

Canine Elbow Mass

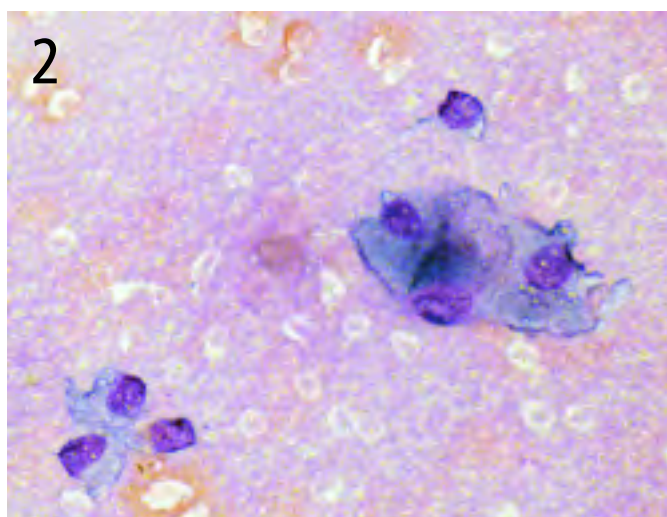
Rose E. Raskin, DVM, PhD, Diplomate ACVP, Purdue University

A 3-year-old, neutered male, mixed-breed dog presented with two raised dermal masses on the elbow during a routine wellness examination.



Aspirate smear (unstained)

Aspirate smear
(modified Wright's
stain; $\times 60$ objective)



History & Physical Examination.

The masses were of similar size, shape, and texture and were adjacent to each other on the lateral and caudal side of the left elbow. Each mass measured 5 mm \times 5 mm \times 3 mm and had been present for an unknown period. A similar-appearing nodule on the right elbow had resolved spontaneously, while the left side masses continued to grow. An aspirate smear was prepared.

ASK YOURSELF ...

- Which conditions could produce the white, chalky, granular appearance of the material?
- What type of nucleated cells predominate in this material?
- What is responsible for the cytologic appearance of the background?

continues

CASE STUDY OF THE MONTH . DIAGNOSIS

Diagnosis: Calcinosis circumscripta

DID YOU ANSWER ...

- Certain cellular accumulations and mineral or crystalline substances
- Large mononuclear phagocytes
- Many poorly stained erythrocytes within a basophilic proteinaceous ground substance that appears granular or foamy

Cytologic Evaluation

The aspirate smear is moderately cellular. Most cells are large, individualized mononuclear phagocytes characterized by moderate to abundant, lightly basophilic cytoplasm that appears mottled or granular (**Figure 3**). Low numbers of small mononuclear cells with scant basophilic cytoplasm identified as lymphocytes are also present, along with moderate numbers of pale-staining erythrocytes in a dense basophilic and granular proteinaceous background (**Figure 3**). Large collections of cohesive benign-appearing spindle cells and scattered pale hyalinized squamous epithelium occur frequently (**Figure 4**). The cytologic interpretation is mixed mononuclear inflammation with benign fibroplasia and amorphous granular extracellular material consistent with mineral. To confirm

mineral, an additional aspirate slide was prepared with von Kossa's stain performed at a reference laboratory. The brownish-black granular material in **Figure 5** is the positive metallic silver reaction for complexed calcium deposits.

Diagnostic Considerations

White, chalky material with accumulations of cells and cellular debris may occur with follicular cysts comprising keratinized squamous epithelium, coagulative necrosis with indistinct cellular outlines, or an abscess containing neutrophils. However, the pure-white, gritty appearance in this case is most likely associated with mineral substances, including crystals or amorphous granules of cholesterol, urates, phosphates, and calcium. Cholesterol crystals are flat plates of colorless notched rectangles. Urates are yellowish-green to colorless crystals that appear finely granular or needle-shaped. They appear birefringent or multicolored when viewed with polarizing lenses. Phosphates may be present in dermal masses complexed with calcium. Calcium granules resemble amorphous urates in size and color but are not birefringent.

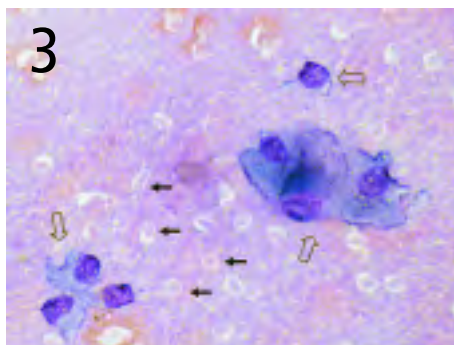
Calcinosis Circumscripta

This is a clinical subgroup of calcification disorders of the skin termed *calcinosis cutis*, which is uncommon in dogs and rare in cats. Calcinosis circumscripta involves a well-circumscribed, solitary lesion typically in the deep dermis and

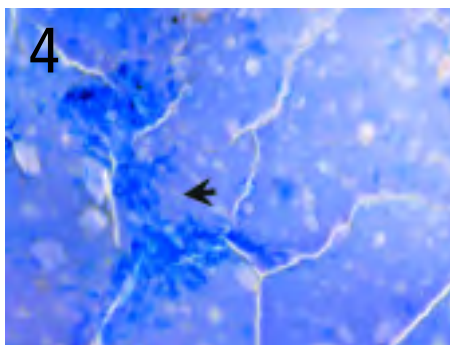
subcutis formed by dystrophic mineralization. This dystrophic condition may occur secondary to inflammatory, degenerative, and neoplastic lesions related to deposition of mineral in the injured or dead tissue. The exact pathogenesis is unknown but is believed to involve abnormally high levels of mitochondrial calcium phosphate. A nidus of calcium phosphate initiates the condition, which progresses to hydroxyapatite crystal formation.¹

An idiopathic form of dystrophic calcinosis cutis is most commonly seen in young dogs (younger than 4 years) of large, rapidly growing breeds, particularly German shepherds, Rottweilers, and Labrador retrievers.^{2,3} The predisposition of such dogs to develop these lesions is believed to be related to the active calcium and phosphorus metabolism during growth. Most commonly affected locations include joint areas or pressure points, sites of previous trauma, and under the tongue. Lesions occur frequently on the hindlimbs and rarely in the intestines and feet. The lesions are firm and gritty. Histologically, it is distinguished by large lakes of mineralized deposits surrounded by dense fibrous connective tissue and foreign body giant cells.

Cytologically, dense granular material is present in the background and a mixed inflammatory response occurs that includes macrophages, giant multinucleated cells, neutrophils, lymphocytes, and plasma cells.^{3,4} Fibroblasts may be



Uniform population of large mononuclear phagocytes with abundant granular basophilic cytoplasm (open arrows). The basophilic background contains numerous pale-staining erythrocytes (closed arrows). The granular or foamy appearance and white color are consistent with mineralized proteinaceous material (Wright's stain; ×60 objective).



Thick area of the slide showing a dense collection of cohesive spindle cells (arrowhead), scattered poorly stained squamous epithelium, and dense basophilic granular background (Wright's stain; ×20 objective).



Note the large macrophage with pink-staining nucleus (open arrow) and numerous unstained erythrocytes (closed arrows). The brownish-black granular appearance reflects a positive reaction for calcium (von Kossa's stain; ×100 objective).

frequently observed. Mineral deposits appear as refractile yellow-green granules of irregular size and shape. The finely granular purple or basophilic material in the background is probably proteinaceous necrotic tissue. This is a benign lesion best treated by surgical excision.

Dystrophic calcification can also be associated with glucocorticoid use or hyperadrenocorticism in dogs.¹ It involves mineralization of collagen or elastin of the skin. These widespread areas of papules, plaques, and nodules are particularly common in the dorsal neck, groin, and axillary region. Injections of progestogens in both dogs and cats have also resulted in calcinosis conditions.⁵

Metastatic calcification is another form of calcinosis cutis related to abnormal metabolism of calcium and phosphorus that results in an abnormal solubility product. Such conditions as chronic renal disease, hypervitaminosis D, and primary hyperparathyroidism are accompanied by observed changes in serum concentrations, whereas conditions associated with dystrophic calcification have normal serum concentrations of calcium and phosphorus. ■

See Aids & Resources, back page, for references, contacts, and appendices.

aids & resources CONTINUED FROM PAGE 68

2. **Gastrointestinal, pancreatic and hepatic disorders.** Willard MD. *Small Animal Clinical Diagnosis by Laboratory Methods*. Willard MD, Tveden H, Turnwald GH—Philadelphia: WB Saunders, 1989, pp 189-228.
3. **Acute abdomen: Evaluation and emergency treatment.** Mann FA. In Bonagura JD (ed): *Kirk's Current Veterinary Therapy XIII*—Philadelphia: WB Saunders, 2002.
4. **Triage and approach to the acute abdomen.** Mazzaferro EM. *Clin Tech Small Anim Pract* 18:1-6, 2003.
5. **Acute abdomen: Diagnosis.** Heeren V, Edwards L, Mazzaferro E. *Compend Contin Educ Pract Vet* 26:350-363, 2004.
6. **Acute abdomen: Treatment.** Heeren V, Edwards L, Mazzaferro E. *Compend Contin Educ Pract Vet* 26:366-373, 2004.
7. **Gastrointestinal obstruction.** MacPhail C. *Clin Tech Small Anim Pract* 17:178-183, 2002.

DIABETES MELLITUS • Jill C. Lurye

Suggested Reading

Canine diabetes mellitus. Feldman EC, Nelson RW. *Canine and Feline Endocrinology and Reproduction*, 3rd ed—St. Louis: Saunders, 2004, pp 486-538.

Diabetes mellitus. In Ettinger SJ, Feldman EC (eds): *Textbook of Veterinary Internal Medicine*, 6th ed—Philadelphia: Elsevier Saunders, 2005, pp 1563-1591.

Diabetic ketoacidosis. Feldman EC, Nelson RW. *Canine and Feline Endocrinology and Reproduction*, 3rd ed—St. Louis: Saunders, 2004, pp 580-615.

Feline diabetes mellitus. Feldman EC, Nelson RW. *Canine and Feline Endocrinology and Reproduction*, 3rd ed—St. Louis: Saunders, 2004, pp 539-579.

Management of canine diabetes. Fleeman LM, Rand JS. *Vet Clin North Am Small Anim Pract* 31:855-880, 2001.

Management of feline diabetes mellitus. Rand JS, Martin GJ. *Vet Clin North Am Small Anim Pract* 31:881-913, 2001.

URETHRAL CATHETERIZATION OF THE FEMALE DOG & CAT • Janet Aldrich

References

1. **Incidence of catheter-associated urinary tract infection among dogs in a small animal intensive care unit.** Smarick SD, Haskins SC, Aldrich J, et al. *JAVMA* 224:1936-1940, 2005.
2. **Placing a urinary catheter in female dogs.** Pugliese K. *Vet Tech* 21:143-147, 2000.
3. **Guidelines for prevention of catheter associated urinary tract infections.** Wong ES. Centers for Disease Control and Prevention; 1981. www.cdc.gov/ncidod/dhqp/gl_catheter_assoc.html.