

CASE REPORT

Keratoacanthoma of the spectacle in a Boa constrictor

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Abstract

Animal studied A Royal Boa constrictor presented with retained spectacle of the right eye and a tumor-like appearance of the left eye.

Procedure The snake was euthanized, the head fixed in buffered formaldehyde, and histologic examination of both spectacles and both eyes performed.

Results The left orbital rim encircled a solid, scaly mass projecting 5–6 mm from the spectacular area. A cup-shaped tumor with a central keratin plug was observed microscopically. There was a thickening of the proliferating squamous epithelium, with squamous eddies and single cell keratinization. A few mitotic figures were seen in the basal layers but the tumor showed no infiltrative growth. The same morphology was observed in the right eye but to a lesser extent. The remaining parts of the eye were normal.

Conclusions The diagnosis was keratoacanthoma and this is the first reported keratoacanthoma of the spectacle in a reptile. Keratoacanthoma should be considered as a differential diagnosis when trying to remove retained spectacles from a reptile eye.

Key Words: Boa constrictor, keratoacanthoma, snake, spectacle, tumor

INTRODUCTION

The 'spectacle' or 'brille' is a transparent, immovable vascular structure serving as a protective covering of the cornea in all snakes (Ophidians) and in lizards (Lacertilians) without eyelids.^{1–4} Embryologically, the spectacle originates from the fusion of the lower and upper eyelid structures. The lower eyelid contributes to the main part of the spectacle.^{5,6} The spectacle takes part in the periodic skin shedding, ecdysis, characteristic of snakes and lizards. During the normal shedding cycle six different histologic stages of epidermal development can be differentiated.⁷

As a result of an abnormal shedding cycle or so-called dysecdysis, retained spectacles is the most common ocular disorder in snakes.^{8–11} Factors such as dry environment, dehydration, poor nutrition and ectoparasitism are mentioned as principal causes.^{12,13}

Tumors in snake eyes are very rare.¹³ Cooper in 1975 reported exophthalmus in a rhinoceros viper (*Bitis nasicornis*) resulting from cyst-like structures around the eye, which were probably part of a developmental anomaly.⁹

We present a tumor of the right spectacle in a Boa constrictor.

CASE REPORT

History

A 12-year-old Royal Boa constrictor (*Boa constrictor constrictor*) measuring 118 cm in length presented at the clinic with bilateral, chronic hyperkeratosis of both spectacles. Clinical examination revealed bilateral, periocular dry and wrinkled scales.

No anatomic recognizable structures behind the spectacles were observable by slit lamp. A thorough examination of the scales demonstrated no parasites. The snake had a history of general dysecdysis connected with poor husbandry and caring. According to the owner, the snake had always had difficulties in shedding, in particular the skin on the head, including the spectacles.

At presentation, the snake had not been eating for more than 9 months. It suffered from dysecdysis, and was depressed, anorexic and dehydrated. The owner did not

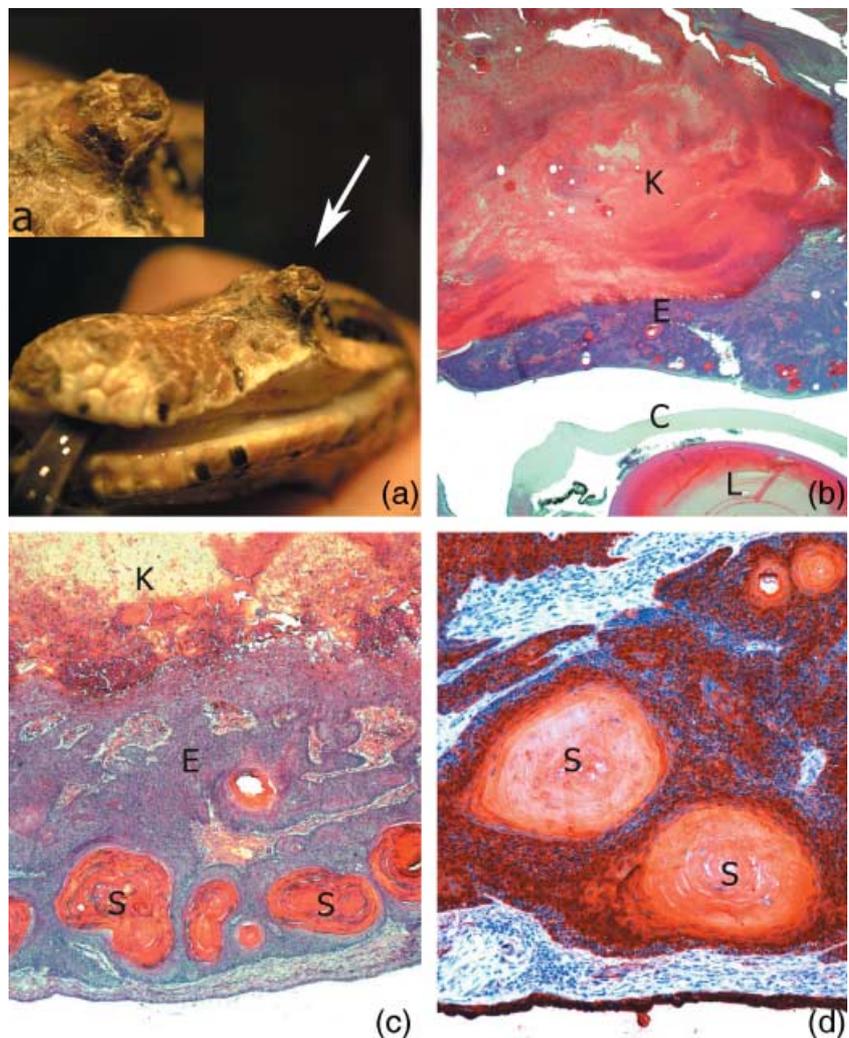


Figure 1. (a) The left eye of the 12-year-old Boa constrictor showing keratotic masses protruding from the left eye (arrow). In higher magnification (insert) the orbital rim encircles a solid, scaly mass with a central keratin plug. The tumor projects 5–6 mm from the spectacle area. (b) The central keratin plug (K) is encircled by epithelial cup-shaped margins. The epithelial layer (E) is thickened. Underneath the spectacle the cornea (C) and lens (L) are present (H&E, $\times 10$). (c) The epithelial layer (E) is extremely acanthotic underneath the keratin (K). Many squamous eddies (S) are present (H&E, $\times 90$). (d) The tumor cells and squamous eddies (S) are positive for antibodies against cytokeratin. The staining demonstrates that the basement membrane is intact (Anti-cytokeratin, $\times 175$).

want further treatment performed and the snake was subsequently euthanized, using toletamin/zolacepam (zoletil 50 vet, Virbac S.A., Carros Cedex, France) injection (i.m.) as sedation prior to the final intracardial injection of pentobarbital (pentobarbitalnatrium 30%, Skanderborg Apotek, Skanderborg, Denmark). The dead boa was decapitated and the head was fixed in 4% buffered formaldehyde.

MATERIALS AND METHODS

The fixed eyes were sectioned and the central ring was processed according to routine paraffin technique. Sections were cut at $4\ \mu\text{m}$ and mounted on glass slides. Deparaffinized hydrated sections were stained with hematoxylin and eosin (H&E), periodic acid Schiff (PAS) and Brown and Hopps modified Gram stain. Immunohistochemical reactions were performed using the streptavidin-biotin method. The procedure included microwave processing. Antibodies against cytokeratin (clone MNF116, code no. M0821, Dako A/S, Copenhagen, Denmark) were applied. Appropriate controls were performed.

RESULTS

Macroscopic examination

On the left side the orbital rim encircled a solid, scaly mass projecting 5–6 mm from the spectacle area (Fig. 1a). On the right side a sharp rim of scales demarcated the transition between periocular scales and the spectacle area which had a flat, rigid surface indented into the orbital cavity.

Microscopic examination

The spectacle of the left eye was massively keratinized, with bacteria on the top of the masses. The keratin formed a central plug with cup-shaped margins (Fig. 1b). There was a thickening of the proliferating squamous epithelium, and the stratum germinativum was extremely acanthotic, consisting of up to 20 layers of cells. Squamous eddies and single cell keratinization were frequent (Fig. 1c). The epithelial cells showed cytologic atypia, but with preserved polarization. Scattered mitotic figures were seen in the basal layers but the tumor masses were not growing infiltratively and the

basement membrane was intact, verified by the cytokeratin immunostaining (Fig. 1d). The rest of the eye appeared normal. The spectacle of the right eye showed the same morphology, but to a lesser extent, and the rest of the eye was normal.

DISCUSSION

Keratoacanthoma (KA) or intracutaneous cornifying epithelioma is a benign neoplasm of epidermal origin.¹⁴ Amongst small animals KA seems to be uncommon in the dog and even more infrequently in the cat.¹⁵ KA in humans is a well documented epithelial tumor with a predilection for the head.^{16,17} To the authors' knowledge keratoacanthoma has not been described in reptiles in general, or of the spectacle.

The principal histologic differential diagnoses are massive retained spectacles and squamous cell carcinoma. However, because of the keratin plug, cup-shaped margins and lack of invasion, verified by the cytokeratin immunostaining, this tumor was classified as a keratoacanthoma.

The spectacle has an obvious protective function to the cornea. Accidental removal of the spectacle leads to exposure keratitis.¹³ In addition, the spectacle has an important refractive function in itself and enhances the refractive role of the lens.¹⁸

In treating retained spectacles great effort must be made to protect the new inner spectacle. If gentle traction with fine forceps of the spectacle fails to remove it, soaking of the snake in warm water overnight is recommended. Rubbing the moist spectacle free with a sterile cotton swab should now be possible. If this fails the retained spectacle should be left until the next shedding.^{12,19} In the meantime, factors such as environmental humidity and temperature, nutritional factors, antiparasitic treatment, and husbandry in general must be monitored and optimized.²⁰ Daily application of artificial tears on the retained spectacles until shedding has also been advised.²¹

In the present case an attempt to remove the lesion connected to the spectacle would not have been appropriate for several reasons. Primarily the overall condition of the patient was so poor that the prognosis for even surviving anesthesia might have been critical. At presentation the snake was blind and surgical intervention most certainly would have damaged the inner spectacle and the cornea extensively, with a secondary devastating exposure keratitis as a result.

The tumor itself may be the result of many retained spectacles adding up on top of each other. The scattered mitotic basal keratinocytes have probably formed the central keratin plug and thereby developed a keratoacanthoma of the spectacle.

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