Eurasia Specialized Veterinary Publication

International Journal of Veterinary Research and Allied Science
ISSN:3062-357X

2022, Volume 2, Issue 2, Page No: 44-49

Available online at: www.esvpub.com/

Submandibular Leiomyosarcoma Masquerading as an Abscess in a Ball Python (Python regius): A Diagnostic Challenge Resolved by Histopathology and Immunohistochemistry

Mia Keller[1], Luca Weber[1*]

[1]Institute for Life Technologies, University of Applied Sciences Western Switzerland Valais-Wallis, Switzerland.

***E-mail** ✉ l.web3r_2025@outlook.com

ABSTRACT

A two-year-old ball python presenting with a submandibular swelling was examined. Fine-needle aspiration yielded purulent debris containing bacterial organisms. Radiographs revealed multiple radiopaque regions within the mass, suggestive of mineralization, but no mandibular or pulmonary involvement. Grossly, the excised lesion was multi-nodular, well-defined, and contained purulent material. Postoperative recovery was smooth. Histopathology followed by immunohistochemical testing confirmed the lesion as a leiomyosarcoma because neoplasms containing pus-like material can mimic abscesses; therefore, comprehensive diagnostic evaluation using multiple modalities is advised.

Keywords: Submandibular leiomyosarcoma, Abscess, Python regius, Immunohistochemistry

Received: 27 October 2021
Revised: 16 January 2022
Accepted: 16 January 2022

How to Cite This Article: Keller M, Weber L. Submandibular Leiomyosarcoma Masquerading as an Abscess in a Ball Python (Python regius): A Diagnostic Challenge Resolved by Histopathology and Immunohistochemistry. Int J Vet Res Allied Sci. 2022;2(1):44-9. https://doi.org/10.51847/zwAQ4D0aXk

Introduction

The ball python (*Python regius*) is a terrestrial snake native to western and central Africa [1]. It is among the most commonly kept reptiles globally, appreciated for its calm temperament and relatively simple husbandry requirements [1, 2]. With the growing popularity and trade of this species, veterinary and zoological investigations have increased substantially. Despite progress in exotic animal medicine, neoplasia in reptiles remains diagnostically and therapeutically challenging. Limited understanding of reptilian oncology forces clinicians to rely on adapted protocols from domestic animal and human oncology [3, 4]. Therefore, comparative reference studies are crucial for effective case management.

Leiomyosarcoma, a malignant tumor of smooth muscle origin, represents around 10% of all soft-tissue sarcomas in humans [5]. Because it arises from smooth muscle, these tumors typically occur in the gastrointestinal tract, spleen, liver, and other organs containing such tissue [6]. Subcutaneous leiomyosarcomas are uncommon, comprising only about 3% of human soft-tissue sarcomas [7]. Although detailed information about their distribution and age predilection is limited, most reports show that they appear between 40 and 60 years of age and commonly affect limbs or thighs [8, 9]. Manifestation in the facial region is extremely uncommon [8].

This report describes a probable submandibular subcutaneous leiomyosarcoma in a 2-year-old ball python, outlining its clinical, histologic, and imaging findings.

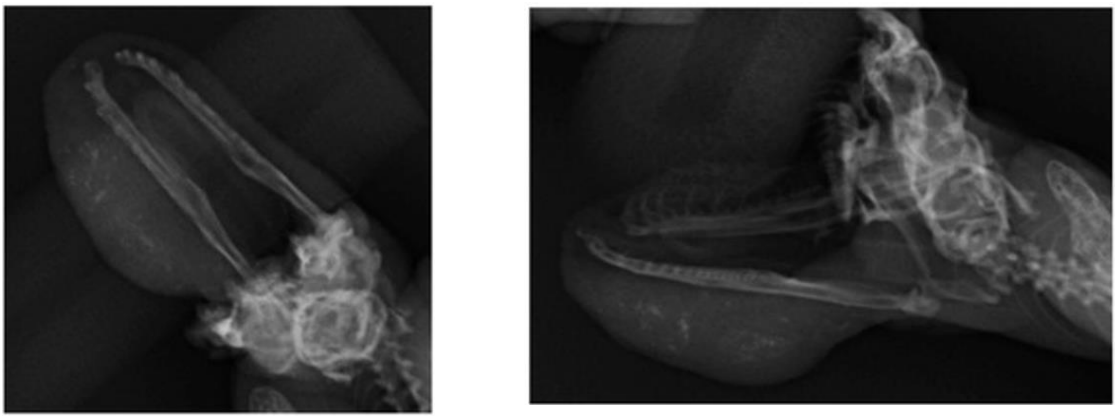
Case presentation

A 2-year-old, 101-cm-long ball python (*Python regius*) weighing 1.2 kg was presented with a left submandibular mass measuring 2 × 3.5 cm **(Figure 1)**. On palpation, the swelling was firm and multilobulated. According to the owner, its size had remained unchanged over the previous year. The animal was bright, alert, eating normally, and showed no systemic abnormalities such as anorexia or dysphagia.

a) b)

Figure 1. Physical evaluation revealed a 2 × 3.5 cm mass in the left submandibular region.

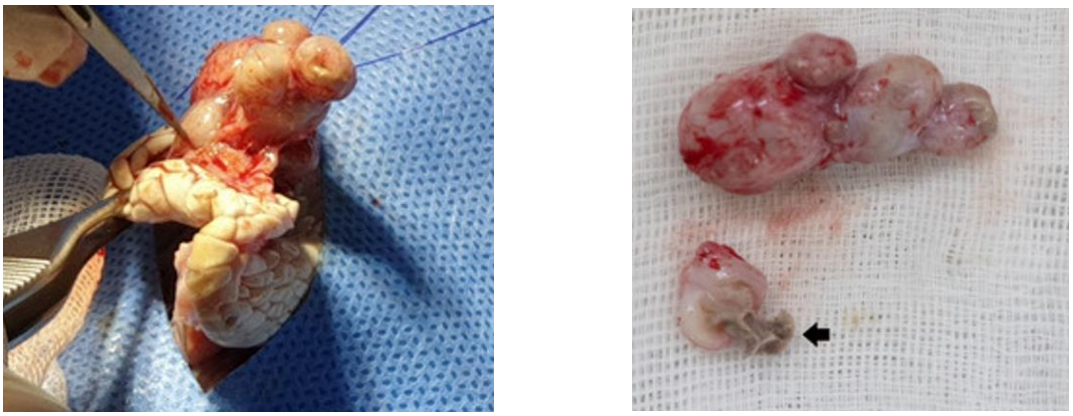
Radiographs of the head and lungs showed multiple radiopaque foci in the lesion, interpreted as potential calcifications, with no signs of mandibular destruction or pulmonary metastasis **(Figure 2)**. The python was anesthetized with isoflurane via chamber induction. Fine-needle aspiration (FNA) yielded only necrotic debris and purulent material containing degenerated heterophils and bacteria. Bacterial culture on Columbia agar with 5% sheep blood was incubated under aerobic and anaerobic conditions at 27 °C for 24 h. A single bacterial colony was isolated and identified as *Klebsiella oxytoca* through 16S rRNA sequencing (Macrogen, Seoul, South Korea).



a) b)

Figure 2. Radiographs revealed multifocal mineralization within the lesion but no mandibular invasion or lung metastasis.

Surgical excision was performed after three days of fasting. Anesthesia was induced and maintained with isoflurane in oxygen. Upon incision, a multi-nodular, clearly demarcated subcutaneous mass was found without invasion of adjacent tissue or evidence of spread. The lesion was completely removed **(Figure 3)**. Postoperative treatment included cephalexin (20 mg/kg PO q12h) and meloxicam (0.2 mg/kg PO q24h) for seven days. The snake was hospitalized for five days, exhibited no postoperative complications, and maintained a normal appetite.

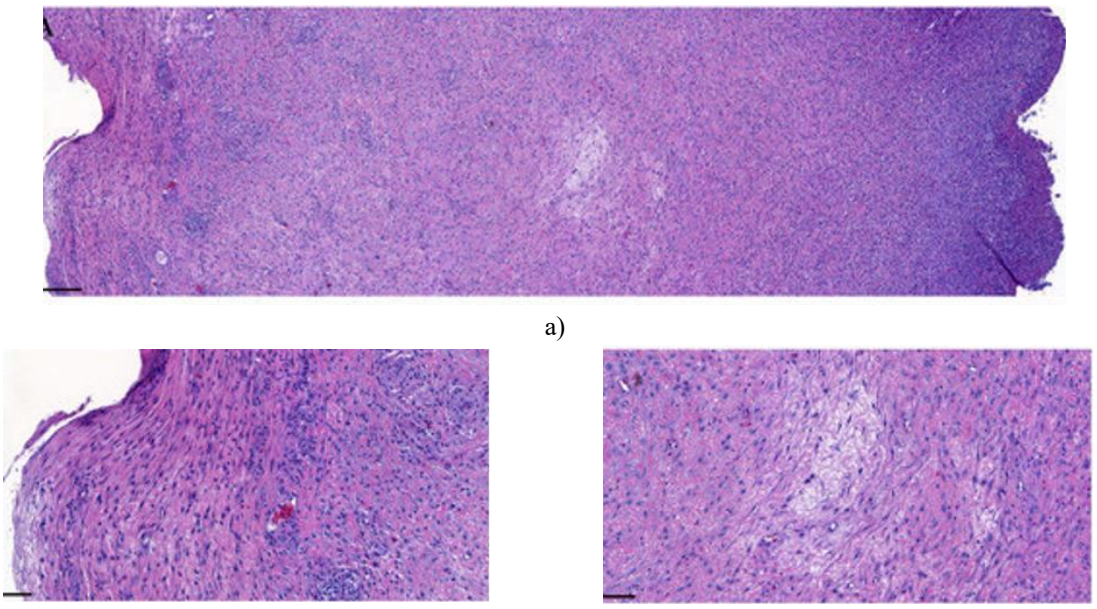


a) b)

Figure 3. Gross appearance of the excised mass. (a) The lesion exhibited a multinodular structure. (b) Pus was visible within the cut surface (arrow).

Macroscopically, the tumor appeared whitish, well-delineated, and composed of multiple nodules tightly attached to one another. The nodules varied in size, and sectioning revealed encapsulated cavities containing caseous purulent material that made up about 30% of the total mass. The excised specimen underwent both microbiological and histopathological analyses. Culture from the abscess contents yielded isolates again identified as *Klebsiella oxytoca*.

Histopathological analysis of the resected tissue was conducted by Korea Vet Lab (KVL, Seongnam, South Korea) **(Figure 4)**. Hematoxylin and eosin (H&E) stained slides showed a connective tissue framework with a partial capsule. The neoplasm was unencapsulated, poorly marginated, and of moderate to high cellularity, consisting of spindle-shaped malignant cells arranged in irregular bundles and interlacing strands within a mild fibrovascular stroma. Under higher magnification, tumor cells displayed cigar-shaped nuclei, moderate nuclear atypia, and visible mitotic activity. Cytoplasm was amphophilic and granular with indistinct boundaries. Marked heterophilic infiltration was present along the inner capsule, and tumor cells extended to the excision margins. No evidence of angiolymphatic invasion was detected. The lesion was diagnosed as a soft tissue sarcoma and, by comparison with the canine grading system, classified as grade 1 [10].



a)

b) c)

Figure 4. Histopathological view of the mass (H&E stain). (a) Low magnification (×7) shows the mass with dense heterophil infiltration at the inner border (scale bar = 200 μm). (b, c) High magnification (×30) reveals

a moderately to densely cellular, infiltrative spindle-cell tumor forming interlacing bundles within a loose fibrovascular stroma (scale bar = 100 μm).

For further tumor characterization, immunohistochemical (IHC) testing was carried out by KVL **(Figure 5)**. Smooth and striated muscle tissues served as positive controls. The antibodies applied targeted desmin (skeletal muscle marker), smooth muscle actin (SMA; smooth muscle marker), vimentin (mesenchymal cell marker), and S-100 (neural marker). Mouse monoclonal anti-human antibodies (Agilent, Santa Clara, CA, USA) were employed. IHC demonstrated strong, diffuse cytoplasmic positivity for SMA, faint patchy reactivity for S-100, and no detectable staining for desmin or vimentin **(Figure 5**). These immunohistochemical findings supported the diagnosis of leiomyosarcoma.

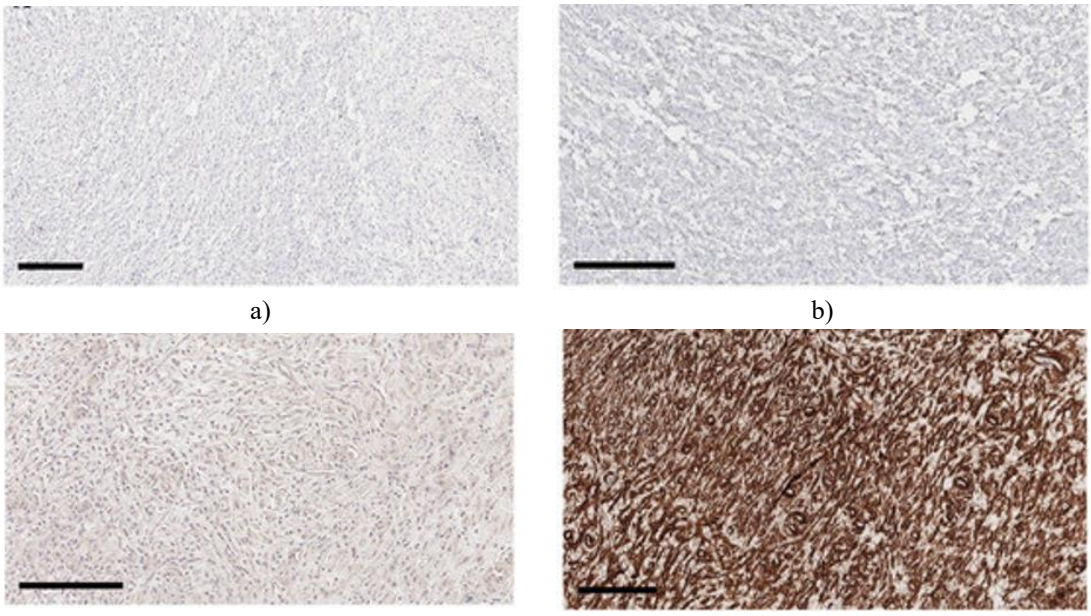


Figure 5. Immunohistochemical staining (scale bar = 200 μm). The neoplastic cells showed negative reactions for desmin (a) and vimentin (b), weak positivity for S-100 (c), and strong cytoplasmic staining for smooth muscle actin (d).

Results and Discussion

Leiomyosarcoma is one of the most frequent malignant soft-tissue sarcomas [5]. Originating from smooth muscle, it typically develops in visceral organs or occasionally in skeletal structures [5–8, 11]. Subcutaneous leiomyosarcomas are uncommon, predominantly found in the limbs, with facial involvement being extremely rare [8]. The current case describes a subcutaneous facial leiomyosarcoma in a ball python. Diagnostic confirmation posed challenges. Due to its unusual location, inflammatory causes—such as trauma or infection—were initially suspected. Fine-needle aspiration revealed purulent material with bacterial elements, later identified as *Klebsiella oxytoca*. As this bacterium is an opportunistic organism from normal reptile skin flora, an abscess was first presumed [12, 13]. However, human literature indicates several instances of abscess-like tumors and tumor-like abscesses complicating differential diagnosis [14–20].

Histopathology was essential to verify neoplastic origin. Although leiomyosarcomas, being mesenchymal tumors, generally express vimentin, the IHC results were negative for this marker. Two explanations were proposed. First, as discussed by Council and Hameed (2009), tumors originating from the muscularis propria may show absent vimentin reactivity, distinguishing their histogenesis [21]. Thus, despite its smooth muscle origin, vimentin negativity was plausible. Second, the use of anti-human antibodies could have produced false-negative results due to species incompatibility [22]. Prior studies have shown similar non-specific responses in reptilian tissues [22–26]. The negative staining of smooth and striated muscle controls in this specimen confirmed antibody non-specificity in this reptile. Consequently, reptile IHC interpretation should always include appropriate positive controls for validation.

Accurate diagnosis is vital for proper management, as therapeutic approaches and prognoses differ markedly between abscesses and tumors. As tumor growth advances, necrosis, degeneration, and hemorrhage in the core can mimic abscess formation [27]. Radiological imaging assists differentiation; though CT cannot always clearly distinguish between abscesses and neoplasms [27], detailed radiographic evaluation remains important to assess bone integrity and to detect possible metastatic spread to the lungs or visceral organs.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

References

1. Rizzo JM. Captive care and husbandry of Ball Pythons (Python regius). J Herpetol Med Surg. 2014;24(1):48–52.
2. D'Cruze N, Harrington LA, Assou D, Green J, Macdonald DW, Ronfot D, et al. Betting the farm: A review of Ball Python and other reptile trade from Togo, West Africa. Nat Conserv. 2020;40:65–91.
3. Christman J, Devau M, Wilson-Robles H, Hoppes S, Rech R, Russell KE, et al. Oncology of reptiles: Diseases, diagnosis, and treatment. Vet Clin Exot Anim Pract. 2017;20(1):87–110.
4. Graham JE, Kent MS, Théon A. Current therapies in exotic animal oncology. Vet Clin Exot Anim Pract. 2004;7(3):757–81.
5. Serrano C, George S. Leiomyosarcoma. Hematol Oncol Clin North Am. 2013;27(4):957–74.
6. Russell KN, Mehler SJ, Skorupski KA, Baez JL, Shofer FS, Goldschmidt MH. Clinical and immunohistochemical differentiation of gastrointestinal stromal tumors from leiomyosarcomas in dogs: 42 cases (1990–2003). J Am Vet Med Assoc. 2007;230(9):1329–33.
7. Kaddu S, Beham A, Cerroni L, Humer-Fuchs U, Salmhofer W, Kerl H, et al. Cutaneous leiomyosarcoma. Am J Surg Pathol. 1997;21(9):979–87.
8. Lin JY, Tsai RY. Subcutaneous leiomyosarcoma on the face. Dermatol Surg. 1999;25(6):489–91.
9. Salemis NS. Recurrent subcutaneous trunk leiomyosarcoma: Management and review of the literature. J Nat Sci Biol Med. 2013;4(1):238–42.
10. Avallone G, Rasotto R, Chambers JK, Miller AD, Behling-Kelly E, Monti P, et al. Review of histological grading systems in veterinary medicine. Vet Pathol. 2021;58(5):809–28.
11. Hagstrom MR, Stöhr AC, Cacioppo JA, Anderson A, Wakamatsu N, Nevarez JG. Axillary leiomyosarcoma in an inland bearded dragon (Pogona vitticeps). J Herpetol Med Surg. 2020;31(1):12–7.
12. Vetere A, Bertocchi M, Pelizzone I, Moggia E, Gerosa S, Di Ianni F. Klebsiella sp.–related infectious spondylitis in a bearded dragon (Pogona vitticeps). BMC Vet Res. 2021;17:230.
13. Jackson KA. Prevalence of Klebsiella oxytoca in Anolis carolinensis of Louisiana. Vector Borne Zoonotic Dis. 2016;16(12):800–1.
14. Peled Z, Linder R, Gilshtein H, Kakiashvili E, Kluger Y. Cecal fibromatosis (desmoid tumor) mimicking periappendicular abscess: A case report. Case Rep Oncol. 2012;5(3):511–4.
15. Wang CH, Sun CK, Jiang JS, Tsai MH. Tumor-like liver abscess mimicking malignancy with lung metastases in a patient with acute renal failure: A case report. Medicine. 2016;95(42):e3145.
16. Gates LK Jr, Cameron AJ, Nagorney DM, Goellner JR, Farley DR. Primary leiomyosarcoma of the liver mimicking liver abscess. Am J Gastroenterol. 1995;90(4):649–52.
17. Mavili E, Öztürk M, Yücel T, Yüce I, Çagli S. Tongue metastasis mimicking an abscess. Diagn Interv Radiol. 2010;16(1):27–9.
18. Liu YW, Chiu HH, Huang CC, Tu CA. Retroperitoneal schwannoma mimicking a psoas abscess. Clin Gastroenterol Hepatol. 2007;5(5):A32.
19. Erdogan C, Hakyemez B, Yildirim N, Parlak M. Brain abscess and cystic brain tumor: Discrimination with dynamic susceptibility contrast perfusion-weighted MRI. J Comput Assist Tomogr. 2005;29(5):663–7.

20. Verdier EP, Konsol O, Portillo S. Intramedullary cervical abscess mimicking a spinal cord tumor in a 10-year-old girl: A case-based review. Childs Nerv Syst. 2018;34(11):2143–7.
21. Council L, Hameed O. Differential expression of immunohistochemical markers in bladder smooth muscle and myofibroblasts and the potential utility of desmin, smoothelin, and vimentin in staging of bladder carcinoma. Mod Pathol. 2009;22(5):639–50.
22. Santos ED, Silva JR, Machado TP, Dau SL, Rodriguez R, Motta ACD. Oral fibrosarcoma in jararaca (Bothrops pubescens): Anatomopathological and immunohistochemical aspects. Pesqui Vet Bras. 2015;35(7):664–70.
23. Sharpe S, Lamm CG, Killick R. Intracoelomic anaplastic sarcoma in an intersex Madagascar tree boa (Sanzinia madagascariensis). J Vet Diagn Investig. 2013;25(2):153–7.
24. Gumber S, Nevarez JG, Cho DY. Endocardial fibrosarcoma in a reticulated python (Python reticularis). J Vet Diagn Investig. 2010;22(6):1013–6.
25. Haines DM, Clark EG. Enzyme immunohistochemical staining of formalin-fixed tissues for diagnosis in veterinary pathology. Can Vet J. 1991;32:295–8.
26. Mohanty KC, Naik DR. Immunohistochemistry and tinctorial affinity of adenohypophysial cells of the rat snake Ptyas mucosus (Colubridae). Gen Comp Endocrinol. 1997;105(2):302–13.
27. Taira N, Kawabata T, Gabe A, Ichi T, Kushi K, Yohena T, et al. Lung cancer mimicking lung abscess formation on CT images. Am J Case Rep. 2014;15:243–6.