CEFOVECIN (CONVENIA) FOR THE TREATMENT OF SEPTIC PERITONITIS IN A FEMALE LION (*PANTHERA LEO*)


Published By: American Association of Zoo Veterinarians
DOI: [http://dx.doi.org/10.1638/2012-0038R.1](http://dx.doi.org/10.1638/2012-0038R.1)

BioOne ([www.bioone.org](http://www.bioone.org)) is a nonprofit, online aggregation of core research in the biological, ecological, and environmental sciences. BioOne provides a sustainable online platform for over 170 journals and books published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Web site, and all posted and associated content indicates your acceptance of BioOne’s Terms of Use, available at [www.bioone.org/page/terms_of_use](http://www.bioone.org/page/terms_of_use).

Usage of BioOne content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.
CEFOVECIN (CONVENIA) FOR THE TREATMENT OF SEPTIC PERITONITIS IN A FEMALE LION (PANTHERA LEO)


Abstract: An 8-yr-old intact female African lion (Panthera leo) presented with a 3-day history of lethargy, anorexia, and vomiting. Hematologic and biochemical abnormalities included a leukocytosis, 41,700/µl (4,700–15,300) with a neutrophilia (37,530/µl; 2,000–9,200) and a left shift (1,250/µl bands; 0–300), and mild hypokalemia of 2.1 mEq/L (2.8–4.8). Abdominal radiographs revealed evidence of intestinal ileus, peritonitis, and the presence of effusion. An exploratory laparotomy was performed, and septic peritonitis due to a pyometra was diagnosed. The lion was treated with an ovariohysterectomy, abdominal lavage, fluid therapy, and a subcutaneous injection of cefovecin. The lion recovered, and clinical signs associated with septic peritonitis resolved within 36 hr. It was returned to conspecifics 3 wk later. Three months postoperatively, the lion showed no residual signs of septic peritonitis.

Key words: Cefovecin, Convenia, lion, Panthera leo, pyometra, septic peritonitis.

BRIEF COMMUNICATION

An 8-yr-old, 128-kg intact female African lion (Panthera leo) presented with a 3-day history of vomiting, lethargy, and anorexia. At the time of acquisition, 3 mo before presentation, it was noted that the animal was defecating small pieces of rubber. Visual examination in a cage revealed the lion to be quiet, alert, and responsive, but more lethargic than on previous examinations. Because of the concern for a possible gastrointestinal foreign body, the lion was immobilized for a complete physical examination and diagnostic work-up. Immobilization was induced with midazolam (NovaPlus, Hospira, Lake Forest, Illinois 60045, USA; 0.12 mg/kg i.m.) and dexmedetomidine (DexDomitor, Pfizer Animal Health, New York, New York 10017, USA; 0.012 mg/kg i.m.) via a remote drug delivery system followed by ketamine (Ketaset, Fort Dodge Animal Health, Fort Dodge, Iowa 50501; 3.1 mg/kg i.m.) via hand injection.1 Physical examination was unremarkable except for the presence of mild abdominal distention. A venous blood sample was collected from the medial saphenous vein for a complete blood count and plasma biochemistry analysis, including electrolytes. The lion was intubated with a 20-mm cuffed endotracheal tube (Jorvet, Jorgensen Laboratories, Loveland, Colorado 80538, USA), and anesthesia was maintained with isoflurane (IsoFlo, Abbott Animal Health, North Chicago, Illinois 60064, USA) in 100% oxygen for the remainder of the procedure. An 18-gauge 1⁄4-inch intravenous catheter (BD Angiocath, Becton Dickinson Infusion Therapy Systems, Sandy, Utah 84070, USA) was placed in the medial saphenous vein, and Normosol R (Normosol-R, Hospira) was administered intravenously for the entire procedure at 10 ml/kg/hr.

Hematologic abnormalities included a marked leukocytosis, 41,700/µl (4,700–15,300) with a neutrophilia (37,530/µl, 2,000–9,200) and a left shift (1,250/µl bands, 0–300). The only clinically relevant biochemical abnormality was a mild hypokalemia of 2.1 mEq/L (2.8–4.8). Abdominal radiographs (Fig. 1) revealed decreased serosal detail, with evidence of peritoneal effusion. Additionally, irregular- and angular-shaped gas opacities were noticed in the lumen of multiple small intestinal segments. Radiographs were consistent with a mechanical ileus likely secondary to an intestinal foreign body; however, peritonitis and intestinal adhesions could not be ruled out. On the basis of the presence of small intestinal ileus on abdominal radiographs and suspected foreign body ingestion, an exploratory laparotomy was performed.

The abdomen was clipped and surgically prepped from xiphoid to pubis. An exploratory laparotomy was performed via a midline incision. After the linea alba was incised, a moderate amount of malodorous, purulent fluid was noted in the abdomen. A sample of the fluid was obtained and submitted for cytologic analysis and aerobic and anaerobic culture. Cytology revealed bacterial infection with marked neutro-
philic to pyogranulomatous inflammation. The remaining fluid was suctioned out of the abdomen. A complete abdominal exploratory was performed, including a thorough examination of the entire gastrointestinal tract, liver, spleen, kidneys, ureters, bladder, ovaries, and uterus. No palpable foreign material was found on examination of the small intestines. Many bowel loops were moderately distended with fluid and gas, indicating generalized ileus. The uterus was turgid and diffusely enlarged, and several follicles and corpora lutea were present on both ovaries. Pyometra was suspected; therefore, an ovariohysterectomy was performed, and the reproductive tract was submitted for histopathology. The abdomen was copiously lavaged with warm saline until the resulting fluid was clear. The abdominal incision was closed in a five-layer closure in a simple interrupted pattern with varying sized poliglecaprone 25 (Monocryl, Ethicon, Somerville, NJ 08876, USA).

Because of the aggressive demeanor of the animal and the difficulty for parenteral or oral antibiotic administration, it was decided to administer cefovecin (Convenia, Pfizer Animal Health; 8 mg/kg subcutaneously) between the shoulder blades before anesthetic recovery. The animal was given meloxicam (Metacam, Boehringer Ingelheim, St. Joseph, Missouri 64506, USA; 0.2 mg/kg subcutaneously) for postoperative analgesia. The lion was moved to a rolling menagerie cage and given atipamezole (Antise-
dan, Pfizer Animal Health; 0.12 mg/kg i.m.) to antagonize the effects of dexmedetomidine. The animal recovered uneventfully and was returned to the sanctuary.

Aerobic culture of the abdominal fluid grew *Escherichia coli* sensitive to enrofloxacin and cefovecin. Sensitivity profile was determined using the Kirby Bauer disc diffusion method. No anaerobic organisms were cultured from the abdominal fluid. Histopathology of the reproductive tract showed marked endometrial hyperplasia and moderate suppurative endometritis and perimetritis, which was consistent with a mild pyometra.

One day after surgery, the lion started eating small amounts of food, and its attitude improved. Over the next 36 hr, the animal became progressively restless in the menagerie cage, and she was subsequently moved to her exhibit and placed into a smaller cage adjacent to the larger enclosure to allow for visualization of conspecifics and close observation by keeper staff. The lion’s appetite and attitude returned to normal 48 hr after the exploratory laparotomy was performed. She was released into the group 21 days after surgery was performed. Three months postoperatively, the lion showed no residual signs from its septic peritonitis.

In the domestic cat, clinical signs most commonly seen with septic peritonitis are lethargy, anorexia, and vomiting. These signs have also been associated with pyometra in large exotic felids. Treatment of septic peritonitis in domestic cats consists of an abdominal exploratory laparotomy with removal of the inciting cause of septic peritonitis, copious abdominal lavage, closed or open abdominal drainage for moderate to severely affected patients, and intensive postoperative care. Intensive care consists of intravenous fluid administration, antimicrobial therapy, incisional or drain care, and observation of physical parameters, such as central venous and peripheral blood pressures, heart rate, and urine production. Even under the most ideal situations, the survival rate for domestic cats with septic peritonitis ranges from 36% to 70%. Bacteria commonly cultured from domestic cats with septic peritonitis are *E. coli*, *Enterobacter* sp., and *Clostridium* sp. The most common bacterial isolate in exotic felids with pyometras is *E. coli*, as was present in this case. The treatment of pyometras in exotic felids consists of removal of the inciting cause, either by ovariohysterectomy or uterine lavage. If the animal is a nonbreeding animal, ovariohysterectomy is recommended to eliminate the chance of subsequent pyometra development.

Cefovecin is a semisynthetic cephalosporin recently approved for the treatment of skin infections in dogs and cats. This long-acting, parenterally administered drug has a dosing interval of 14 days. The spectrum of activity of cefovecin is similar to that of most other β-lactam antibiotics. Cefovecin is primarily used to treat skin wounds such as abscesses; however, it has also been shown to be safe and effective in domestic cats for the treatment of urinary tract infections caused by *E. coli*. To the authors’ knowledge, there have been no reports of the pharmacokinetics of cefovecin in exotic felids; the dose for the lion reported here was extrapolated from domestic cat studies. Side effects reported with the use of cefovecin in domestic cats, such as vomiting, lethargy, and anorexia, were not observed in the lion of this report.

Because of the potential for serious harm to animal care staff, safety concerns must be considered when developing a treatment plan for exotic felids. The use of a long-acting drug such as cefovecin reduces the frequency of dangerous and stressful interactions with these animals during the treatment period. Additionally, it decreases the concerns regarding ineffective antimicrobial therapy in anorectic patients to which oral medications cannot safely be delivered. Use of cefovecin in this case along with ovariohysterectomy and abdominal lavage allowed for complete resolution of the lion’s septic peritonitis. High cost might prohibit long-term use of this antibiotic in large exotic felids; however, the cost difference between a 2-wk course of enrofloxacin and a single injection of cefovecin was minimal in this case and was considered insignificant compared with safety and compliance issues. Further studies need to be performed to evaluate the safety, effectiveness, and pharmacokinetics of cefovecin in a variety of exotic felid species.

**Acknowledgments:** The authors thank the staff at Tiger Haven Inc., especially Debbie Wilkins, and Mary Lynn Haven for the care and management of the lion presented in this report.

**LITERATURE CITED**


Received for publication 8 February 2012