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Case Report

Cutaneous adenocarcinoma in a desert tortoise (*Gopherus agassizii*)

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Abstract This report describes the clinical and histopathological findings of a rare case of cutaneous adenocarcinoma in a 40-year-old desert tortoise. Surgical excision of the neoplasm improved the general health condition and locomotion of the tortoise although recurrence of the neoplasm had been recorded 1 year post-surgery.

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1. Introduction

The turtles and tortoises are belonging to order Chelonia (Testudines), which is one of the four main orders of class Reptilia. Order Chelonia includes 13 families and more than 285 species [1]. Phylogenetically, it is the oldest group of reptiles that is characterized by presence of a bony shell.

A retrospective study of neoplasia in reptiles was previously conducted at the Philadelphia Zoological Garden. A total of 3684 original necropsy reports conducted from 1901 to 2002 revealed 86 cases of neoplasia. At necropsy, a total of six neo-

plasms were identified in six out of 490 chelonians (1.2%). In chelonians, all neoplasms were seen in turtles, four out of six tumors (66%) were malignant with no observed organ predilection [2]. Several types of neoplasms were previously reported in tortoises, such as undifferentiated sarcoma in an adult female radiated tortoise (*Geochelone radiata*) [3], a well-differentiated cutaneous mast cell tumor in a sub-adult female giant Galapagos tortoise [4], adenocarcinoma emerging from the Harderian gland of a Florida Red-bellied Turtle (*Pseudemys nelsoni*) [5], and fibropapilloma associated with herpesvirus in *Chelonia mydas* [6].

A heterotopic in-situ complex adenocarcinoma developing on the hind limb was reported for the first time in an Asian Leaf Turtle (*Cyclemys dentata*). Histopathological assessment of such a tumor revealed all characteristics of a well-differentiated adenocarcinoma originating from apocrine gland-like tissue. The neoplasm showed irregular, tubular structures of various sizes lined by two to four layers of cuboidal and columnar neoplastic epithelial cells [7].

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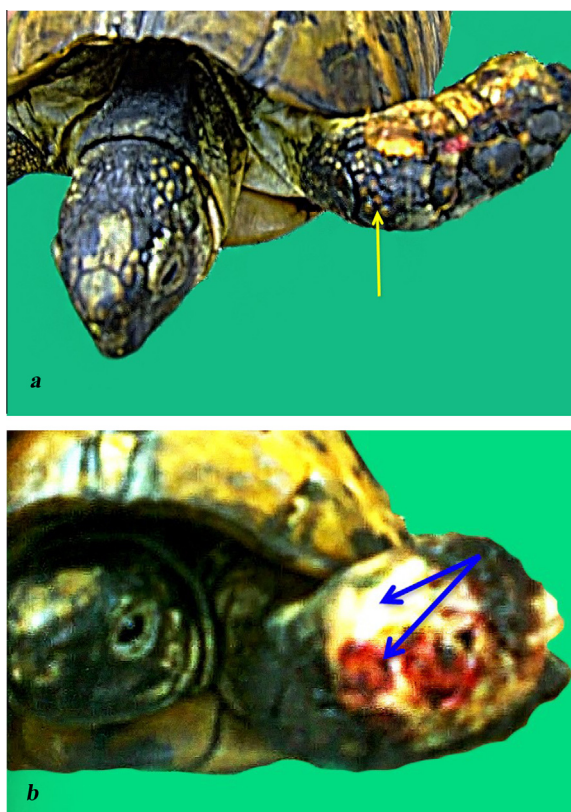


Figure 1 Adenocarcinoma: (a) Early stage of adenocarcinoma showing small soft swelling with normal skin at the left fore limb (yellow arrow) of a 40-year-old tortoise. (b) Late stage of adenocarcinoma in the same tortoise showing large soft ulcerated swelling discharging pus tinged with blood (blue arrows). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

In the currently reported tumor, adenocarcinoma is considered a rare neoplasm affecting reptiles that is firstly described in a desert tortoise (*Gopherus agassizii*).

2. Case history and clinical findings

A 40-year-old female desert tortoise was admitted to the surgery clinic at Faculty of Veterinary Medicine, Cairo University with a history of imperfect locomotion of the left forelimb together with slight diffuse painful swelling and intact skin (Fig. 1a). The limb was treated with systemic antibiotics and local ichthyol ointment, which slightly decreased the size of the swelling. After 3 months, the tortoise was re-admitted with a larger, soft, ulcerated swelling (Fig. 1b). The tumor had offensive odor discharging pus tinged with blood. It was obvious that the tumor is mechanically hampering the movement of the animal. The appetite of the tortoise markedly decreased and consequently developed a poor health condition.

3. Surgical excision and its sequels

Under complete aseptic measures and local infiltration analgesia using 5 ml of Xylocaine HCL [8], the swelling was

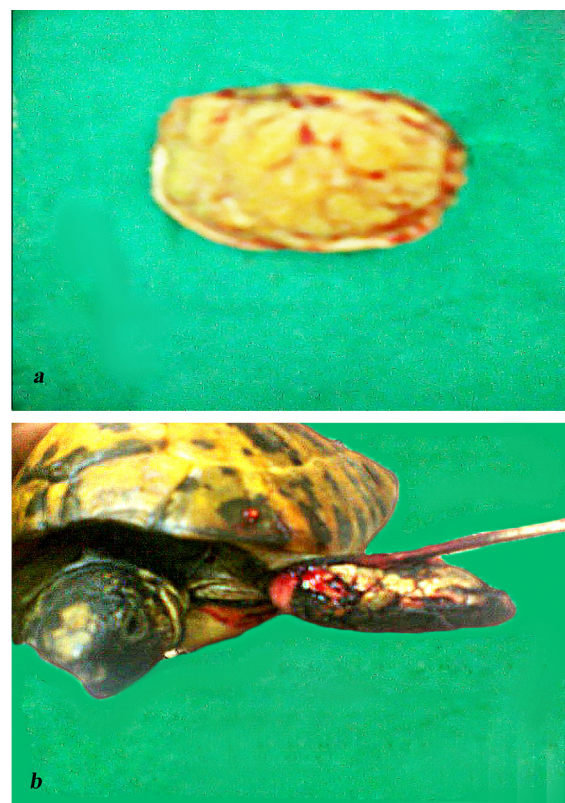


Figure 2 Adenocarcinoma: (a) The Excised neoplasm showing pale yellow lobulated greasy mass. (b) The tortoise just after surgery. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

surgically excised. After excision, skin was sutured using polypropylene suture material and simple interrupted pattern (Fig. 2a). Dressing of the wound with povidone iodine solution and bandaging of the operated limb were performed for 7 successive days. Cefotaxime sodium (Cefotax®, EIPICO) was given intramuscularly for 5 days postoperatively. The skin stitches were removed 7 days post-surgery.

The tortoise recovered well after surgery. The movement, appetite and condition of the animal were improved. One year post-surgery, the swelling reappeared at the same location. Reoperation was carried out as previously discussed with no recurrence.

4. Histopathological findings

Macroscopically, the excised swelling was pale yellow, friable, greasy and lobulated on cut section (Fig. 2b). Histopathological specimen was taken and fixed in 10% neutral buffered formalin solution, embedded in paraffin wax, sectioned at 5 μ and stained with haematoxylin and eosin [9]. Microscopically, Areas of dysplastic adenoma were seen with irregular gland acini and desquamated lining cells that showing pleomorphism (Fig. 3). The swelling revealed well differentiated adenocarcinoma with criteria of malignancy such as

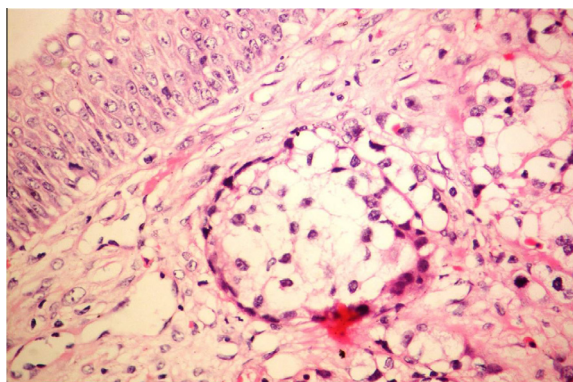


Figure 3 Histopathology of adenocarcinoma: Photomicrograph of dysplastic adenoma showing irregular glandular acini with desquamated lining cells that showing pleomorphism. Also few hemorrhages are present (H&E X 400).

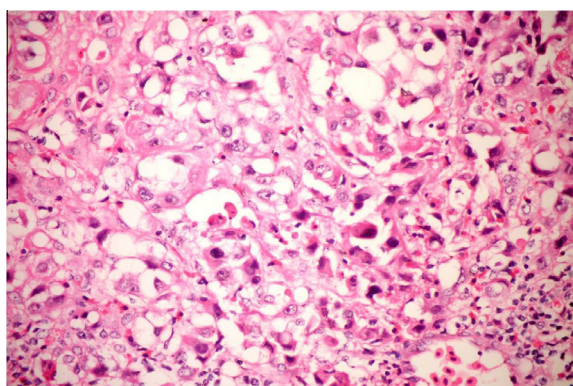


Figure 4 Histopathology of adenocarcinoma: Photomicrograph of well differentiated adenocarcinoma showing criteria of malignancy (pleomorphism, hyperchromasia and increase nuclear/cytoplasmic ratio), leucocytic infiltration and hemorrhage (H&E X 400).

pleomorphism, hyperchromasia, increase nuclear/cytoplasmic ratio, leucocytic infiltration and hemorrhage (Fig. 4)

5. Discussion

Skin neoplasms are broadly classified as epithelial, mesenchymal and melanocytic malignant tumors. Adenocarcinoma is one of the most catastrophic epithelial neoplasms that usually concealed with a bad prognosis [10]. The neoplasm recorded in the current case report had an offensive odor and the pus discharged from the swelling could be attributed to secondary bacterial infection. The losses of both appetite and general health condition of the affected tortoise are expected to be related to the continuous bleeding from the neoplastic swelling

as well as the tissue damage metabolic products. The impaired locomotion may also be related to the mechanical impairment and associated pain. Similar findings were reported in a previous study [7].

Although surgical excision of the neoplasm improved the movement, appetite and condition of the tortoise, recurrence of the neoplasm was recorded one year after initial excision, which could be attributed to incomplete excision of the epithelial remnants of the carcinoma. Such remaining neoplastic cells could have allowed the gradual recurrence of the tumor at the same site.

Histopathologically, the neoplasm had areas of dystrophic adenoma, which suggests that adenocarcinoma started as adenoma then changed to malignant neoplasm. The concurrent presence of hemorrhagic areas inside the neoplasm could be attributed to the less developed blood vessels associated with such a swelling. However, the leucocytic infiltration could be attributed to secondary bacterial infections. All criteria of malignancy that were seen in the glandular acini have pathologically confirmed the diagnosis of adenocarcinoma in the currently tortoise.

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