



SURGICAL RESECTION OF A TESTICULAR SEMINOMA IN A GUINEA PIG (*CAVIA PORCELLUS*)

Rima J. Kharbush, BA, Renee V. Richmond, DVM, Howard Steinberg, VMD, PhD, Dip. ACVP, and Kurt K. Sladky, MS, DVM, Dip. ACZM, Dip. ECZM (Herpetology)

Abstract

An approximately 6-year-old intact male guinea pig (*Cavia porcellus*) presented with a 5- to 6-day history of an enlarged left testicle. Physical examination revealed a firm mass, roughly 5 cm in diameter, encompassing the region of the left testicle. All other organ systems appeared unremarkable. Routine bilateral orchiectomy was performed, and the enlarged testicle submitted for histopathologic analysis. Histopathologic results confirmed the presence of a seminoma with intravascular invasion. The patient made a complete recovery, and contrast-enhanced computed tomography, performed 4 months postoperatively, did not reveal the presence of local recurrence or metastatic disease. This report describes and further demonstrates that surgical resection, when used as the sole treatment modality, may provide substantial disease-free resolution of testicular seminomas in guinea pigs. Copyright 2017 Elsevier Inc. All rights reserved.

Key words: seminoma; guinea pig; orchiectomy; neoplasia; testicular; small mammal

An intact male, approximately 6-year-old, 940 g guinea pig (*Cavia porcellus*) was presented to the University of Wisconsin Veterinary Medical Teaching Hospital (UW-VMTH) for the presence of an enlarged left testicle. The owner initially reported observing the enlarged testicle 5 to 6 days before presentation. The patient was otherwise reported as healthy, with no noticeable change in appetite, activity level, or behavior. During the physical examination, the left testicle, measuring $4.7 \times 3.4 \times 3.0$ cm, was determined to be markedly enlarged, with a slight increase in firmness, and smooth on palpation. The right testicle appeared normal in size and structure. All remaining physical examination findings were unremarkable. The owner elected not to pursue preoperative diagnostics that included evaluating hematology and plasma biochemistries and a whole-body computed tomography (CT) scan for evaluation of metastatic disease. However, the owner agreed to the option of the guinea pig being scheduled for a bilateral orchiectomy.

The guinea pig was premedicated with butorphanol tartrate (1 mg/kg intramuscularly; Torbugesic, Fort Dodge Animal Health, Fort Dodge, IA USA) and midazolam (1 mg/kg intramuscularly; Midazolam hydrochloride, Hospira Inc., Lake Forest, IL USA). Induction of

anesthesia was achieved with isoflurane (4 % to 5% via face mask, Isoflo, Abbott Animal Health, AbbottPark, IL USA) in 1 L/minute of oxygen and maintained using isoflurane (1.5% to 3.0% via face mask) in 1 L/minute of oxygen. Lactated Ringer's solution was administered

From the Department of Surgical Sciences, School of Veterinary Medicine, University of Wisconsin-Madison, Madison, WI, USA; and the Department of Pathobiological Sciences, School of Veterinary Medicine, University of Wisconsin-Madison, Madison, WI, USA.

Address correspondence to: Kurt K. Sladky, MS, DVM, Dip. ACZM, Dip. ECZM (Herpetology), Department of Surgical Sciences, School of Veterinary Medicine, University of Wisconsin-Madison, 2015 Linden Dr., Madison, WI 52706. E-mail: kurt.sladky@wisc.edu

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subcutaneously (90 mL total, 250 mL/kg boluses, Abbott Laboratories, North Chicago, IL USA), with 45 mL administered immediately before beginning surgery, and 45 mL provided halfway through the procedure. A lidocaine block was administered directly into the left testicle and spermatic cord (2 mg; Lidocaine hydrochloride, Hospira Inc., Lake Forest, IL USA), and the surgical site draped and aseptically prepared. A routine open bilateral scrotal castration was performed as follows: A 2- to 3-cm incision was made in the left scrotum to the level of the visceral vaginal tunic. The left spermatic cord and vessels were identified and ligated using 3 surgical ligating clips (Hemoclip ligation system, size medium, Teleflex Inc., Morrisville, NC USA). The vaginal tunic and epididymal fat pad were ligated and closed with 2 additional hemoclips before returning both anatomical structures back into the inguinal canal. Mild hemorrhage was controlled with manual pressure and bipolar cautery. The deep subcutaneous tissues, closely associated with the inguinal canal, were closed using 3-0 monofilament absorbable suture (Maxon, Covidien Inc, Mansfield, MA USA) in a simple continuous pattern, and the skin apposed using skin staples (Appose single-use skin stapler, Covidien, Dublin, Ireland). A lidocaine block was administered to the right testicle and right spermatic cord (2 mg; Lidocaine hydrochloride, Hospira Inc., Lake Forest, IL USA) and the right testicle was similarly excised using an open technique, but with only 2 hemoclips placed on the spermatic cord and 1 on the vaginal tunic and epididymal fat pad.

The anesthetic procedure was smooth and uncomplicated; however, the patient had a delayed recovery from the anesthetic event. The guinea pig's postoperative body temperature was 93.9°F, and the patient was placed in an incubator and administered meloxicam (1 mg/kg subcutaneously; Metacam, Boehringer Ingelheim, Vetmedica, St. Joseph, MO USA), and flumazenil (0.05 mg/kg intramuscularly; Flumazenil hydrochloride, Abaxis Pharmaceutical Products, Schaumburg, IL USA). Owing to the slow recovery, 2 additional doses of flumazenil were administered intramuscularly over the first hour following the surgical procedure. At 1.5 hours postoperatively, owing to the patient's slow recovery, the anesthesiologists decided to administer naloxone (0.04 mg/kg intramuscularly; Naloxone Hydrochloride, Endo Pharmaceuticals Inc., Chadds Ford, PA USA), which was used to partially antagonize the preoperative dose of

butorphanol. Although the guinea pig remained moderately lethargic and sedate following the naloxone injection, the body temperature had increased to 101.1°F, and recovery was improving. Heart and respiratory rates were maintained within normal limits, and 2 hours after surgery the patient was amenable to syringe feedings of a commercial herbivore diet (Critical Care, Oxbow Animal Health, Murdock, NV USA). The guinea pig was discharged and handed over to the owner approximately 6 hours after the surgical procedure as it showed a significant improvement in mentation, with instructions to monitor sedation level and to administer oral meloxicam (0.5 mg/kg once daily; Metacam, 1.5 mg/mL; Boehringer Ingelheim, Vetmedica, St. Joseph, MO USA), oral trimethoprim-sulfamethoxazole (30 mg/kg twice daily; Sulfatrim, STI Pharma LLC, Langhorne, PA USA), and commercial herbivore diet syringe feedings (50 mL/kg/day, divided into 3 feedings of approximately 15 mL each) as needed. The next morning, the owner reported that the guinea pig was found to be fully recovered with normal behavior. The guinea pig presented for routine staple removal 11 days after the bilateral orchiectomy, at which time the surgical site was observed to be healing well and without complication.

Histopathologic analysis of the left testicle was consistent with a seminoma with intravascular invasion (Fig.). More than 99% of the testicle was effaced and expanded by a well-demarcated, nonencapsulated mass composed of sheets and lobules of round cells supported by a fine fibrovascular stroma. The neoplastic cells had distinct cell borders, finely granular eosinophilic cytoplasm, round-to-oval nuclei with finely stippled to vesicular chromatin, and variably prominent nucleoli. Mitoses averaged 3 per high power field and were frequently atypical and bizarre in appearance. There was moderate anisocytosis and anisokaryosis, and frequent karyomegalic cells. Binucleate and multinucleate cells were rarely observed. There were moderate numbers of individual shrunken, hyper eosinophilic, necrotic cells with pyknotic-to-karyorrhectic nuclei and tingible body macrophages scattered throughout the mass. Rafts of neoplastic cells were rarely observed within peripheral blood vessels. The mass appeared narrowly excised, with the nearest surgical margin being separated from the mass by 1 to 2 layers of collagen. The adjacent epididymis and vas deferens were unremarkable.

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