocytoma

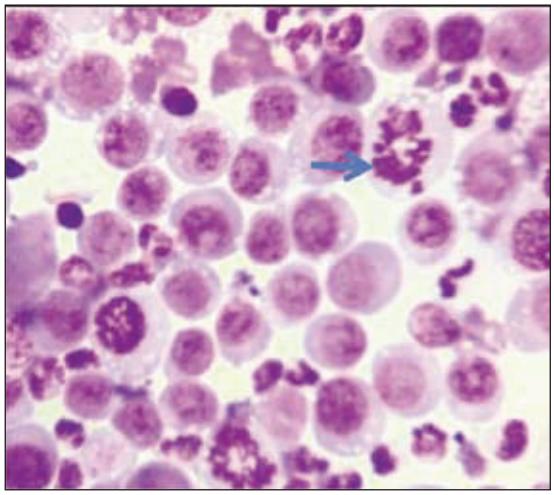

Fig 8: Transmissible Venereal Tumor: Mitotic figures (arrow)

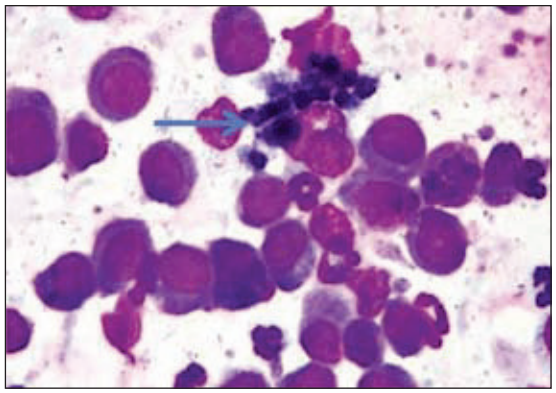

Fig 9 : Melanoma:Melanin granules(arrow)

of exfoliation thereby ensuring good cellularity. Cytomorphological features of round cell tumours described in the above mentioned study were also similar to our observations.

In conclusion, the present paper attempts to give an insight to the cytomorphological features of superficial tumours and based on the result of the study cytology could be suggested as a valuable tool for the early diagnosis of superficial tumours in canines.

REFERENCES

Begum, S., Deka, A., Tamuli, S.M., Dutta, B. and Buragohain, M. 2023. Histopathological and cytopathological findings of canine squamous cell carcinoma. *Haryana Vet*. **62**:162-164.

Bray, F., Laversanne, M., Sung, H., Ferlay, J., Siegel, R.L., Soerjomataram, I. and Jemal, A.2024. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA*: *Cancer J*.**74**: 229-263.

Devi, S.S., Ajith, J.G., Ashna, S. and Sajitha, I.S. 2020. A study on cytological diagnosis of canine lymphomas.*J. Indian Vet*. *Assoc*.**18**:38-43.

Kaldrimydou, H., Leontides, L., Koutinas, A.F., Saridomichelakis, M.N. and Karayannopoulou, M. 2002. Prevalence, distribution and factors associated with the presence and the potential for malignancy of cutaneous neoplasms in 174 dogs admitted to a clinic in northern Greece. *J. Vet. Med*.**49**: 87-91.

Kaur, M., Gupta, K., Mohindroo, J. and Singh, A. 2021. Cytopathology of round cell and melanocytic tumors of

cutaneous and subcutaneous origin in dogs. *Indian J. Vet. Pathol*. **45**: 279-283.

Krithiga, K., Manohar, B.M. and Balachandran, C. 2005. Cytological and histopathological study on cutaneous round cell tumours in canines. *Indian J. Vet. Pathol*. **29**:38-41.

Pakhrin, B., Kang, M.S., Bae, I.H., Park, M.S., Jee, H., You, M.H., Kim, J.H., Yoon, B.I., Choi, Y.K. and Kim, D.Y.2007. Retrospective study of canine cutaneous tumours . *Korea. J. Vet. Sci*. **8**: 229-236.

Piseddu, E., De Lorenzi, D., Freeman, K. and Masserdotti, C. 2011. Cytologic, histologic, and immunohistochemical features of lingual liposarcoma in a dog. *Vet.Clin.Pathol*. **40**:393-397.

Sridharan, G. and Shankar, A.A. 2012. Toluidine blue: A review of its chemistry and clinical utility .*J. Oral. Maxillofac. Pathol*. **16**:251-5.

Subapriya, S., Pazhanivel, N., Gokulakrishnan, M., Nagarajan, B., Kavitha, S., Sumathi, D. and Vairamuthu, S.2021. Incidence and pathology of skin tumours in dogs. *Pharm. Innov. J*. **10**:620-629.

Thangapandiyan, M. and Balachandran, C. 2010. Cytological evaluation of canine lymphadenopathies-a review of 109 cases. *Vet. Arh.* **80**: 499-508.

Vail, D.M., Withrow, S.J., Schwarz, P.D. and Powers, B.E. 1990. Perianal adenocarcinoma in the canine male: a retrospective study of 41 cases.*J. Am. Anim. Hosp. Assoc*. **26**:329-334.

Volkan, I.P.E.K., Taci, C.I. and Ahmet, A.K.K.O.C. 2021. Comparative evaluation of the cytological, histopathological and immunohistochemical findings of canine cutaneous and subcutaneous masses. *Acta Veterinaria*.**71**:61-84.

Wang, S.L., Lee, J.J. and Liao, A.T. 2014. Comparison of cytological and histopathological validation on fine needle aspiration of superficial masses. *Taiwan. Vet. J*. **40**:191-198.

Yumuşak, N., ÇaliŞkan, M. and Kutsal, O. 2016. Fine needle aspiration cytology (FNAC) in the diagnosis of canine hepatoid gland tumors-A comparative study with histopathology. *Ankara. Üniv. Vet. Fak. Derg*. **63**:259-266.