What Is Your Diagnosis?

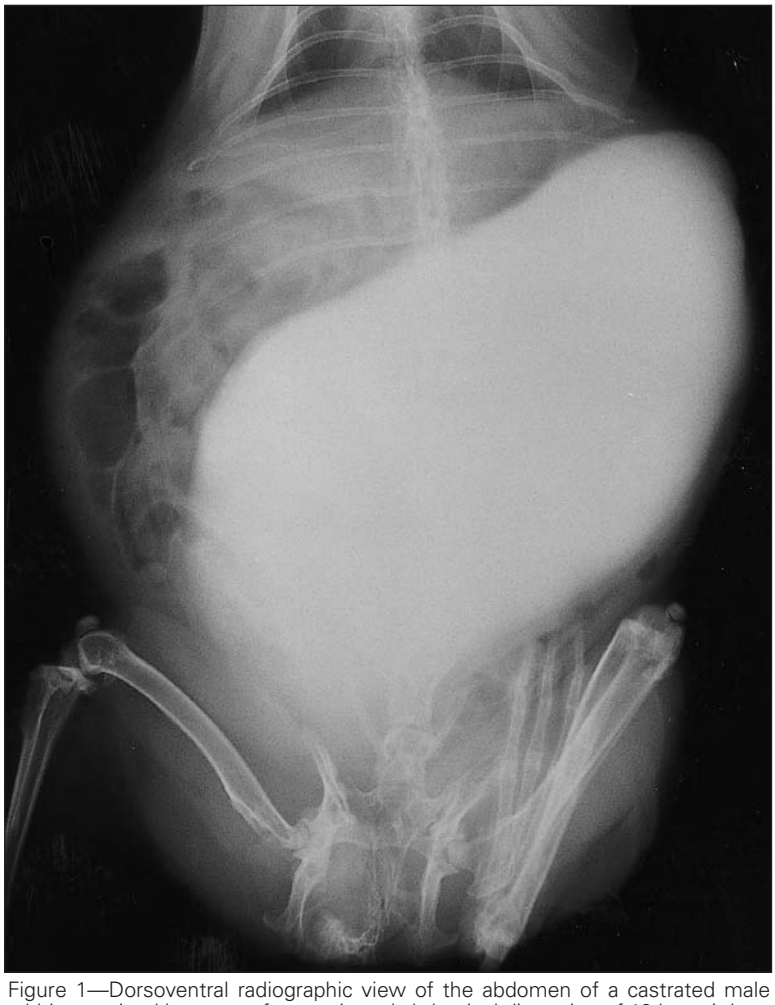

Figure 1—Dorsoventral radiographic view of the abdomen of a castrated male rabbit examined because of anorexia and abdominal distention of 12 hours' duration.

History

A 7-year-old 5-kg (11.25-lb) castrated male lop-eared rabbit was examined because of anorexia and abdominal distention of 12 hours' duration. The rabbit was fed a diet consisting of commercial rabbit food (80%), alfalfa hay (15%), and fresh greens (5%). The owners reported that the rabbit was producing a normal amount of feces and did not have hematuria or stranguria. Physical examination revealed a severely distended abdomen. The distention was firm but reducible and located primarily on the left side. No other abnormalities were detected. A dorsoventral radiographic view of the abdomen was obtained **(Fig 1)**.

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

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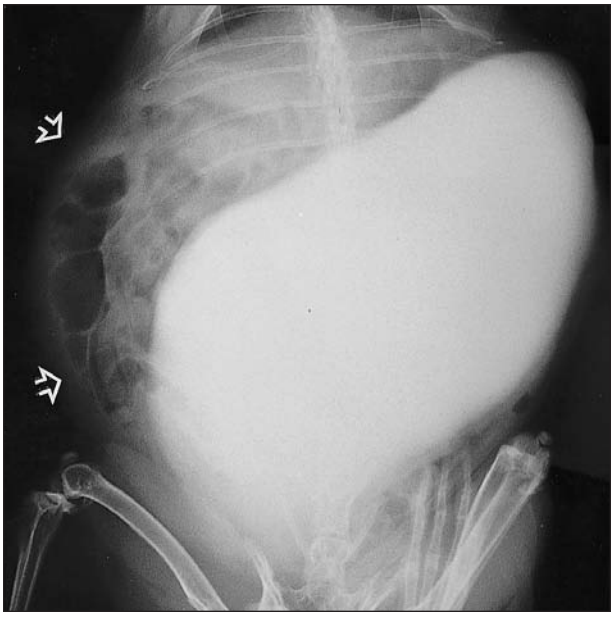

Figure 2—Same radiographic view as in Figure 1. Notice the large (40 × 60 cm) mass with a heterogeneous mineral opacity that has displaced abdominal viscera (open white arrows) to the right.

Diagnosis

Radiographic diagnosis—Large (40 × 60 cm) abdominal mass with a heterogeneous mineral opacity.

Comments

The mass occupied 80% of the abdominal cavity and displaced abdominal viscera to the right side of the cranial portion of the abdomen **(Fig 2)**. After obtaining the dorsoventral radiographic view, the rabbit developed respiratory distress that resolved after 5 minutes of rest. Because of the rabbit's condition and the questionable prognosis, and in view of financial constraints, the owners elected to have the rabbit euthanatized. A lateral radiographic view of the abdomen was obtained after euthanasia; that view indicates that the mass originated in the caudal portion of the abdomen **(Fig 3)**. Differential diagnoses included urinary bladder neoplasia and cystic calculi (ie, urolithiasis); final radiographic diagnosis was urolithiasis.

Necropsy revealed a distended bladder filled with 500 ml of uniform calculi with the texture of sand and 300 ml of blood-tinged urine. The contents of the urinary bladder weighed 1.12 kg (2.52 lb). The bladder wall was thickened, and fine paintbrush hemorrhages were visible on the mucosal surface. Urolith analysis revealed calcium carbonate and oxalate dihydrate sand.

The predisposing cause for urolithiasis in rabbits is hypercalciuria.[1-4] Rabbits can excrete 30 times more calcium in urine than other mammals.[5-6] High urinary calcium concentrations are exacerbated by feeding commercial pelleted diets, alfalfa hay, and mineral supplements.[5] Limited exercise and obesity may also play a role in the development of urolithiasis.[1]

Diagnosis of urolithiasis is best achieved with the use of imaging techniques. Radiography may reveal a urinary bladder that appears normal or distended. The entire bladder may be filled with urine and homogeneous radiopaque urolith sand. Typically, small amounts of urolith sand are evident in the dependent portion of the bladder. Rabbits commonly produce radiopaque calcium carbonate sand and calcium monohydrate crystals.[1] Retrograde contrast radiography, using organic iodides, can be performed to better determine the location of the bladder and assess the bladder wall and urethra. Double-contrast radiography has been used to identify mural lesions and uroliths in other species.[7] Contrast cystography allows better evaluation of bladder wall thickness, mucosal border irregularities, and filling defects. The bladder must be fully distended to see mural masses, uroliths, bubbles, and clots. However, over-distention may result in rupture, and air bubbles and partial filling may be mistaken for tumors or calculi.[7] Neoplasia can be differentiated radiographically from calculi, because bladder neoplasia typically results in an irregular bladder shape, irregular mucosal borders, and irregular attachment of the mass to the bladder wall. Ultrasonography can also be used to evaluate the bladder, kidneys, ureters, and urethra. During real-time B-mode ultrasonography, calculi may be seen moving within the bladder lumen or along the bladder wall when the bladder is shaken. Masses within the bladder can be viewed from multiple longitudinal and transverse cross sections to determine whether they are attached to the bladder wall.

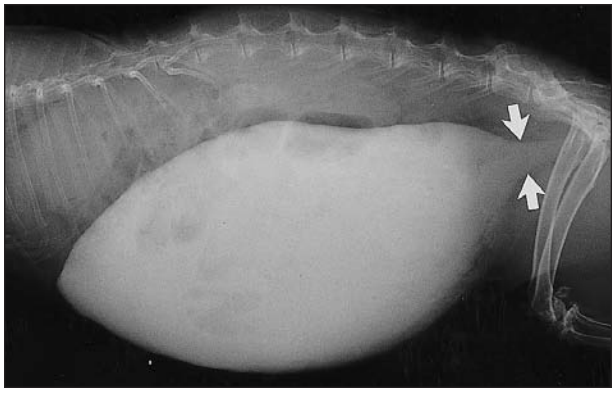

Figure 3—Lateral radiographic view of the abdomen of the rabbit described in Figure 1, obtained after euthanasia. Notice that the mass appears to be originating from the dorsocaudal area of the abdomen (solid white arrows).

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