What Is Your Diagnosis?

History

A 9-month-old 10.9-kg (24-lb) spayed female mixed-breed dog was evaluated because of a 2-month history of a hard swelling dorsal to the left frontal bone, a several-day history of lethargy, fever (40.1°C [104.2°F]), and generalized signs of pain. The patient was prescribed an NSAID and antimicrobials with no resolution of the swelling.

Seven weeks later, the patient was referred to the Iowa State University Lloyd Veterinary Medical Center for further evaluation. No abnormalities were found on physical examination, with the exception of a 2 X 4-cm hard swelling dorsal to the left orbit.

Results of a CBC and urinalysis were within reference ranges. Serum biochemical analysis revealed mild hyperphosphatemia (6.6 mg/dL; reference range; 3.2 to 6.0 mg/dL) and mildly high alkaline phosphatase activity (234 U/L; reference range; 20 to 150 U/L), both of which were attributed to the age of the patient. Computed tomography of the skull with a multidetector scanner was performed to further characterize the bony lesion (Figure 1).

Figure 1—Transverse (A) and sagittal (B) CT images (bone algorithm; window width, 4,500 Hounsfield units; window level, 450 Hounsfield units; slice thickness, 0.5 mm) of a 9-month-old mixed-breed dog evaluated because of a bony swelling dorsal to the orbit of 2 months' duration. The transverse image is at the level of the frontal sinuses, and the patient's right side is on the left of the image. The sagittal image is at the level of the left frontal sinus, and rostral is to the left of the image.

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

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Diagnostic Imaging Findings and Interpretation

Contiguous axial CT images were obtained in a bone algorithm, and 3-plane reconstructions were made on a dedicated imaging workstation.

A focal zone of moderate, fusiform expansion of the left frontal bone with heterogeneous mineral attenuation at the dorsal-most aspect of the left frontal sinus is evident (Figure 2). The bony abnormality has smooth margins with no osteolysis identified. The medial aspect of the right frontal bone is mildly thickened within the same plane. Differential diagnoses include idiopathic calvarial hyperostosis or chronic, reactive hyperostosis secondary to focal trauma, or an atypical inflammatory or a neoplastic process. On the basis of the young age of the patient without history of trauma, idiopathic calvarial hyperostosis was the leading differential diagnosis.

Treatment and Outcome

Following CT, 2 bone biopsy specimens were obtained from the dorsolateral and rostrodorsal aspect of the bony protuberance on the calvarium with a bone marrow aspiration needle. Biopsy specimens were submitted for bacteriologic culture and histologic evaluation. Skull radiographs were obtained to assess the biopsy depth following the procedure.

Histologic examination of the biopsy specimens revealed trabecular bone with a covering of fibrous tissue resembling periosteum. No evidence of neoplasia or inflammation was found, and there was no bacterial growth on culture media. No underlying etiology could be determined. The histologic findings were consistent with idiopathic calvarial hyperostosis.

The patient was discharged from the hospital the same day that the bone biopsy was performed. Pain medication was prescribed to be used as needed. The owners were advised that most reported cases of idiopathic calvarial hyperostosis in dogs are self-limiting by sexual maturity and resolve without medical interventions.

Comments

Idiopathic calvarial hyperostosis is a nonneoplastic osteopathy histologically similar to craniomandibular osteopathy. Craniomandibular osteopathy and idiopathic calvarial hyperostosis occur in young dogs (5 to 10 months of age) and may be painful. Originally, idiopathic calvarial hyperostosis and craniomandibular osteopathy were thought to be the same syndrome; however, multiple case reports have identified distinct differences between these clinical entities. Craniofacial hyperostosis is a bilateral, irregular, osteoproliferative disease that may affect multiple bones of the cranium and mandible and may occur sporadically in many breeds of dogs. In contrast to craniofacial hyperostosis, dogs with idiopathic calvarial hyperostosis have an asymmetric periosteal thickening of the frontal and parietal bones. Idiopathic calvarial hyperostosis was originally reported in young Bullmastiffs and more recently in a pit bull–type dog and an English Springer Spaniel. Craniofacial osteopathy has been compared with human infantile cortical hyperostosis, a proliferative bony condition of humans with similar radiographic and histologic findings.

The diagnosis of idiopathic calvarial hyperostosis should be suspected from findings on skull radiography or skull CT, although confirmation is made on the basis of histologic evaluation. A rostrocaudal view of the dorsal calvarium or paired left ventral-right dorsal and right ventral-left dorsal oblique radiographic views of the frontal bone and sinuses may be considered as an alternative to CT, but would not provide images in a transverse plane. The focal thickening of the left frontal bone with no history of trauma, combined with the lack of neoplastic or inflammatory changes on histologic
evaluation, confirmed the suspicion of calvarial hyperostosis in the dog of the present report. This condition is usually self-limiting and has the potential for partial to complete resolution.3–4
