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RESEARCH ARTICLE

Comprehensive evaluation of auricular squamous cell carcinoma in dogs: Clinical and pathological perspectives

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ABSTRACT

Squamous cell carcinoma (SCC) is one of the most frequently encountered malignant cutaneous neoplasms in dogs particularly affecting sun-exposed regions such as the pinna. The present study was conducted over a period of one year to evaluate the prevalence, haematological, biochemical and histopathological characteristics of auricular SCC in 786 dogs of different breeds of canine dermatological cases presented to the Teaching Veterinary Clinical Complex, Bihar Veterinary College, BASU, Patna. Twenty-two cases were recorded having squamous cell carcinoma with a mean age of 9.1 ± 2.3 years. The overall prevalence rate of auricular SCC during the study period was 2.8% among canine dermatological cases. Breed-wise prevalence indicated higher incidence in German Shepherds (32%), Labrador Retrievers (27%), Spitz (18%) and non-descript dogs (23%) with a higher occurrence in males. Clinically, affected dogs exhibited ulcerated, proliferative or crusted growths on the pinna, foul-smelling discharge, head shaking, pain and pruritus in chronic cases. Haematological analysis revealed moderate anaemia, leucocytosis and neutrophilia indicative of chronic inflammatory response and tumour-associated infection. Biochemical evaluation demonstrated elevated liver enzymes (ALT, AST) and increased total protein and globulin levels suggestive of systemic inflammatory and hepatic stress responses. Histopathological examination confirmed the diagnosis revealing invasive nests and cords of neoplastic squamous epithelial cells with keratin pearl formation, cellular pleomorphism, mitotic figures and stromal desmoplasia consistent with well to moderately differentiated SCC. Auricular squamous cell carcinoma in dogs is a relatively common malignant neoplasm with breed predisposition and distinct clinico-pathological alterations. This study highlights the clinicopathological significance of auricular squamous cell carcinoma in dogs emphasizing the importance of early diagnosis, surgical management and awareness among veterinarians and dog owners particularly in predisposed breeds such as German Shepherds and Labradors exposed to prolonged sunlight. Early recognition through clinical and histopathological correlation is crucial for timely management and to prevent local invasiveness and recurrence.

Keywords: Biochemistry and histopathology, ear, prevalence, haematology, squamous cell carcinoma

INTRODUCTION

Squamous cell carcinoma (SCC) is one of the most common malignant cutaneous tumours in dogs arising from the epidermal keratinocytes and frequently affecting regions exposed to chronic ultraviolet (UV) radiation such as the nasal planum, eyelids and pinnae[5,14]. It constitutes a significant dermatological and oncological concern in canines particularly in middle-aged to geriatric animals due to its locally invasive nature, potential for tissue destruction and tendency for recurrence despite low metastatic rates[6,18].

In dogs, SCC presents in the skin at slightly pigmented or hairy sites[13]; the digits, representing 25% to 52 % of all neoplasms that occur at this location[12]; the nasal planum which may be associated with cutaneous erythematosus lupus, pemephigus and vitiligo; the oral mucosa constituting the most common oral neoplasia in dogs[13] and rarely the eye[12]. In a retrospective study of third eyelid neoplasms in dogs and cats, 145 dogs were evaluated and only one (0.8%) was diagnosed with SCC of the third eyelid, highlighting the rarity of this presentation in dogs[4].

Squamous cell carcinoma (SCC) is an uncommon but important cutaneous neoplasm in dogs representing roughly 4–5% of canine cutaneous tumours in large retrospective surveys[17]. Anatomical distribution differs between species and studies. Tumours involving the pinna or external ear (auricular/ pinnal SCC) are reported in the veterinary literature (case reports and retrospective reviews of ear neoplasms) but ear tumours overall are uncommon and pinnal SCC is usually described as isolated cases or small series rather than large population percentages[7].

The ear pinna is among the most commonly affected sites

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because of its sparse hair coverage and high sun exposure especially in lightly pigmented and short-coated breeds[1]. Chronic solar exposure, repeated trauma and papillomavirus infection have been suggested as major predisposing factors in the development of auricular SCC[8,11]. Environmental and geographic factors also play a crucial role with increased incidence observed in tropical and subtropical regions where sunlight intensity is high[15].

Clinically, affected dogs present with ulcerated, proliferative or crusted lesions that may be painful or bleeding and in chronic cases, necrotic with foul odour and discharge [16,18]. The condition often leads to significant discomfort, otitis externa and secondary bacterial infections compromising animal welfare. Early and accurate diagnosis is therefore essential to prevent local invasion into deeper tissues and recurrence following surgery.

Haematological and biochemical alterations in affected dogs often reflect chronic inflammation, secondary infection and occasionally hepatic stress due to systemic inflammatory mediators[3]. Histopathological examination remains the gold standard for confirmation typically revealing irregular nests, cords or sheets of malignant squamous epithelial cells, keratin pearl formation, nuclear pleomorphism and mitotic figures consistent with well to moderately differentiated SCC[6,10].

The incidence of SCC in dogs has been reported to range between 4% and 19% of all skin tumours with a predilection for German Shepherds, Labradors, Boxers and Spitz breeds[8,14]. Despite its frequent occurrence, regional studies in India remain limited particularly those focusing on auricular forms with clinicopathological correlations.

The present study was therefore undertaken to evaluate the prevalence, breed-wise and age-wise distribution along with the haematological, biochemical and histopathological characteristics of auricular squamous cell carcinoma in dogs presented to the Department of Pathology, Bihar Veterinary College, Patna, over a one-year period. The findings are expected to enhance understanding of the epidemiology and pathological behaviour of SCC in dogs contributing to improved diagnostic and therapeutic approaches in veterinary oncology.

MATERIALS AND METHODS

The present study was conducted on clinical cases of auricular squamous cell carcinoma (SCC) in dogs that were presented to the Department of Veterinary Surgery and Radiology, Teaching Veterinary Clinical Complex, Bihar Veterinary College, Patna, during a period of one year. A total of 786 dogs of different breeds, ages and sexes were examined. Out of 786, 22 dogs were selected for study for further process. The animals were brought with a history of ulcerated or proliferative growths on the ear pinna, crusting, bleeding, foul-smelling discharge

Table 1. Haematological profiles of 22 dogs (Breed wise) suffering from Squamous cell carcinoma.

Parameter	Labrador Retriever (n=6)	German Shepherd (n=7)	Spitz (n=4)	Non-descript (n=5)	Reference Range (canine)
RBC ($\times10^{12}$/L)	5.8 ± 0.5	5.6 ± 0.6	5.9 ± 0.4	5.5 ± 0.6	5.5 - 8.5
Hb (g/dL)	12.7 ± 1.3	12.5 ± 1.4	12.9 ± 1.2	12.4 ± 1.3	12 - 18
PCV (%)	38 ± 3.2	37 ± 3.8	39 ± 2.7	37 ± 3.9	37 - 55
WBC ($\times10^{9}$/L)	12.8 ± 2.4	13.5 ± 3.1	12.6 ± 1.6	13.3 ± 3.0	6 - 17
Neutrophils (%)	65 ± 5	67 ± 7	64 ± 5	66 ± 6	60 - 70
Lymphocytes (%)	28 ± 4	27 ± 5	28 ± 3	27 ± 5	20 - 30
Monocytes (%)	4 ± 1	4 ± 1	4 ± 1	4 ± 1	3 - 10
Eosinophils (%)	3 ± 1	3 ± 1	3 ± 1	3 ± 1	2 - 10
Platelets ($\times10^{9}$/L)	280 ± 30	275 ± 40	290 ± 25	278 ± 35	200 - 500

Table 2. Biochemical profiles of 22 dogs (Breed wise) suffering from Squamous cell carcinoma.

Parameter	Labrador Retriever (n=6)	German Shepherd (n=7)	Spitz (n=4)	Non-descript (n=5)	Reference Range (canine)
ALT (U/L)	48 ± 12	52 ± 15	46 ± 10	50 ± 13	10 - 60
AST (U/L)	40 ± 10	42 ± 12	38 ± 9	41 ± 11	15 - 45
ALP (U/L)	110 ± 25	120 ± 30	105 ± 20	115 ± 28	20 - 150
Total Protein (g/dL)	6.8 ± 0.5	7.0 ± 0.6	6.9 ± 0.4	6.7 ± 0.5	5.5 - 7.5
Albumin (g/dL)	3.2 ± 0.3	3.3 ± 0.4	3.2 ± 0.2	3.1 ± 0.3	2.5 - 4.0
Globulin (g/dL)	3.6 ± 0.4	3.7 ± 0.5	3.7 ± 0.3	3.6 ± 0.4	2.5 - 4.0
Urea (mg/dL)	32 ± 5	34 ± 6	33 ± 4	32 ± 5	20 - 40
Creatinine (mg/dL)	1.2 ± 0.2	1.3 ± 0.3	1.2 ± 0.1	1.2 ± 0.2	0.5 - 1.5

and in some cases, head shaking and scratching due to discomfort occurs. The duration of lesions as reported by owners ranged from one month to eight months prior to presentation. Some owners also noticed loss of appetite, irritability and occasional ear tilting.

On clinical examination, the affected dogs were generally alert and responsive though some showed signs of pain and pruritus upon palpation of the ear. Lesions were mostly ulcerated, proliferative or nodular varying in size from 1 cm to 6 cm and occasionally associated with serosanguinous exudation. Regional lymphadenopathy was palpable in a few chronic cases. Physiological parameters such as rectal temperature, pulse rate and respiration rate remained within normal limits in most animals.

For diagnostic evaluation, haematological and biochemical analyses were performed using standard protocols. Blood samples were collected aseptically from the cephalic vein into EDTA and plain vacutainers. Haematological parameters included haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC), total leukocyte count (TLC) and differential leukocyte count (DLC). Biochemical assays measured serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), total protein, albumin, globulin, blood urea nitrogen (BUN) and creatinine using an automatic biochemical analyser. Haematological findings showed mild to moderate anaemia, leucocytosis and neutrophilia while biochemical profiles revealed elevated ALT and AST with normal renal parameters (Tables 1 & 2).

Dogs with confirmed or suspected SCC underwent surgical excision of the auricular mass under general anaesthesia. Animals were pre-medicated with inj. atropine sulphate (0.04 mg/kg body weight, i.m.) and inj. xylazine (1 mg/kg body weight, i.m.) followed by induction with inj. ketamine (5 mg/kg body weight, i.v.). After achieving adequate anaesthesia, the animal was positioned in lateral recumbency and the affected ear was prepared aseptically. Draping of surgical site of ear tumour in dog was done (Fig. 1). Linear incision was made over the affected auricular tissue having tumour mass (Fig. 2) and the mass was carefully excised using scissors and tissue forceps (Fig. 3). Bleeding vessels were ligated with absorbable suture material (Polyglycolic acid 2/0) and the incision was closed with nylon 2/0 (Fig. 4).

The excised tumour specimens were immediately fixed in 10% neutral buffered formalin and submitted to the Department of Veterinary Pathology, Bihar Veterinary College, BASU for gross, cytological and histopathological evaluation. Grossly, the masses were examined for size, colour, consistency and ulceration. Tissue samples were routinely processed by paraffin embedding, sectioned at 4–5 µm thickness and stained with Haematoxylin and Eosin (H&E) for microscopic evaluation.

Postoperatively, dogs were treated with inj. ceftriaxone (25 mg/kg body weight, i.m.) once daily for five days and inj. meloxicam (0.2 mg/kg body weight, i.m.) for three days to control pain and inflammation. The surgical site was cleaned with povidone-iodine ointment twice daily for one week and sutures were removed after 10–12 days.

All procedures were carried out in compliance with the Institutional Animal Ethics Committee (IAEC) guidelines, Bihar Veterinary College, BASU, Patna (Approval No.: IAEC/BVC/2025/29).

RESULTS AND DISCUSSION

All affected dogs resumed normal feeding and activity within 3–7 days post-surgery. The surgical wounds healed uneventfully and sutures were removed on day 10–12 without complications. On follow-up examination after two months, no local recurrence or evidence of metastatic spread was observed in any of the treated cases indicating a favourable postoperative outcome.

Grossly, the excised auricular masses were irregular, firm to hard and ulcerated with raised and proliferative margins. The cut surface appeared whitish to grayish-white occasionally showing yellow necrotic foci and areas of haemorrhage. The tumour size varied from 1.5 cm to 6.2 cm in diameter. The lesions were mostly unilateral and the underlying cartilage was thickened in chronic cases though invasion beyond the pinna was not observed.

Histopathologically, the cells exhibited abundant eosinophilic cytoplasm, prominent intercellular bridges and keratin pearl formation which are characteristic features of squamous differentiation. It demonstrated moderate cellular pleomorphism, hyperchromatic nuclei, occasional mitotic figures and focal keratinization (Fig. 5). Histopathological examination of tumour sections also shows nests and cords of neoplastic epithelial cells infiltrating the dermis (Fig. 6). The stroma showed fibroblastic proliferation and lymphoplasmacytic infiltration around tumour lobules indicative of a chronic inflammatory response. Based on these findings, the lesion was diagnosed as well to moderately differentiated squamous cell carcinoma.

Squamous cell carcinoma is one of the most frequently diagnosed malignant cutaneous neoplasms in dogs accounting for 4–19% of all skin tumours [1,8]. The mean age of affected dogs in the present study was 9.1 ± 2.3 years which agrees with the previous findings who reported a higher occurrence in middle-aged to

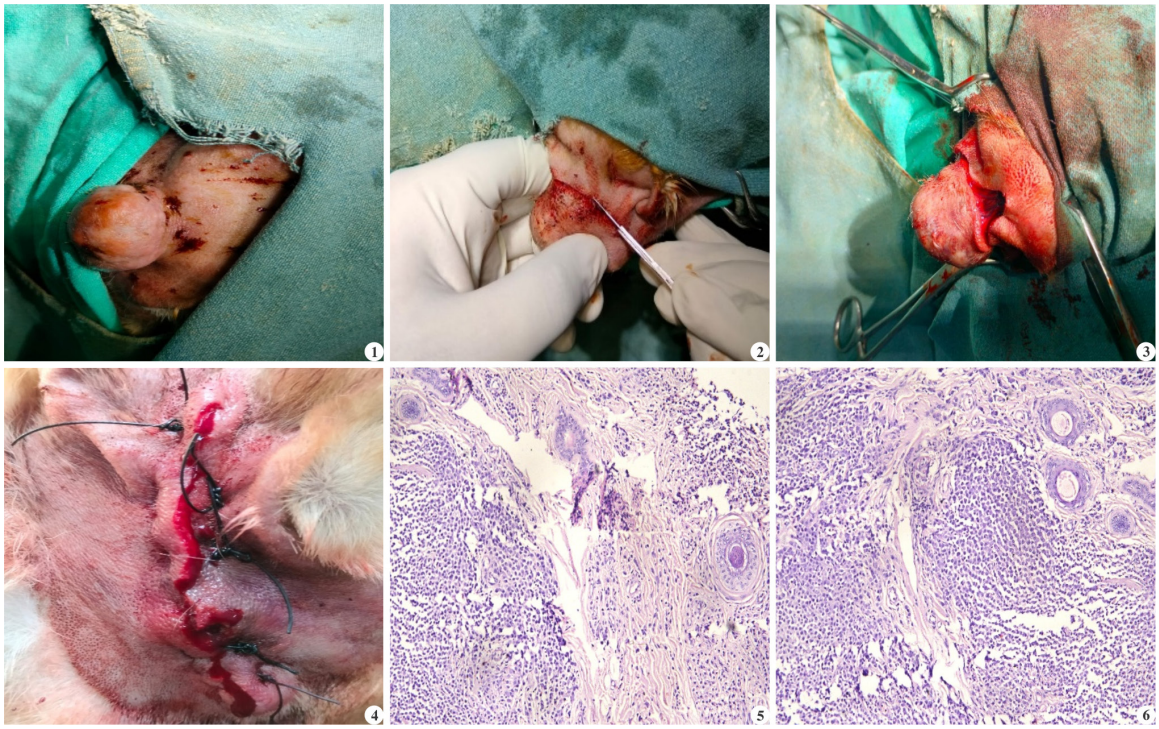

Fig. 1. Image showing draping of surgical site of ear tumour in dog; **Fig. 2.** Linear incision over the affected auricular tissue showing surgical approach to the tumour mass; **Fig. 3.** Intraoperative view showing scissors and forceps employed for precise dissection of auricular tumour; **Fig. 4.** Operative site showing apposition of skin margins with interrupted sutures after tumour removal from the ear; **Fig. 5.** Histological section of canine oral tumour (H&E, 100x) showing well-differentiated squamous cell carcinoma characterized by concentric keratin pearl formation surrounded by malignant epithelial cells; **Fig. 6.** Histological section of ear of dog (H&E, 100x) showing nests and cords of neoplastic epithelial cells infiltrating the dermis.

geriatric animals[8,14]. Breed-wise prevalence indicated a higher incidence in German Shepherds (32%) followed by Labrador Retrievers (27%), Spitz (18%) and non-descript dogs (23%) suggesting breed predisposition and increased solar exposure as important contributing factors. Previous studies have also reported breed-related clustering of cutaneous SCC with higher overall prevalence of SCC among short-haired, lightly pigmented breeds and dogs with chronic sun exposure. Additionally, broader epidemiological surveys have shown that squamous cell carcinoma accounts for 5–7% of all canine cutaneous tumours with commonly affected sites including the ventral abdomen, limbs, nasal planum, eyelids and pinnae supporting the multifocal nature and variable anatomical distribution of SCC in dogs. Similar observations have been reported by earlier authors[1,15].

A total of 138 dogs with a history of neoplastic growths were evaluated from nearby veterinary hospitals between August 2004 and December 2006 at the Department of Pathology, Veterinary College, Hebbal, Bangalore. Out of which, 17 cases were confirmed of of squamous cell carcinoma (SCC). Out of SCC-affected dogs, eight were males and nine were females. The highest occurrence was observed in nondescript dogs (8 cases; 47.1%) followed by Dobermans (2 cases; 11.8%). German Shepherd, Dalmatian, Spitz, Golden Retriever, Cocker Spaniel, Labrador and Poodle contributed one case each (approximately 5.9% per breed) [2].

Study further supported a breed-specific predisposition for squamous cell carcinoma in dogs. In their detailed analysis of 79 dogs with digital squamous cell carcinoma, they constituted nearly one-third of all cases indicating a strong breed over-representation. Other frequently affected breeds in the cohort included Labrador Retrievers, Rottweilers, Poodles and other large, dark-coated breeds highlighting the influence of both genetic and phenotypic factors on SCC susceptibility. The authors suggested that pigmentation, body size and breed-associated keratinisation patterns may contribute to this clustering. Although this study focused on digital SCC, the consistent over-representation of certain breeds across SCC types supports the broader concept of breed-related risk, reinforcing patterns observed in the present investigation[9].

Haematological examination revealed mild to moderate anaemia, leucocytosis and neutrophilia consistent with a chronic inflammatory condition. These findings are comparable to those of previously documented similar alterations in dogs with cutaneous

neoplasms[3]. Biochemical analysis showed elevated ALT and AST levels and mild increase in ALP and globulin indicative of liver stress and systemic inflammatory response. Comparable biochemical deviations have been recorded in cases of chronic cutaneous SCC previously [8,16].

Histopathological features observed in this study namely keratin pearl formation, cellular pleomorphism and stromal desmoplasia closely resemble the previous descriptions[6,18]. The absence of vascular invasion and metastasis in all cases supports the notion that auricular SCC in dogs is typically locally invasive but rarely metastatic as also concluded in past[1].

The favourable postoperative recovery and absence of recurrence following complete surgical excision reaffirm that early detection and wide surgical resection remain the treatment of choice for auricular SCC in dogs. Adjuvant therapy may be considered in extensive or recurrent cases. The findings of the present study highlight the need for early clinical recognition especially in sunlight-exposed breeds and stress the importance of routine ear examination in geriatric dogs for timely intervention.

CONCLUSION

Auricular squamous cell carcinoma in dogs is an important cutaneous malignancy, particularly affecting middle-aged to older animals with prolonged exposure to sunlight. The condition holds considerable clinical and pathological significance due to its locally invasive nature and potential for tissue destruction and recurrence. Early diagnosis through clinical, haematological, biochemical and histopathological evaluation followed by prompt surgical excision offers an excellent prognosis. The present study emphasizes the influence of breed and age predisposition and underlines the necessity of accurate histopathological confirmation and periodic monitoring for effective management and prevention of recurrence.

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REFERENCES

1. Bomhard W, Goldschmidt MH. (2015). Cutaneous squamous cell carcinoma in dogs and cats. *Vet Cli North America: Small Ani Prac*. **45(4):** 653–672.
2. Chandrashekaraiah GB, Rao S, Munivenkatappa BS, Mathur KY. 2011. Canine squamous cell carcinoma: A review of 17 cases. *Braz J Vet Pathol*. **4(2):**79-86.
3. Das B, Kumar S, Tiwari R, Sharma AK. 2021. Evaluation of biochemical changes in canine skin tumours. *Jo Ani Res*. **11(4):** 725–729.
4. Dees DD, Schobert CS, Dublielzig RR, Stein T J. 2016. Third eyelid gland neoplasms of dogs and cats: a reterospective histopathologic study of 145 cases. *Vet Opthalm*. **11(4):** 269-272.
5. Goldschmidt MH, Hendrick MJ. 2017. Tumours of the Skin and Soft Tissues. In: Meuten D. J. Tumours in Domestic Animals (5th edn., pp. 88–141). Wiley-Blackwell.
6. Gross TL, Ihrke PJ, Walder EJ, Affolter VK. 2005. Skin Diseases of the Dog and Cat: Clinical and Histopathologic Diagnosis (2nd edn.). Blackwell Publishing, Oxford.
7. Lanz O, Wood BC. 2005. Surgery of the ear and pinna. *Vet Clin. North Am Small Anim Pract.* **34 (2):** 567-599doi: 10.1016/j.cvsm.2003.10.011
8. Lim CC, Savickis M, Taylor R. 2016. Canine cutaneous squamous cell carcinoma: clinicopathologic features and outcomes of 51 cases (2009–2014). *Vet Derma*. **27(5):** 411–e109.
9. Marconato L, Murgia D, Finotello R, Meier V, Morello EM, Pisoni L, Foglia A, Guerra D, Chalfon C, Aralla M, Mesto P, Annoni M, Albanese F, Bettini G, Sabattini S. 2021. Clinical features and outcome of 79 dogs with digital squamous cell carcinoma undergoing treatment: a SIONCOV observational study. *Front Vet Sci*. **8:**645982. doi:10.3389/fvets.2021.645982.
10. Meuten DJ. 2017. *Tumors in Domestic Animals* (5th edn.). Wiley-Blackwell.
11. Munday JS, French AF, Peters-Kennedy J. 2017. Papillomaviruses in dogs and cats. *Vet J*. **225:** 23–31.
12. Northrup N, Gieger T. 2010. Tumours of the skin, subcutis and other soft tissues. In: Henry C. J. & Higginbotham M. L. (Eds). *Cancer Management in Small Animal Pratcice.* St. Louis: Elseiver, pp. 299-328.
13. Scott DW, Miller WH, Griffin CE. 2013. Muller and Kirk's Small Animal Dermatology (6th edn.). Philadelphia: W. B. Saunders, pp. 1236-1415
14. Scott DW, Miller WH, Griffin CE. 2013. Muller and Kirk's Small Animal Dermatology (7th edn.). Saunders Elsevier. St. Louis Missouri.
15. Sharma A, Singh D, Sood NK, Sandhu BS, Kaur P. 2020. Incidence of cutaneous neoplasms in dogs: A retrospective study. *Indian Veterinary Journal*. **97(10):** 45–48.
16. Singh SK, Gupta K, Kumar A, Sinha N. 2019. Auricular squamous cell carcinoma in dogs: clinico-pathological and therapeutic aspects. *Indian Jo Vet Patho*. **43(2):** 121–124.
17. Webb J, Burns R, Brown H, Roy B, Kosarek C. 2009. Squamous cell carcinoma in dogs. *VetFolio.* https://www.vetfolio.com/learn/article/squamous-cell-carcinoma
18. Yager JA, Wilcock BP. 1994. Color Atlas and Text of Surgical Pathology of the Dog and Cat: Dermatopathology and Skin Tumours. Wolfe Publishing.