



What Is Your Diagnosis?



Figure 1—Lateral (A) and dorsopalmar (B) radiographic views of the left manus of a 9-year-old 6-kg (13.2-lb) spayed female Miniature Poodle with a 3.5-week history of left forelimb lameness that did not respond to antimicrobial treatment or pain management.

History

A 9-year-old 6-kg (13.2-lb) spayed female Miniature Poodle was evaluated for a 3.5-week history of left forelimb lameness. Conservative treatment with pain management (carprofen, 2 mg/kg [0.9 mg/lb], PO, q 12 h) and antimicrobials (amoxicillin trihydrate-clavulanate potassium, 10 mg/kg [4.5 mg/lb], PO, q 12 h) was pursued after the first 2 weeks because of dermatitis or an interdigital wound was suspected. There was slight improvement, but clinical signs did not resolve.

On physical examination, the left forepaw was malodorous, firm, and moderately swollen. Palpation of the second digit elicited signs of severe pain. No obvious masses, crepitus, or fractures were palpated. A CBC and serum biochemical analysis revealed hypoglobulinemia (2.4 g/dL; reference range, 2.5 to 3.5 g/dL) and low amylase activity (402 U/L; reference range, 500 to 1,500 U/L). Results of serologic testing for heartworm disease, ehrlichiosis, Lyme disease, anaplasmosis, and giardiasis were negative. The result of fecal examination for parasitic ova was negative. Radiographs of the left manus were obtained (**Figure 1**).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

This report was submitted by Hye-Yeon Jang, DVM, and Elyshia Hankin, BVSc, MS; from Friendship Hospital for Animals, 4105 Brandywine St NW, Washington, DC 20016.

Address correspondence to Dr. Jang (jang0hyeyeon@gmail.com).



Figure 2—Same radiographic images as in Figure 1. In both views, there is diffuse coalescing geographic lysis of the medulla and cortex of the distal phalanx of the second digit. Also note the moderate focal soft tissue swelling (1.8 cm wide) associated with the distal aspect of the second digit (arrows).

Radiographic Findings and Interpretation

A predominantly lytic bone lesion involving the distal aspect of the distal phalanx of the second digit is evident. The lesion is associated with coalescing medullary and cortical geographic lysis (ie, large area of lysis with sharp and distinct margins) of the distal aspect of the distal phalanx, which has resulted in almost complete obliteration of the affected phalanx (**Figure 2**). On the dorsopalmar view, there is medial displacement of the distal phalanx. Moderate focal soft tissue swelling surrounding the distal aspect of the second digit is evident.

On the basis of the imaging findings, the radiographic diagnosis was an aggressive bone lesion arising from the distal phalanx, and differential diagnoses included the following: neoplasia (squamous cell carcinoma and melanoma), primary bone neoplasia (osteosarcoma, chondrosarcoma, and fibrosarcoma), and infectious osteomyelitis. Three-view thoracic radiography was subsequently performed to assess for potential pulmonary metastasis. No abnormalities were detected in the cardiovascular, pulmonary, or extrathoracic structures.

Treatment and Outcome

Amputation of the second digit of the left manus was performed. There was a large amount of thick,

white discharge expressed from the nail bed. The distal phalanx detached with mild pressure. The metacarpophalangeal joint was disarticulated by blunt dissection, and the digit was removed. The dog recovered uneventfully and was discharged from the hospital 6 hours after surgery.

Histologic evaluation of the amputated digit revealed a well-demarcated cystic structure within the superficial and deep dermal connective tissues that nearly completely effaced the distal phalanx and extended into the distal interphalangeal joint. The cyst wall was lined by stratified squamous epithelium, whereas the cyst lumen contained lamellated keratinaceous debris. The microscopic interpretation was a subungual (nail bed) follicular inclusion cyst.

Comments

Inclusion cysts are lined by epithelial cells and are further characterized by the mesothelial or epithelial cells forming the lumen of the cyst. The most common cutaneous cysts in dogs are infundibular cysts (synonymous with follicular or epithelial inclusion cysts), a benign and encapsulated proliferation of epidermal cells and keratinaceous material within the dermis.¹

Humans and dogs can develop subungual follicular inclusion cysts, which are an uncommon type of inclusion cyst occurring in the nail bed epidermis. The pathogenesis is unknown, although it is suspected that trauma may result in the implantation of epidermal remnants into dermal tissue under the nail bed.² Growth and expansion of subungual follicular inclusion cysts can lead to pain and pressure-induced lysis of the distal phalanx, as was seen in the dog of the present report. In situations with severe, chronic inflammation, periosteal fibrosis and bone proliferation can be observed.³ In humans and dogs, surgical excision of the cyst is curative.

In a retrospective study⁴ of 117 cases of dogs with digit masses, 29 had radiographic evidence of bone lysis. Of the 29 dogs, 24 (83%) had malignant neoplasia and the remaining 5 (17%) had benign or inflammatory masses.⁴ These findings indicated that malignant, benign, and inflammatory conditions can cause lytic lesions of the digit and a definitive diagnosis can only be obtained with histologic evaluation of the mass.

Follicular inclusion cysts are uncommon in dogs, especially in the subungual region. One study⁵ on histopathologic diagnoses and clinical outcomes of dogs with amputated digits found that follicular inclusion cysts represented 20 of 404 (5%) of all submissions.

Similarly, in another study,⁶ only 1 of 64 (1.6%) digital tumors in dogs was a follicular inclusion cyst. Although rare, nail bed follicular inclusion cysts should be considered as a differential diagnosis for aggressive bone lesions of the distal phalanx in dogs, particularly those without metastatic disease.

References

1. Hnilica KA. Neoplastic and non-neoplastic tumors. In: *Small animal dermatology: a color atlas and therapeutic guide*. 3rd ed. St Louis: Elsevier-Saunders, 2010;484-485.
2. Bukhari IA, Al-Mugharbel R. Subungual epidermoid inclusions. *Saudi Med J* 2004;25:522-523.
3. Ihrke PJ, Walder EJ, Affolter VK, et al. Nailbed epithelial tumors. In: *Skin diseases of the dog and cat: clinical and histopathologic diagnosis*. 2nd ed. Ames, Iowa: Wiley-Blackwell, 2005;695-696.
4. Marino DJ, Matthiesen DT, Stefanacci JD, et al. Evaluation of dogs with digit masses: 117 cases (1981-1991). *J Am Vet Med Assoc* 1995;207:726-728.
5. Wobeser BK, Kidney BA, Powers BE, et al. Diagnoses and clinical outcomes associated with surgically amputated canine digits submitted to multiple veterinary diagnostic laboratories. *Vet Pathol* 2007;44:355-361.
6. Henry CJ, Brew WG Jr, Whitley EM, et al. Canine digital tumors: a Veterinary Cooperative Oncology Group retrospective study of 64 dogs. *J Vet Intern Med* 2005;19:720-724.