Diagnostic Imaging in Veterinary Dental Practice

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Figure 1—Photograph of the left mandibular molar teeth of a 10-year-old 35.5-kg (78.1-lb) castrated male Chesapeake Bay Retriever evaluated for preanesthetic assessment and routine periodontal treatment.

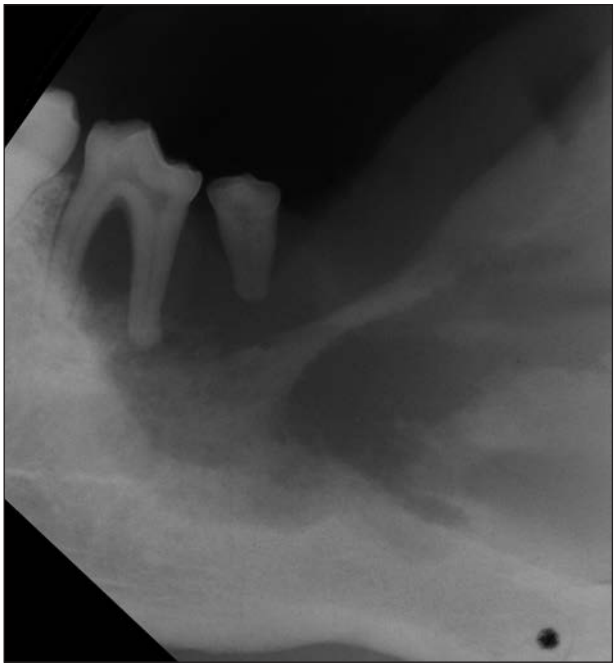

Figure 2—Intraoral radiographic view obtained by means of the parallel technique of the caudal aspect of the left mandible in the dog in Figure 1.

History and Physical Examination Findings

A 10-year-old castrated male Chesapeake Bay Retriever was evaluated at the Community Practice and Dentistry and Oral Surgery Services of the Cornell University Hospital for Animals for preanesthetic assessment and routine periodontal treatment, respectively. The patient had a history of skin masses that had been previously investigated and had been determined to be benign. The dog also had a history of a grade II of VI left-sided apical systolic murmur of several years' duration, with no reported signs of congestive heart failure. The dental history included 2 prior preventive periodontal treatments with no dental extractions.

On physical examination, the dog was bright, alert, and responsive, with a body condition score of 5 of 9, a body weight of 35.5 kg (78.1 lb), and no signs of systemic disease apart from the heart murmur. Characteristics of the heart murmur were unchanged, compared with historical data. Results of routine clinicopathologic testing were unremarkable, and the patient was deemed a good candidate for general anesthesia. An oral examination performed with the dog awake revealed mild to moderate generalized gingivitis and moderate localized calculus accumulation; no signs of oral discomfort or pain were observed.

The dog was anesthetized, and a complete dental evaluation, including periodontal probing and charting, and full-mouth radiography were performed. Relevant clinical findings included moderate generalized plaque and calculus accumulation, moderate generalized gingivitis, and stage 2 and 3 mobility of the left mandibular second and third molar teeth, respectively, with no signs suggestive of clinical attachment loss (ie, no increased probing depth or gingival recession; **Figure 1**). Full-mouth radiographs were unremarkable, with the exception of an osseous lesion located in the caudal aspect of the left mandible. A radiograph of this region was obtained by means of the parallel technique **(Figure 2)**.

Determine whether additional studies are required, or make your diagnosis, then turn the page →

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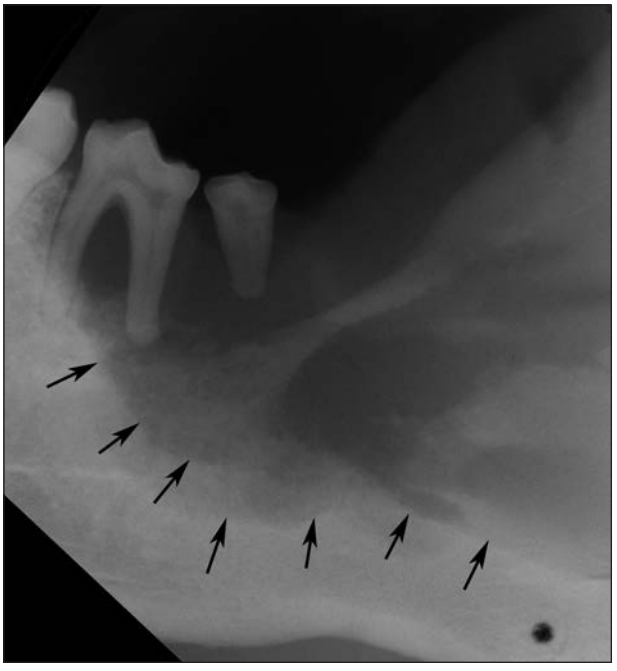

Figure 3—Same radiographic view as in Figure 2. Notice the area of bone destruction with well-defined margins (arrows), consistent with a pattern of geographic bone loss.

Diagnostic Imaging Findings and Interpretation

There is an area of bone destruction in the caudal aspect of the mandible measuring approximately 5 cm in diameter. The lesion involves the left mandibular second and third molar teeth, occupies the dorsal two-thirds of the caudal aspect of the mandibular body, and extends caudally to involve the ramus (**Figure 3**). Radiographically, the lesion has a pattern of geographic bone loss. Geographic bone loss is a radiologic term used to describe destructive osseous lesions that are uniform in appearance and have well-defined regular or irregular borders.[1]

Although the lesion explained the increased mobility of the left mandibular second and third molar teeth that was observed clinically, the radiographic findings did not allow a definitive diagnosis. Moreover, the caudal extent of the lesion could not be determined. To further document the extent and severity of the lesion, CT of the skull was performed, which showed that the rostral and ventral halves of the left coronoid process were involved (**Figure 4**).

Treatment and Outcome

Complete periodontal treatment, including supragingival and subgingival ultrasonic scaling and pumice polishing, was performed. To obtain a definitive diagnosis for the mandibular lesion and implement a treatment plan, an incisional biopsy was performed during the same anesthetic event, and a biopsy specimen was submitted for histologic analysis. Because malignant neoplasia was among the differential diagnoses, complete staging,[2] including fine-needle aspiration of the mandibular lymph nodes, abdominal ultrasonography, and CT of the thorax, was performed.

Figure 4—Three-dimensional CT reconstruction of the skull of the dog in Figure 1. The arrows surround an area of osseous destruction in the caudal aspect of the mandible. The CT images revealed that a major portion of the coronoid process was compromised.

Histologic analysis of sections of the biopsy specimen stained with conventional stains revealed a poorly differentiated sarcoma. Further analysis with immunohistochemical and immunophenotyping techniques confirmed the diagnosis of malignant melanoma. Examination of a fine-needle aspirate of the left mandibular lymph node revealed regional metastasis; results of abdominal ultrasonography and thoracic CT did not provide any evidence of primary neoplasia or metastatic disease in any other organs.

After the diagnosis was confirmed, the patient was referred to the Oncology Service and treated with a palliative course of radiotherapy and immunotherapy; pain management was provided as needed. Nine months after the diagnosis was made, the dog remained free of clinical signs, with local and regional control of the tumor and no evidence of distant metastasis.

Comments

The case reported here highlights the importance of performing full-mouth radiography as part of a comprehensive diagnostic plan in patients undergoing dental treatment, as has been described.[3] The historical, clinicopathologic, and clinical data collected prior to a seemingly routine periodontal treatment failed to reveal a potentially life-threatening condition; in contrast, intraoral radiography was fundamental in the detection of a malignant tumor of the mandible.

The present case also illustrates how dental radiography is an important tool in the assessment of jaw lesions.[4] In this case, the caudal mandibular lesion had a radiographic pattern of geographic bone loss. Geographic patterns of bone loss are usually associated with slow-growing neoplastic or nonneoplastic lesions.[1,4]

The 2 other radiographic patterns that are associated with bone destruction are moth-eaten and permeative bone loss. In contrast with a geographic pattern of bone loss, a permeative pattern is seen as an area of bone destruction with irregular borders and is usually associated with malignant and aggressive neoplasia. Similarly, a moth-eaten bone loss pattern is suggestive of malignant and aggressive neoplasia and is seen as multiple contiguous areas of bone destruction with irregular borders.[1,4]

Although a definitive diagnosis of jaw lesions often cannot be made solely on the basis of clinical and radiographic characteristics,[5] radiographic abnormalities can alert the clinician to conditions that warrant additional diagnostic testing. The importance of performing full-mouth radiography prior to a dental procedure cannot be overemphasized.

References

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