History

A 9-year-old spayed female mixed-breed dog was evaluated for an interdigital mass on the left forelimb. The mass had been resected 7 months previously but recurred 2 months later and had since increased dramatically in size and had begun to ulcerate. The dog's history included amputation of the fourth digit on the right hind limb for a malignant peripheral nerve sheath tumor approximately 2 years previously.

Physical examination revealed a large, red, nodular, fixed, expansile mass measuring approximately 4 × 4 cm between the second and third digits of the left forelimb. A thick band of tissue was palpable on the craniodorsal aspect of the limb extending from the digit to just distal to the elbow joint. Multiple variably sized, firm, nonpainful cutaneous and subcutaneous nodules were present diffusely over the head, neck, and both forelimbs, including additional interdigital masses. Results of CBC, serum biochemical analysis, and urinalysis were unremarkable. Cytologic evaluation of a fine-needle aspirate of the mass was nondiagnostic, and cytologic evaluation of the left prescapular lymph node revealed reactive lymphoid hyperplasia with hemorrhage. Radiographs of the left forelimb were obtained (Figure 1).

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

A large (3 × 3.5 × 2.5-cm), lobulated, soft tissue opacity mass is superimposed with the left second digit with evidence of mild, smooth periosteal new bone formation of the second phalanx but no bone lysis. Numerous smaller (5- to 10-mm) soft tissue opacity nodules surrounding the circumference of the limb extending proximally are also evident (Figure 2). Differential diagnoses for both lesions included granulomatous disease, bacterial infection, sterile abscesses, or neoplasia.

Abdominal ultrasonography revealed multiple round-ed hypoechoic and anechoic lesions within the cortex of the left kidney that were up to 1.5 cm in diameter, some of which deformed the kidney's capsular margin. The anechoic structure was septated and had an eccentric, thick capsular rim. (Figure 3). In the cranial and caudal poles of the right kidney, a large, round hypoechoic structure was noted within the cortex along with multiple smaller hypoechoic foci. With the concurrent dermal lesions, renal cystadenoma or cystadenocarcinoma was considered the most likely diagnosis.

Comments

A digital amputation was performed, and histologic examination of the associated mass revealed proliferating spindle cells with moderate amounts of collagenous stroma.

The presence of multiple firm, cutaneous and subcutaneous nodules was consistent with a diagnosis of nodular dermatofibrosis. Nodular dermatofibrosis is a paraneoplastic syndrome associated with renal cystadenoma and cystadenocarcinoma in dogs characterized by multiple variably sized cutaneous or subcutaneous collagenous nodules. A genetic predisposition has been detected in German Shepherd Dogs, in which it has been shown to be inherited. The mean reported age at onset of skin lesions is 6 years, whereas the mean age at diagnosis of renal changes is 8 years, so nodular dermatofibrosis appears to be a slowly progressive disease and many affected dogs can have a good quality of life for several years. In German Shepherd Dogs, lesions have been detected in dogs as young as 4.7 years of age. Unfortunately, renal changes are almost always bilateral and there is no known treatment. Most affected dogs are euthanized because of progressive neoplasia or renal failure. Metastasis is found at necropsy in 50% of affected dogs, most commonly to lymph nodes, lung, liver, pleura, or peritoneum. Nodular dermatofibrosis should be suspected in any dog with diffuse, variably sized skin nodules. Histologic examination of affected tissue is necessary to confirm the diagnosis. Abdominal ultrasonography is indicated to identify renal changes, although they may not be present for months to years after the development of skin lesions. In German Shepherd Dogs, screening for renal lesions before breeding may be useful in dogs that are potentially genetic carriers.