# Surgical Repair of an Inguinal Herniation of the Urinary Bladder in an Intact Female Domestic Rabbit (*Oryctolagus cuniculus*)

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*Abstract*

**A 4-month-old intact female domestic rabbit (*Oryctolagus cuniculus*) was evaluated for a recent onset of lethargy, anorexia, foul-smelling red urine, diarrhea, and a soft subcutaneous swelling in the inguinal region. Physical examination confirmed the presence of a flocculent subcutaneous swelling in the ventral pelvic region. Whole body radiographs showed an approximately 5 × 3.5 × 3.5 cm structure of mineral opacity within the subcutaneous tissues ventral to the pelvic girdle. Cytology of fluid aspirated from the mass and an excretory urogram supported the diagnosis of a herniation of the urinary bladder through the right caudoventral abdominal body wall. The hernia was successfully repaired with an inguinal herniorrhaphy and replacement of the bladder within the abdominal cavity. The etiology of this herniation could not be definitively determined but was likely congenital or non-traumatically acquired in origin. This is the first published report describing the surgical repair of an inguinal herniation and incarceration of the urinary bladder in an intact female rabbit.** 

*Key words:* **Bladder; hernia; inguinal; rabbit; urogram**

A 4-month-old, intact female Flemish giant cross pet rabbit was presented as an after-hours emergency to the Avian and Zoological Medicine Service at the University of Tennessee Veterinary Teaching Hospital with a 1-day history of lethargy, anorexia, foul-smelling red urine, and diarrhea. The owners had also noted a large, soft swelling in the ventral pelvic region while bathing the rabbit a few hours before presentation. The rabbit had been raised since birth by the present owners and had been offered a varied diet that consisted of pellets, Timothy hay, and fresh produce. The patient was being housed indoors and there was no known history of trauma.

On physical examination, the rabbit weighed 2.96 kg and had a body condition score of 3 of 5.[1] The rabbit's perineal area was stained with diarrhea and red urine. A flocculent subcutaneous swelling, measuring approximately 6 × 5 cm, was present in the

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**Figure 1.** A 4-month-old, intact female rabbit that was diagnosed with an inguinal urinary bladder hernia is shown in dorsal recumbency before surgery. Note the swelling over the ventral pelvic region.

ventral pelvic region (Fig 1). The remainder of the physical examination was unremarkable. To obtain more information on the patient's health status diagnostic tests were recommended, which included a complete blood count (CBC), plasma biochemical analysis, whole body radiographs, and centesis of the ventral pelvic swelling. However, because of initial financial constraints, the CBC and plasma biochemical analysis were declined by the owner at that time.

The rabbit was placed under inhalant general anesthesia for whole body radiographs. Anesthesia was induced with 3% isoflurane in 100% oxygen administered by face mask and maintained with 2.5% isoflurane in 100% oxygen administered by face mask for the duration of the procedure. Right lateral and ventrodorsal radiographs revealed an approximately 5 × 3.5 × 3.5 cm smoothly marginated, well-circumscribed mineral opaque structure within the subcutaneous tissues of the right inguinal region (Fig 2). The urinary bladder could not be visualized within the abdominal cavity on the radiographic images and no other abnormalities were noted.

While the patient was maintained under general anesthesia, and with the initial clinical suspicion that this swelling represented a subcutaneous mineralized abscess, a sterile aspiration of the mass was performed with an 18-gauge needle and a 20 mL syringe. Approximately 35 mL of an extremely thick, cream-colored fluid that smelled like urine was obtained for analysis. Cytology of the fluid stained with a modified Wright Giemsa stain (Dip Quick; Jorgensen Laboratories Inc., Loveland, CO USA) showed few bacteria and cells, and numerous clear crystals consistent with calcium carbonate. These findings supported the diagnosis of a herniated urinary bladder.

The rabbit's recovery from general anesthesia was uneventful, and she was hospitalized with supportive therapy including crystalloid fluids (20 mL/kg, subcutaneously), enrofloxacin (5 mg/kg, subcutaneously in the fluid pocket, Baytril; Bayer Health Care LLC, Shawnee Mission, KS USA), meloxicam (0.1 mg/kg, every 24 hours, subcutaneously, Metacam; Boehringer Ingelheim Vetmedica Inc., St. Joseph, MO USA), and herbivore-assisted feeding formula (25 mL, every 8 hours, orally, Herbivore Critical Care; Oxbow Animal Health, Murdock, NE USA). During hospitalization, the rabbit did eat a small amount on her own and routinely passed urine and small fecal pellets. The patient was maintained on antibiotic treatment that consisted of oral trimethoprim sulfamethoxazole (30 mg/kg, every 12 hours for 14 days, Hi-Tech Pharmacal Co., Amityville, NY USA).

The following day, a CBC and plasma biochemical analysis were performed. The blood work revealed an increased blood urea nitrogen (BUN) (53 mg/dL; reference range, 15-30 mg/dL), hyperglycemia (256 mg/dL; reference range, 75-150 mg/dL), hyperphosphatemia (7.6 mg/dL; reference range, 2.3-6.9 mg/dL), increased alkaline phosphatase (70 IU/L; reference range, 4-16 IU/L), and elevated creatine kinase (3175 IU/L; reference range, 58.6-175.0 IU/L).[2,3] No other abnormalities were noted.

That same day, the rabbit was placed under general anesthesia as previously described for repeat survey radiographs and an excretory urogram. Whole body right lateral and ventrodorsal radio-

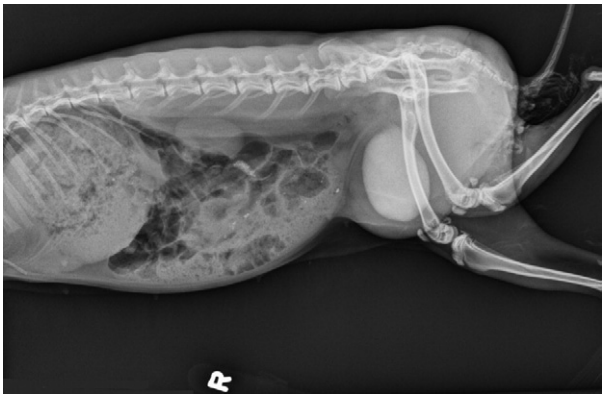

**Figure 2.** Right lateral survey radiograph of the rabbit described in Figure 1. Note the large mass of mineral opacity in the inguinal region.