

Localized histiocytic sarcoma in a captive capybara (*Hydrochoerus hydrochaeris*)

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Abstract

An irregular, subcutaneous mass (2x3x2 cm) located between the first and second digits of the left hindlimb of a nine-year-old, male, captive capybara (*Hydrochoerus hydrochaeris*) was biopsied. Microscopically, the mass scattered throughout the dermis. The neoplastic cells were arranged in solid-sheet patterns and comprised of pleomorphic histiocytic cells with pleomorphic nuclei and abundant eosinophilic cytoplasm. Mitotic figures were 2-3 cells/HPF. Numerous, multinucleated, giant cells, up to 10 nuclei/cells, were also prominently observed and found scattered throughout the mass. Immunohistochemically, the neoplastic cells were strongly positive for vimentin and ionized calcium-binding adaptor molecule 1 (Iba-1), while immunoreactivity for cytokeratin was negative. Based on histopathological and immunohistochemical characterizations, localized histiocytic sarcoma was diagnosed.

Keywords: Capybara, histiocytic sarcoma, *Hydrochoerus hydrochaeris*

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Introduction

Histiocytic proliferative disorders are common skin disorders in animals that mostly involve the skin, alone or with other organs (Moore, 2014). Histiocytes are a subset of leukocytes that differentiated from CD34⁺ stem cells into macrophages and several dendritic cell (DC) lineages (Fulmer and Mauldin, 2007). In animals, canine histiocytic disorders have been classified into three categories according to their clinical behavior and pathological features, including reactive histiocytosis (cutaneous and systemic forms), cutaneous histiocytoma, and histiocytic sarcoma (localized and disseminated forms) (Affolter and Moore, 2002; Fulmer and Mauldin, 2007; Moore, 2014). Cutaneous histiocytoma is a common, benign, cutaneous neoplasm of dogs, in which the lesions have an epidermal focus ("top-heavy"), and most of the tumors spontaneously regress (Moore, 2014). The lesions of cutaneous reactive histiocytosis are mostly identical to histiocytoma, however, cytological atypia are rare, and most of the lesions are focused on mid-dermis to subcutis ("bottom heavy") (Affolter and Moore, 2002; Moore, 2014). The lesions are more complicated in histiocytic sarcoma in which the tumors behave aggressively, and multiple organs are usually involved (Affolter and Moore, 2002; Moore, 2014; Moore and Rosin, 1986). Until recently, most reports of animal histiocytic disorders have involved domestic animals, including dog, cat, pig, rabbit, cow and horse (Helie et al., 2014; Leissingner et al., 2013; Matsuda et al., 2010; Moore, 2014; Paciello et al., 2013). In the present study, we describe histiocytic sarcoma in a capybara (*Hydrochoerus hydrochaeris*), the world's largest extant rodent (Hamano et al., 2014), raised in captivity in a zoo.

Materials and Methods

A nine-year-old, male, captive capybara (*Hydrochoerus hydrochaeris*) presented with a large, multinodular, firm, skin-colored mass located between the first and second digit of the left hindlimb (Fig. 1a). The mass had grown for 12 months with no obvious lymph node enlargement, skin ulceration, or alteration of animal movement, until the zoo keeper recognized an increase in the size of the mass. The zoo veterinarian performed a cytological examination and diagnosed the lesion as undifferentiated sarcoma of mesenchymal origin. Thereafter, radiographic diagnosis indicated an increase in the radiopacity of the mass (Fig. 1b). The veterinarian then decided to surgically remove the mass, which was submitted for histopathological diagnosis at the Veterinary Diagnostic Laboratory, Faculty of Veterinary Medicine, Chiang Mai University. A representative biopsy specimen of the mass was fixed in 10% neutral buffered formalin, routinely embedded in paraffin, and 4- μ m thick sections were stained with hematoxylin and eosin (H&E). After histological examination, periodic acid Schiff (PAS) and acid-fast staining were performed. The sections were also subjected to immunohistochemical labeling using an avidin-biotin complex immunoperoxidase technique (Vector Laboratories Inc., Burlingame, California, USA), as previously described (Pringproa et al., 2015), with the

primary antibodies against cytokeratin (1:200; AE1/AE3, Diagnostic BioSystems, Pleasanton, California, USA), vimentin (1:200; Diagnostic BioSystems, Pleasanton, California, USA), and ionized calcium-binding adaptor molecule 1 (Iba-1, 1:400; EMD Millipore, Darmstadt, Germany). A 3, 3'-diaminobenzidine (DAB) solution was used as the chromogen. The nuclei were counterstained with Mayer's hematoxylin.

Results and Discussion

Gross examination of the lesion revealed it to be a reddish, solitary, multinodular mass with dimensions of approximately 2x3x2 cm (Fig. 1c). Histologically, the mass scattered throughout the dermis, and was comprised of round to polygonal neoplastic cells with abundant eosinophilic cytoplasm that were arranged in sheets or a solid pattern (Fig. 1d). Mitotic figures were 2-3 cells/HPF. Numerous, multinucleated, giant cells, up to 10 nuclei/cells, were also prominently observed and found scattered throughout the mass (Fig. 1e). Lymphocytic infiltration and necrotic areas were randomly seen. The acid-fast and PAS stains showed no evidence of acid-fast bacteria, fungi, or protozoa. Immunohistochemically, the tumor cells were negative for cytokeratin (Fig. 1f), but strongly positive for vimentin (Fig. 1g) and Iba-1 (Fig. 1h). Based on histopathology and immunohistochemistry, a localized histiocytic sarcoma was diagnosed.

Histiocytic proliferative disorders are derived from two major lineages, including monocyte-macrophage and dendritic or Langerhans cells (Moore, 2014). Tumors originating from a macrophage origin are characterized by immunocytological labeling with CD204, lysozyme and iNOS (Helie et al., 2014), while dendritic cells use S-100 and CD208 (Helie et al., 2014; Moore, 2014). Although E-cadherin has also been used to characterize cells originated from the dendritic cell lineages, it has been observed in other round cell tumors, such as plasmacytomas, epitheliotropic lymphomas and mast cell tumor (Ramos-Vara and Miller, 2011). Therefore, E-cadherin is likely not sensitive enough to distinguish histiocytic tumors from other round cell tumors (Ramos-Vara and Miller, 2011). On the other hand, Pierezan et al. (2014) demonstrated that Iba-1 was a pan-macrophage marker that did not express in other round cell tumors (Pierezan et al., 2014).

In the present case, localized histiocytic sarcoma was diagnosed based on histopathology and immunohistochemistry. Until recently, only a few reports have described tumors in capybara (*Hydrochoerus hydrochaeris*), including fibrosarcoma and squamous cell carcinoma (Hamano et al., 2014; Stoffregen et al., 1993). Due to the various clinical presentations of histiocytic diseases, the recommended treatment for and survival times with these diseases may vary greatly (Fulmer and Mauldin, 2007). Surgical resection of cutaneous lesions or affected organs (e.g., spleen, liver, lungs) is generally not recommended, unless it will provide some palliative benefit (Coomer and Liptak, 2008). Although chemotherapy is recommended, few reports of successful treatment

exist (Coomer and Liptak, 2008). Moreover, differentiating histiocytic tumors from other proliferative disorders is important, because of differences in prognosis and therapeutic protocol (Palmeiro et al., 2007). Therefore, routinely observing

clinical presentation, histopathology, and immunohistochemistry of lesions is essential for veterinarians to accurately diagnose histiocytic disease.

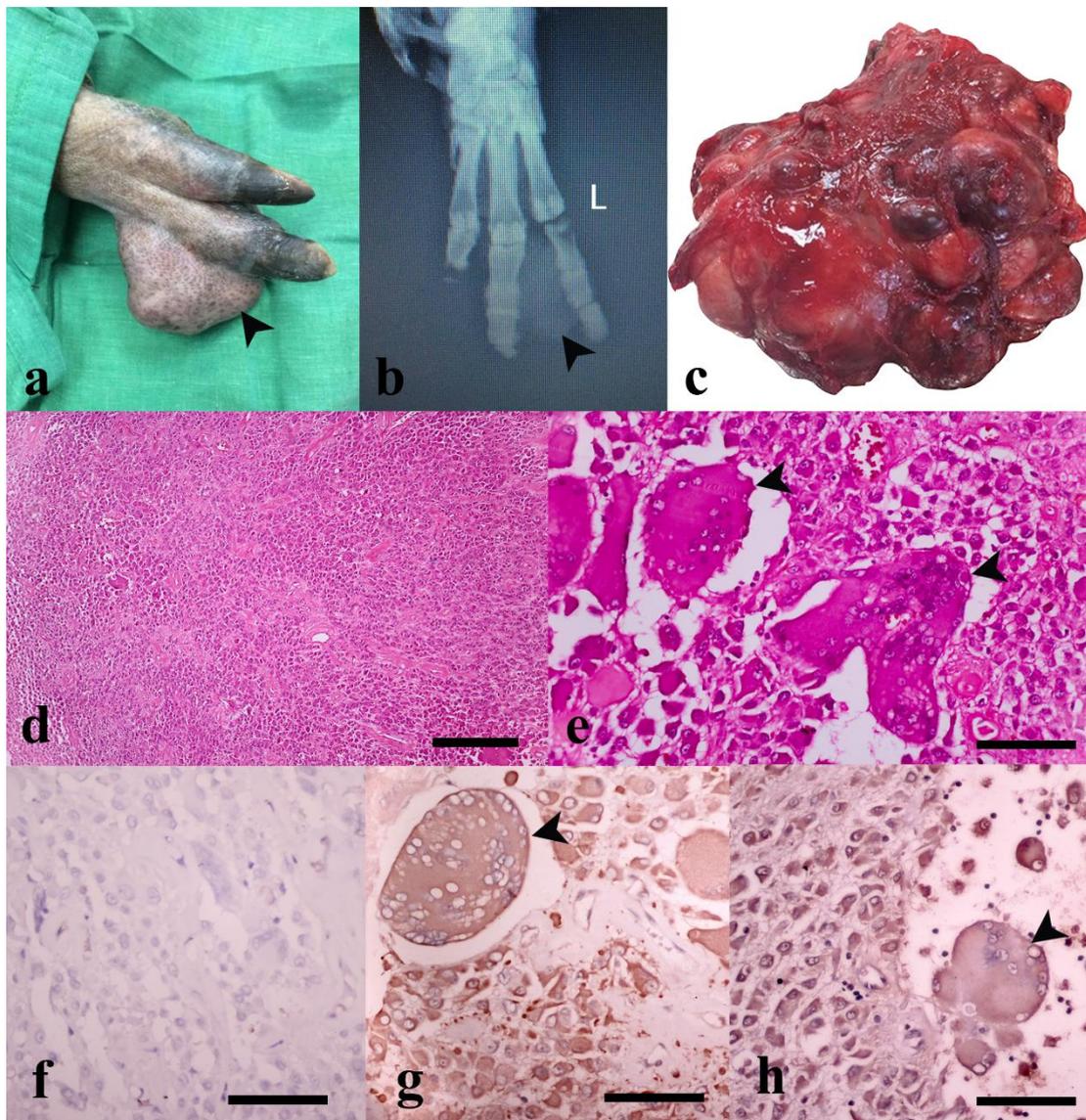


Figure 1 Photomicrograph (a) and radiographic finding (b) of the mass prior to surgical excision. The mass was located between the first and second digit of the left hindlimb, and presented as round, firm and skin-colored (a, arrowhead). Radiographic finding (b) of the mass revealed an increase in the radiopacity of the mass between the first and second digit of the left hindlimb (b, arrowhead). Macroscopically, the mass presented as 2x3x2 cm in size with irregular, multinodular; a firm consistency; and hemorrhaging (c). Histopathologically, the tumor comprised of multinucleated histiocytic cells with pleomorphic nuclei and abundant eosinophilic cytoplasm arranged in solid patterns (d). Some of the histiocytic cells revealed multinucleated giant cells with up to 10 nuclei/cell (e, arrowhead). Many of the neoplastic cells were strongly immunopositive for vimentin (g) and Iba-1 (h), but negative for cytokeratin (f). d and e: H&E stain. Scale bar in d, f-h = 50 μ m, scale bar in e = 200 μ m.

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บทคัดย่อ

มะเร็งฮิสทีโอไซต์ที่เกิดแบบเฉพาะที่ในคางคกบาราเลีย

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คางคกบารา (*Hydrochoerus hydrochaeris*) เพศผู้ อายุ 9 ปี พบก้อนเนื้อขนาด 2x3x2 เซนติเมตร บริเวณเนื้อเยื่อใต้หนังระหว่างนิ้วเท้าที่หนึ่งและสองของขาหลังซ้าย ก้อนเนื้อนี้มีลักษณะแน่น และผิวขรุขระ จากลักษณะทางจุลพยาธิวิทยา พบเซลล์ฮิสทีโอไซต์ที่มีภาวะหลากหลาย ร่วมกับนิวเคลียสที่มีภาวะหลากหลายและไซโตพลาสติดสีชมพู มีการจัดเรียงตัวอยู่ในรูปแบบแน่นและเป็นแผ่น ร่วมกับพบการแทรกของเซลล์ขนาดใหญ่ที่มีหลายนิวเคลียสซึ่งบางเซลล์พบได้มากถึง 10 นิวเคลียสต่อเซลล์ พบไมโทติคพีเกอร์จำนวน 2 ถึง 3 เซลล์ต่อกำลังขยายกล้องจุลทรรศน์ขนาด 100x เมื่อทำการตรวจมะเร็งด้วยวิธีอิมมูโนฮิสโตเคมี พบว่ามะเร็งให้ผลบวกต่อแอนติบอดีชนิดไวมินติน และไอ บี เอ วัน จากการตรวจทางจุลพยาธิวิทยา และวิธีอิมมูโนฮิสโตเคมี จึงวินิจฉัยก้อนเนื้อดังกล่าวเป็นมะเร็งฮิสทีโอไซต์ที่มีจุดกำเนิดมาจากเซลล์มีเซนไคม์ การศึกษาในรายงานนี้เป็นกรณีศึกษาแรกที่พบมะเร็งชนิดดังกล่าวในคางคกบาราเลีย

คำสำคัญ: คางคกบารา มะเร็งฮิสทีโอไซต์

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