

## Subcutaneous Hemangiosarcoma: The First Report in Maltese Dog

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**Abstract :** Subcutaneous hemangiosarcoma is rare malignant condition in dogs. An eleven-year-old neutered male Maltese was presented with multicentric cutaneous hemorrhagic nodules followed by lethargy. The patient showed regenerative anemia and thrombocytopenia with skyrocketing D-dimer, indicating that he had disseminated intravascular coagulation (DIC) on progress. Fine needle aspiration, histopathology, X-ray, and computed tomographic scanning ultimately diagnosed this patient as subcutaneous hemangiosarcoma with disseminated metastasis to the body. Unfortunately, the dog died due to side effects of anti-thrombotic therapy for DIC. This case report described a rare subcutaneous hemangiosarcoma in a Maltese dog.

**Key words :** dog, skin neoplasms, hemangiosarcoma, disseminated intravascular coagulation, histopathology.

### Introduction

Hemangiosarcoma (a.k.a. malignant hemangioendothelioma or angiosarcoma) is an outbreak of tumor from endothelial cells which occurs more frequently in dogs than any other species, accounting for 0.3% to 2.0% of all tumors in dogs with a high fatality rate (1,7). It mostly affects elder dogs with no sex predisposition, although many reports have shown increased prevalence in males (1,7). This tumor is capable of affecting any tissue in the body, most commonly the spleen (28% to 50%), right atrium or auricle (3% to 50%), and skin or subcutaneous tissue (13%) (1). As a primary site of origin, spleen is the most common primary site; however, primary hypodermal or dermal hemangiosarcomas are also common enough, taking up to 14% of these tumors in dogs (7). Subcutaneous or cutaneous (i.e. hypodermal or dermal) hemangiosarcomas may occur due to solar radiation or even foreign bodies such as vaccines, vaccine adjuvants or suture etc (6). In humans, cutaneous hemangiosarcomas are rare but described as highly invasive tumor with high recurrence rate and poor long-term prognosis (8). Predisposing factors for cutaneous hemangiosarcomas in humans include vascular stasis, trauma, radiation therapy, and sun exposure (8). Since subcutaneous or cutaneous hemangiosarcomas as primary tumors are infrequently reported in dogs and rather metastasized from internal organs, it is usually in an advanced or metastatic stage with poor prognosis when detected (3,4).

### Case Report

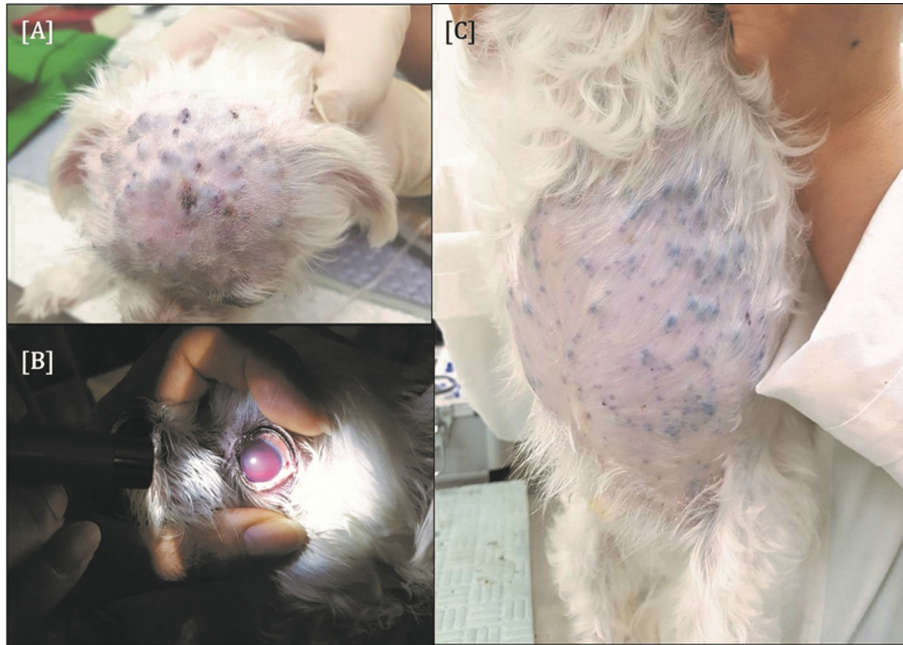
An eleven-year-old neutered male Maltese was referred due to anorexia and lethargy which continued for 3 days. He

had a 2 month history of multicentric cutaneous hemorrhagic nodules initiated from his dorsum (Fig 1A and C). There were no specific findings from skin examination such as scraping or taping, and no bacteria or fungi were cultured from the lesions. On physical examination, he had a pale mucous membrane with bilateral ocular hemorrhage (Fig 1B). Complete blood count indicated constant leukocytosis with marked regenerative anemia and thrombocytopenia followed by skyrocketing D-dimer on coagulation panel. With the support of thromboelastogram evaluation with activated partial thromboplastin time and prothrombin time, all of these results proved that this patient had disseminated intravascular coagulation (DIC) on progress. Serum chemistry, electrolytes, and blood gas showed no relevant findings. Fine needle aspiration was carried out from his dorsum. Cytologic evaluation of the sample revealed predominant mesenchymal cell type neoplastic cells on microscope. Radiography, ultrasonography, and computed tomography images were subsequently taken. Multifocal radiopaque masses were detected from the thorax with concurrent splenomegaly on radiograph. Large masses from both kidneys and also the spleen followed by multifocal masses over the entire abdominal region were observed from ultrasonography. Computed tomography revealed systemically spread multicentric masses including his skull (Fig 2). Lastly, a wedge biopsy from his initial lesion was conducted. Histopathologic examination of the sample made it possible for us to ultimately diagnose this patient as subcutaneous hemangiosarcoma (Fig 3). Unfortunately, this patient was died on the treatment of DIC using low molecular heparin, dalteparin (150 U/kg, sc, tid) and aggressive fluid therapy before chemotherapy which in conclusion made us unable to evaluate medication response.

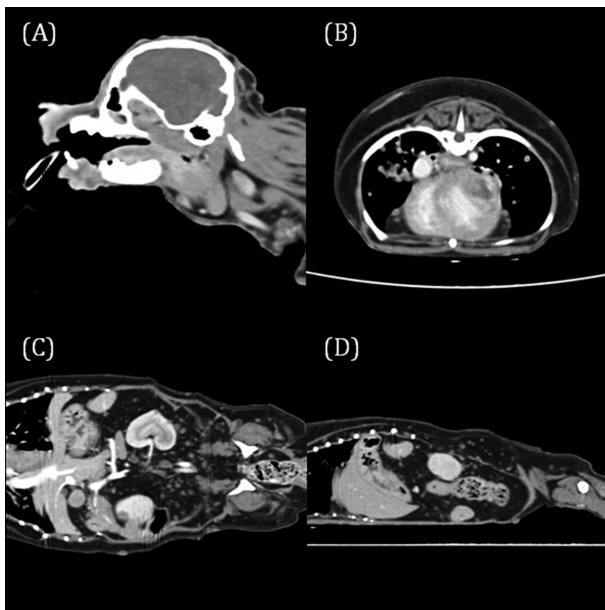
### Discussion

The patient in this report was presumptively diagnosed as

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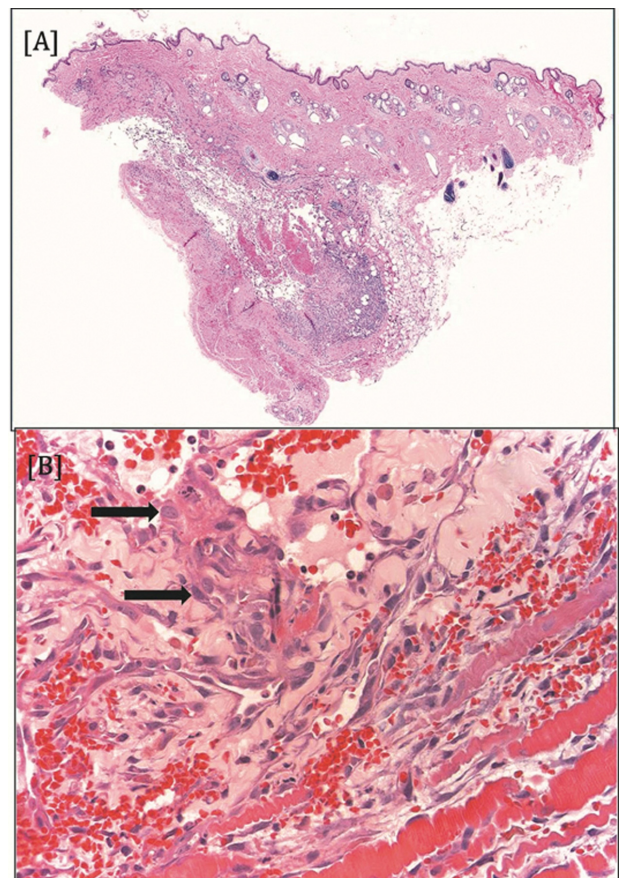
**Fig 1.** Generalized distribution of multicentric nodules on head (A) and abdomen (C). Bilateral anterior hemorrhage was detected on ophthalmic examination (B).



**Fig 2.** Computed tomography. Multifocal masses are found over the entire body including skull (A), thorax (B), abdomen and subcutis (C, D).

subcutaneous hemangiosarcoma based on many diagnostic tools which are: physical examination, hematology, cytology and imaging. This diagnosis was confirmed by histopathologic examination.

This type of tumor might be hard to differentiate from other types of hemangiosarcoma because if lesions are disseminated, it is difficult to determine whether this type of tumor is developed primarily from the skin itself or the result of metastasis from internal tumors (4). However from the history of the patient and the fact that there was no evidence of visceral hemangiosarcoma at local hospital before the visit



**Fig 3.** Histopathologic examination showed subcutaneous affected area (A) and the majority of tumor cells (arrows) were plump endothelial cells aligned on mature collagen trabeculae or pre-existing dermal collagen bundle (B). The trabeculae formed an anastomosing meshwork of blood-filled channels of varying size, and the vascular spaces of tumor cells were not uniformly enclosed by endothelial cell with blind-ended.

to our hospital, we eventually managed to diagnose this patient as primary subcutaneous hemangiosarcoma.

Cutaneous or subcutaneous hemangiosarcoma have been defined as that stage I is confined to the dermis; stage II involves the hypodermis but does not involve invasion of the musculature, and stage III involves invasion of the musculature (8). The present case could be classified as stage III which was certainly disseminated to the body including abdominal cavity, brain, and subcutis. The dog had a poor prognosis with the severity of stage III.

Canine hemangiosarcoma is more so common in certain breeds including German Shepherd Dogs and Golden Retrievers (2). Recently, a subcutaneous hemangiosarcoma within an intermuscular lipoma was reported in a golden retriever dog (5). To our knowledge, it is the first report in a Maltese dog with subcutaneous hemangiosarcoma. The breed predilection of the disease was not clear in dogs, but only one retrospective study had reported the relationship between them (4).

Hemangiosarcoma can cause a wide variety of hematologic and hemostatic abnormalities, including anemia, thrombocytopenia, and DIC. Because the tumor is originated from blood vessel, the damage to blood vessel could trigger to be weak. The condition is closely associated with the development of DIC. DIC is a condition in which thrombosis form throughout the body and contributes to the development of multi-organ failure (9). The condition is very fatal in dogs and is a large challenge for management.

The present case describes a rare subcutaneous hemangiosarcoma with multi-organ metastasis in a Maltese dog. This case could contribute to understanding of the diagnostic approach and clinical consequences in dogs.

### Acknowledgements

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### Conflict of Interest

The authors declare no conflicts of interest.

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