In cooperation with

Pathology in Practice

Figure 1—Photographs of a body wall mass (A) and a cross section of the body wall mass (B) in an 11-year-old female Rainbow boa constrictor that was evaluated because of a 1.5-month history of constipation. Notice the mass invading the deep dermis, ribs, and vertebrae with multifocal areas of fat necrosis (arrows) and extending into the coelomic cavity (arrowhead).

History

An 11-year-old female Rainbow boa constrictor (197 cm in length and weighing 4 kg [8.8 lb]) was evaluated at the zoological medicine service of Louisiana State University Veterinary Teaching Hospital and Clinics, Baton Rouge, La, because of a 1.5-month history of constipation.

Clinical and Gross Findings

On physical examination, the boa constrictor was weak and lethargic and had a large swelling in the body wall; the swelling was located 72 cm cranial to the tip of the tail (**Figure 1**). Ultrasonographic examination revealed a mass that was compressing the colon and invading approximately 80% of the coelomic cavity and a small amount of effusion cranial and caudal to the mass. The boa constrictor was euthanized because of the poor clinical prognosis and submitted for necropsy. Postmortem examination revealed a pale gray, firm, multilobulated mass (12 cm in diameter) in the body wall. On cut surface, the mass encompassed the deep dermis, ribs, and vertebrae and had multifocal areas of fat necrosis. The mass extended approximately 4 cm into the coelomic cavity and the cranial poles of both kidneys and compressed the adjacent viscera, including fat bodies and intestines. The segment of fat bodies adjacent to the mass was thickened (2 cm in diameter), firm, and gray. The coelom contained approximately 100 mL of clear fluid. Feces were dry and firm, consistent with the history of constipation. There were no other major gross findings.

Formulate differential diagnosis from the history, clinical findings, and Figure 1—then turn the page →

This report was submitted by Sanjeev Gumber, DVM, MVSc, PhD, DACVP; Rodney Schnellbacher, DVM; Marlene S. Orandle, DVM, PhD; and Nobuko Wakamatsu, DVM, PhD, DACVP; from the Department of Pathobiological Sciences, School of Veterinary Medicine, Louisiana State University, Baton Rouge, LA 70803 (Gumber, Orandle, Wakamatsu); and the Department of Zoological Medicine, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506 (Schnellbacher). Dr. Gumber's present address is Kansas State Veterinary Diagnostic Lab, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506. Dr. Orandle's present address is National Institute of Allergy and Infectious Diseases, National Institutes of Health, 6610 Rockledge Dr, Rockville, MD 20852.

Address correspondence to Dr. Wakamatsu (nwakamatsu@vetmed.lsu.edu).

Histopathologic Findings

At necropsy, various tissue samples were fixed in neutral-buffered 10% formalin, routinely processed, paraffin-embedded, sectioned at 5 µm, and stained with H&E stain. Histologically, the body wall mass was a large, unencapsulated, infiltrative, moderately cellular subcutaneous neoplasm composed of spindle cells arranged in bundles and streams that effaced, replaced, and separated the existing skeletal muscle (**Figure 2**). Neoplastic cells were densely packed with indistinct cell borders and frequently contained moderate amounts of eosinophilic fibrillar cytoplasm. Nuclei were oblong to cigar shaped with finely stippled chromatin (**Figure 3**). There were 2 to 3 mitoses/10 hpf. Multifocal areas of fat necrosis, myodegeneration, and myonecrosis were observed. The renal architecture at the cranial poles of both kidneys was effaced by broad streams of neoplastic spindle cells resembling the body wall mass. Similarly, aggregates of adipocytes in fat bodies were interlaced with numerous bundles of neoplastic spindle cells. Neoplastic cells in the body wall mass stained strongly with an α-smooth muscle actin immunohistochemical stain (monoclonal mouse anti-human antibody [clone 1A4]) via the streptavidin-biotin-peroxidase method.[a] Histologic examination of other tissue samples revealed no important findings.

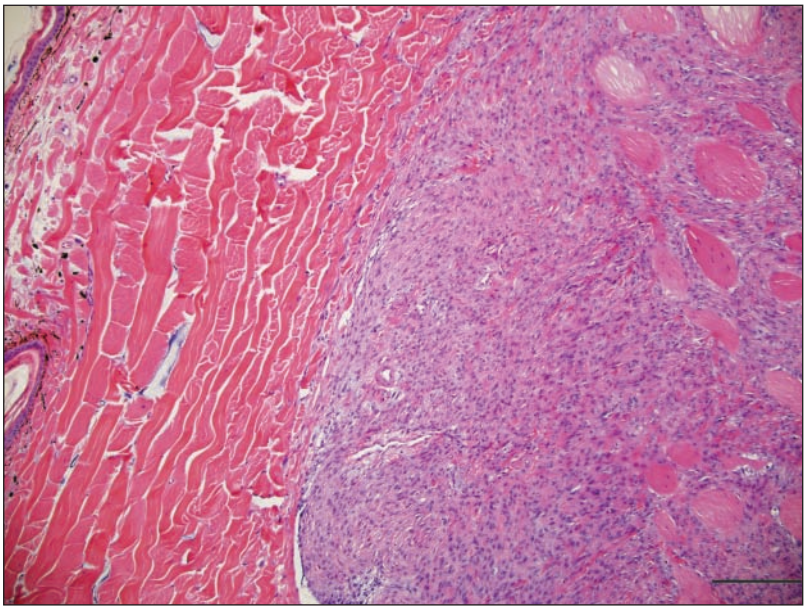

Figure 2—Photograph of a section of tissue obtained from the body wall mass of the snake in Figure 1. The subcutis is multifocally replaced and effaced by an unencapsulated, infiltrative, moderately cellular neoplasm composed of tightly packed spindle cells arranged in bundles and streams. H&E stain; bar = 200 µm.

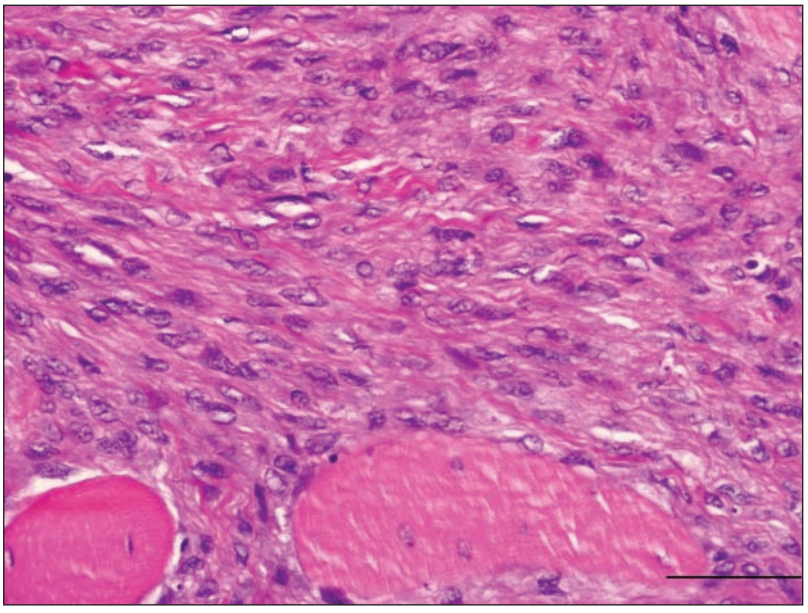

Figure 3—Photograph of a section of tissue obtained from the body wall mass of the snake in Figure 1. Notice the fascicles of neoplastic cells with elongated cigar-shaped nuclei and multifocal areas of myodegeneration and myonecrosis. H&E stain; bar = 50 µm.

Morphologic Diagnosis

Leiomyosarcoma of the body wall with extension to the abdominal fat bodies and kidneys.

Comments

Neoplasia is frequently encountered in the practice of reptile medicine,[1,2] although neoplastic diseases in reptiles were once thought to be rare.[3] The prevalence of neoplastic disease in captive reptiles is increasing as a result of increased life expectancy associated with improved husbandry and management.[4] The commonly reported neoplasms included mesenchymal,[1,5] epithelial,[1,4] and lymphoid or hematopoietic neoplasms.[1,6] Among ophidian species, neoplasms are most commonly reported for aged colubrids, followed by crotalids, vipers, and boids.[1]

Few comprehensive retrospective studies[1,4,6,7] on reptile neoplasia are reported in the veterinary medical literature. In 1 retrospective study,[1] the proportion of 5,353 neoplasia-related case submissions to a specialty diagnostic service during a 9-year period was highest for snakes (15%), followed by lizards (8.5%), chelonians (2.7%), and crocodilians (2.2%). Soft tissue sarcoma (11.4%), renal adenocarcinoma (8.2%), lymphoma (10.6%), and fibrosarcoma (5.8%) were more prevalent than leiomyosarcoma (0.9%) among 325 tumors in snakes.[1] Another retrospective study[7] of neoplasia in reptiles at the Philadelphia Zoological Garden revealed that the liver was most commonly affected, followed by the integumentary and digestive systems. One third of the sarcomas in snakes originate from the skin or subcutis with rare metastasis to viscera.[1]

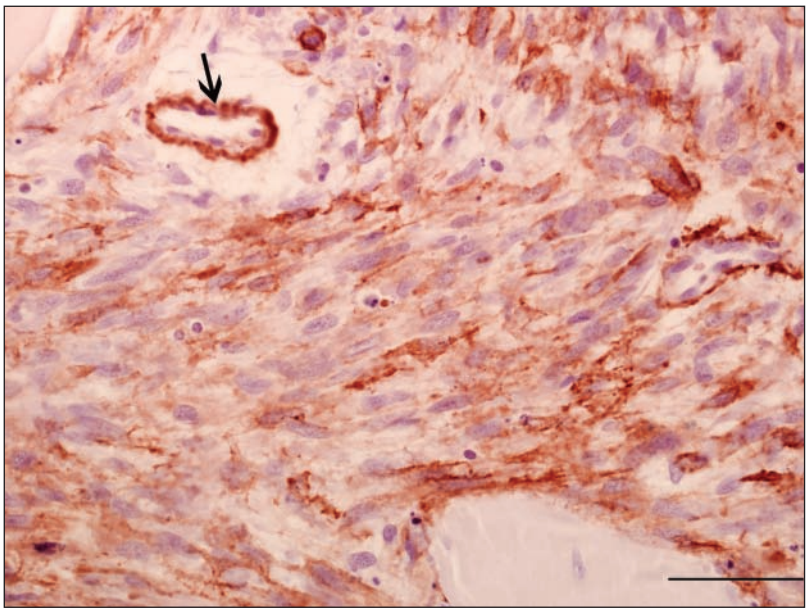

Figure 4—Photograph of a section of tissue obtained from the body wall mass of the snake in Figure 1. Immunohistochemical staining to detect α-smooth muscle actin resulted in strong labeling of the neoplastic cells; an entrapped skeletal muscle bundle (bottom right of image) is not stained. Internal positive control vascular smooth muscle cells are indicated (arrow). Immunoperoxidase with 3,-3′-diaminobenzidine with Mayer's hematoxylin counterstain; bar = 50 µm.

For the snake of this report, the differential diagnoses (determined on the basis of clinical history of constipation and abdominal swelling) were subcutaneous granulomas caused by various infectious organisms (fungi, mycobacteria, or parasites), bacterial abscess, egg binding, gastrointestinal tract obstruction, and a neoplastic process. The gross postmortem examination of the snake revealed a multilobular mass infiltrating the deep dermis, cranial poles of both kidneys, and fat bodies. Neoplasms such as fibrosarcoma and other spindle cell tumors were primarily included in the differential diagnoses. The histopathologic features of the body wall mass were consistent with leiomyosarcoma in the body wall with extension into the kidneys and fat bodies in a Rainbow boa constrictor. Leiomyosarcoma in the cloaca of a cobra,[1] testicle of a boa,[6] oviduct of a boa,[4] and the intestine of a Texas indigo snake[8] has been reported. In snakes, other spindle cell tumors such as fibrosarcomas affecting the oral cavity, skin, subcutaneous tissue, body wall, cardiovascular system, and musculoskeletal system have been reported.[1,2,9–11] C-type oncogenic retroviruses have been reported to cause mesenchymal tumors in snakes.[12] However, retroviral testing was not pursued in the case described in the present report. The body wall neoplasm in the snake of this report probably originated from the smooth muscle in a blood vessel wall; however, a definitive origin cannot be determined.

a. EnVision+System-HRP Labeled Polymer (DAB), Dako North America Inc, Carpinteria, Calif.

References

1. Garner MM, Hernandez-Divers SM, Raymond JT. Reptile neoplasia: a retrospective study of case submissions to a specialty diagnostic service. *Vet Clin North Am Exot Anim Pract* 2004;7:653–671.
2. Mauldin GN, Done LB. Oncology. In: Mader DR, ed. *Reptile medicine and surgery*. 2nd ed. St Louis: Saunders, Elsevier, 2006;299–322.
3. Lucke B, Schlumberger HC. Neoplasia in cold-blooded vertebrates. *Physiol Rev* 1949;29:91–126.
4. Ramsay EC, Munson L, Lowenstine L, et al. A retrospective study of neoplasia in a collection of captive snakes. *J Zoo Wildl Med* 1996;27:28–34.
5. Hubbard GB, Schmidt RE, Fletcher KC. Neoplasia in zoo animals. *J Zoo Wildl Med* 1983;14:33–40.
6. Catao-Dias JL, Nichols DK. Neoplasia in snakes at the National Zoological Park, Washington, DC (1978–1997). *J Comp Pathol* 1999;120:89–95.
7. Sykes JM IV, Trupkiewicz JG. Reptile neoplasia at the Philadelphia Zoological Garden, 1901–2002. *J Zoo Wildl Med* 2006;37:11–19.
8. Barten SD, Frye FL. Leiomyosarcoma and myxoma in a Texas indigo snake. *J Am Vet Med Assoc* 1981;179:1292–1295.
9. Frye FL, Dutra F. Fibrosarcoma in a boa constrictor. *Vet Med Small Anim Clin* 1973;68:245–246.
10. Jacobson ER. Chromomycosis and fibrosarcoma in a mangrove snake. *J Am Vet Med Assoc* 1984;185:1428–1430.
11. Gumber S, Nevarez JG, Cho DY. Endocardial fibrosarcoma in a reticulated python (*Python reticularis*). *J Vet Diagn Invest* 2010;22:1013–1016.
12. Lunger PD, Hardy WD Jr, Clark HF. C-type virus particles in a reptilian tumor. *J Natl Cancer Inst* 1974;52:1231–1235.