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SHORT COMMUNICATION

# Oral melanoma with multicentric metastasis in a sniffer dog

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## ABSTRACT

A twelve-year-old airport sniffer male Labrador dog was brought to Veterinary Clinical Complex, VCRI, Namakkal with the history of sudden seizures and drooling of saliva. However, the dog was found dead while on arrival at the Veterinary Clinical Complex. The dog carcass was referred to the Department of Veterinary Pathology, VCRI, Namakkal for necropsy. On gross examination, multiple blackish nodular growths in the oral cavity; leathery appearance of lungs with tiny raised greyish nodules; dark blackish raised nodules in spleen; shrunken kidneys with focal blackish areas in cortico-medullary junction; blackish discolouration with haemorrhage in intestine; thickened urinary bladder and prostate gland were observed. Cytological examination of oral growth revealed clusters of melanin-laden melanocytes with anisocytosis, anisokaryosis, prominent nucleoli and intracytoplasmic coarse granular melanin pigments. Histopathological examination of the oral growth exhibited replacement of normal stratified squamous epithelium with numerous melanin-laden melanocytes. In addition, melanin-laden melanocytes were also noticed in various organs like lungs, spleen, kidney and intestine. This case deals with oral melanoma with multicentric metastasis to various organs in a sniffer dog.

**Keywords:** Melanoma, metastasis, multicentric, sniffer dog

Oral melanoma represents the most prevalent and aggressive oral neoplasm in dogs[1,2]. It usually arises from the mucocutaneous junction of lips, gums as well as from any part of the oral cavity[3]. Its incidence increases with age[4] and most commonly above 10 years of age[5]. Low grade malignant oral melanomas are common in 8 years of age, whereas high grade malignant forms are more frequent in 12 years of age[6]. Most of the malignant melanomas are fatal in life as it grows very rapidly and metastasis to various organs. It can spread mainly through lymphatics as well as regional lymph nodes and thereafter, it spreads to lungs and other organs like heart, brain, spleen and gastrointestinal tract[3,7,8]. Melanomas are the most common tumours which originate from the melanoblast and melanocytes of neuroectodermal origin[9]. Various causes for malignant melanoma include trauma, hormones, chemical exposure and genetic susceptibility[10]. Because of its aggressiveness and its tendency to spread to lungs, canine oral melanoma is considered as valuable model for developing novel therapies in humans[11]. Recent studies have shown that oral melanoma is highly helpful in finding novel protocols for immunotherapy especially in development of modified vaccines for both primary and metastatic neoplastic conditions[12]. This case report deals with oral melanoma and its propensity for multicentric metastasis in a sniffer dog.

A twelve-year-old sniffer male Labrador was brought for treatment to Veterinary Clinical Complex, VCRI, Namakkal with the history of sudden episodes of seizures and drooling of saliva. However, the dog was found dead while on arrival at the clinical complex. The carcass was referred to the Department of Veterinary Pathology, VCRI, Namakkal for necropsy. A detailed postmortem examination was carried out and gross lesions were recorded. Fine needle aspiration cytology (FNAC) was taken from the growth present in the oral cavity. Impression smears were prepared from various organs showing lesions. The cytology smears were fixed in methanol, air dried and stained with Giemsa, Leishman and combination of Leishman-Giemsa. The oral growth and organs showing lesions were collected and fixed in 10 percent neutral buffered formalin for histopathological examination. The tissue sections were cut into 4 µm thickness and subjected to routine H&E staining.

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On gross examination, multiple blackish nodular growths were seen in the left lateral aspect of the oral cavity, upper and lower gums as well as in oral commissures (Fig. 1). There were stray tiny greyish black nodules scattered over the lung parenchyma. Spleen showed two large circumscribed black coloured elevated nodules on lateral borders with few raised areas on the dorsal surface (Fig. 2). There were no observable gross lesions in the heart and

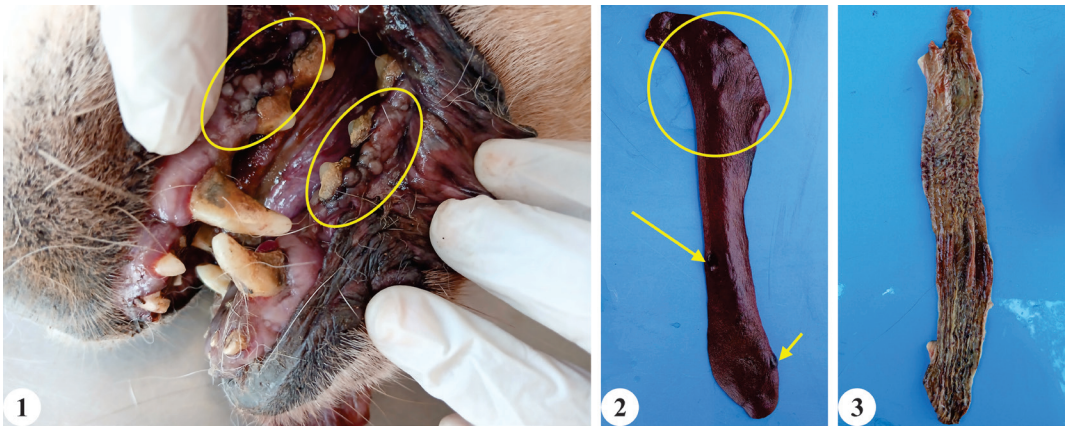

**Fig. 1.** Multiple black coloured nodular growth on the left lateral aspect of the oral cavity (circles); **Fig. 2.** Circumscribed blackish nodules (arrows) with multiple raised areas (circle) noticed on the splenic parenchyma; **Fig. 3.** Large intestine showing thickened mucosa with black discolouration and haemorrhage.

liver except for mild hepatic congestion and subcapsular haemorrhage in liver.

The gastric mucosa was thickened with few scattered ulcers. Intestinal serosa revealed stray blackish areas and the mucosa exhibited severe thickening with haemorrhage and linear to nodular blackish areas (Fig. 3). Both the kidneys were shrunken and loss of renal architecture with cystic, pitted and uneven surface (Fig. 4); while on cut section, there was focal blackish areas in corticomedullary junction. The mucosa of urinary bladder and prostate gland were severely thickened.

FNAC from the oral growth revealed clusters of melanin-laden melanocytes with anisocytosis, anisokaryosis, prominent and multiple nucleoli, intracytoplasmic coarse granular black coloured melanin pigments (Fig. 5). In few cells, melanin granules totally masked the nucleus and appeared as dark areas. Similarly, the impression smears from the black nodular areas of the spleen and lungs also exhibited scattered cell population of melanin-laden neoplastic melanocytes.

Histopathological examination of the mass from the oral cavity exhibited replacement of various layers of normal stratified squamous epithelium with numerous melanin-laden melanocytes (Fig. 6). The lung section showed metastatic blackish melanotic nodule in the peribronchiolar areas (Fig. 7). Liver exhibited severe necrosis with occasional melanin-laden melanocytes in the sinusoidal space. There were huge population of melanin-laden melanocytes replaced the normal lymphatic tissue and lymphoid cells of spleen (Fig. 8). Masson Fontana stain was employed on the sections of spleen to differentiate melanin and haemosider in pigment, where those were found to be positive. The intestine showed severe destruction of intestinal villi and crypts of lieberkuhn with severe submucosal congestion and focal infiltration of melanin-laden melanocytes. There were stray melanin-laden melanocytes in the renal tubular basement membrane and severe fibrous tissue proliferation with mononuclear cell infiltration noticed in kidney sections (Fig. 9). Prostate revealed fibrous tissue proliferation with atrophied glandular tissue.

Most of the malignant melanoma occurs either as sessile mass or pedunculated growth with small stalk. The aggressiveness is low in the case of pedunculated mass when compared to sessile growth[3]. The exact mechanism is not clear; this is mainly due to biological nature of neoplasm. In the present case, there was multiple blackish sessile nodular growth noticed in the oral cavity with multicentric metastasis. The gross morphology and metastatic potential of the blackish sessile nodular growth in oral cavity is very well correlated with the earlier report[3].

The clusters of melanin-laden melanocytes with prominent multiple nucleoli and intracytoplasmic coarse granular blackish pigments were noticed in the FNAC samples of oral growth. Similar cytological features were also observed in spleen and lungs. These cytological observations were in accordance with the findings of earlier authors[13]. Additionally, the cytological findings were well illustrated by the histopathological features of the oral growth and other affected organs.

In the present case, the primary tumour was noticed in the oral cavity and metastasis to various organs like of spleen, lung, kidney and intestine which was evidenced in both gross and microscopic lesions. The multicentric melanoma noticed in the present case might be due to metastasis via the lymphatic system, regional lymph nodes and subsequent spread to various organs[3,14].

Multiple tiny greyish/blackish nodules in lung and spleen noticed in the present case, might be due to metastasis of neoplastic melanocytes from the primary site of oral melanoma[15]. Shrunken kidneys and stray focal blackish area noticed in the corticomedullary

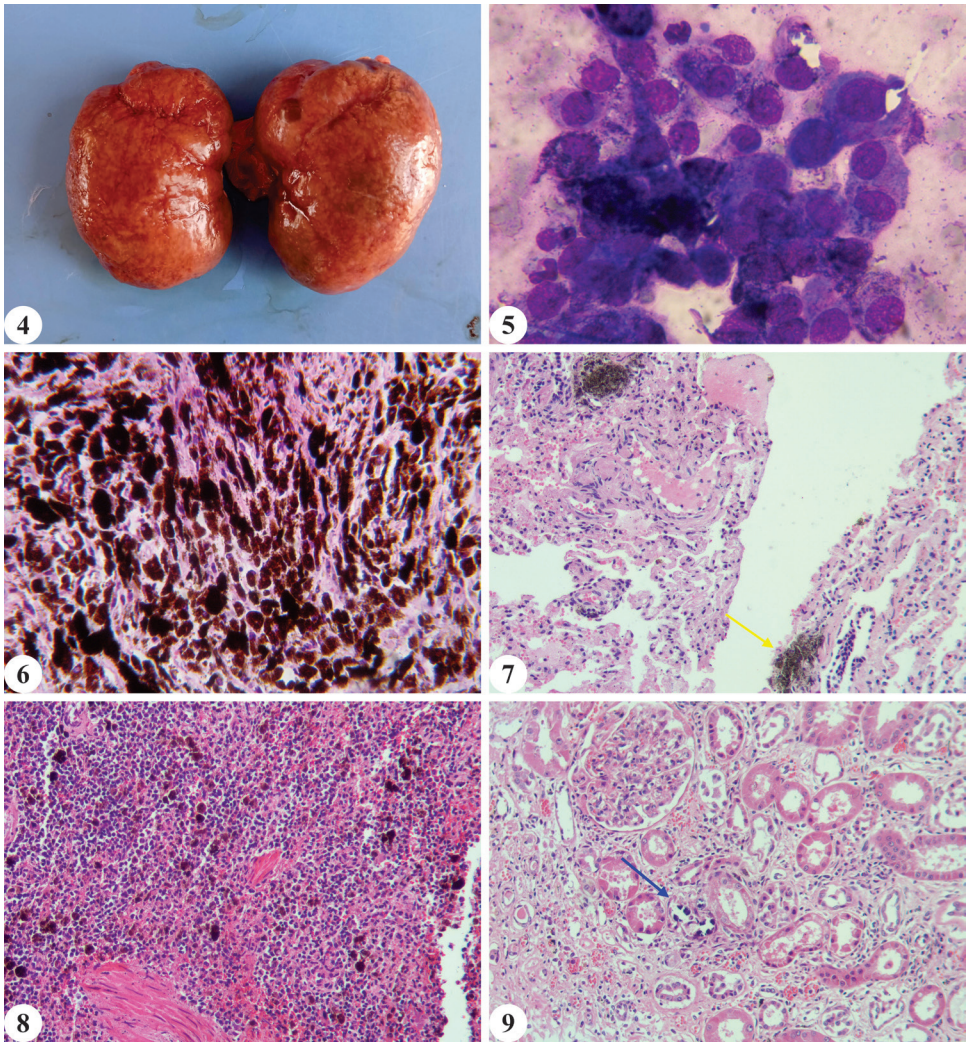


**Fig. 4.** Shrunken kidneys with pitted, cystic and granular surface; **Fig. 5.** Clusters of cells showing anisocytosis, anisokaryosis and prominent nucleoli with intra cytoplasmic blackish melanin pigment (Giemsa x400); **Fig. 6.** Oral cavity growth showing neoplastic melanocytes replacing the normal oral stratified squamous epithelium (H&E x400); **Fig. 7.** Lung revealing metastatic blackish melanotic nodule (arrow) in peribronchiolar areas (H&E x100); **Fig. 8.** Spleen revealing melanin laden neoplastic melanocytes in the splenic parenchyma (H&E x100); **Fig. 9.** Kidney section showing melanin laden melanocytes in the tubular basement membrane (arrow) with fibrous tissue proliferation and mononuclear cell infiltration (H&E x100).

junction might be due to the chronic inflammatory response related with neoplastic conditions and senility. It was evidenced in histopathology by fibrous tissue proliferation in interstitium and presence of melanin laden melanocytes in the tubular basement membrane. The prostate gland exhibited mucosal thickening and atrophy of glandular tissue which might be due to advanced age.

A notable feature observed in this study was gross blackish thickening of the intestinal mucosa and presence of melanin laden melanocytes within the submucosa in microscopy though intestinal malignant metastatic melanomas are uncommon in dogs[16].

Metastatic malignant oral melanoma leading to aggressive local invasiveness and widespread metastasis to various vital organs resulted in organ failure and fatal death.

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