



ISSN: 2456-2912

VET 2024; 9(6): 87-89

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www.veterinarypaper.com

Received: 09-09-2024

Accepted: 16-10-2024

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Surgical management of cystic endometrial hyperplasia-pyometra complex in ten-year-old dog

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Abstract

This case report discusses the surgical management of a ten-year-old female dog diagnosed with the cystic endometrial hyperplasia-pyometra complex. CEH-pyometra is a progesterone-driven uterine disorder primarily affecting older intact bitches, resulting from hormonal imbalances during the luteal phase, which create a favorable environment for bacterial growth and subsequent infection, most commonly due to *Escherichia coli*. The dog presented with clinical signs including anorexia, vomiting, and vaginal discharge. Physical examination revealed abdominal distension and elevated body temperature, indicative of potential uterine enlargement and systemic infection. Ultrasonography confirmed significant fluid accumulation in the uterus, consistent with pyometra.

Pre-anesthetic evaluation ensured stabilization through intravenous fluid therapy, while specific anesthetic protocols were implemented to mitigate risks associated with the patient's compromised state. The surgical procedure involved a ventral midline incision to access the uterus, which was found to be severely distended and herniated. An ovariohysterectomy was performed, alongside a kelyotomy to address the herniated uterine horn. The excised tissue weighed approximately 3.4 kg, with around 3 liters of pus, underscoring the severity of the condition. Post-operative care included antiseptic dressing, fluid therapy, and a course of antibiotics and anti-inflammatory medications, resulting in a successful recovery. Histopathological examination confirmed the diagnosis of CEH-pyometra complex. This case highlights the importance of prompt surgical intervention in managing advanced cases of pyometra, the necessity of supportive care, and the potential need for alternative management strategies in breeding females.

Keywords: Surgical management, ten-year-old dog, progesterone-driven uterine disorder

Introduction

The CEH-pyometra complex is a progesterone-driven uterine disorder mainly in older or middle-aged intact bitches and queens after one or more estrous cycles. During the luteal phase, progesterone reduces the uterine leukocyte response to infection, decreases myometrial contractility and stimulates endometrial gland development, creating a favorable environment for bacterial growth. Bacteria typically ascend from the lower genitourinary tract and failure to eliminate them results in pyometra—a septic inflammation of the uterus, often caused by *E. coli*. (Nelson and Coutot 2019) [2].

Pyometra typically occurs after recent estrus and can present with or without purulent vulvar discharge, depending on cervical patency. Closed-cervix pyometra is more serious, with risks of uterine rupture or septic peritonitis. Common clinical signs include vulvar discharge, lethargy, anorexia, weight loss and increased drinking and urination. Diagnosis is supported by neutrophilic leukocytosis, hyperglobulinemia and imaging showing uterine enlargement. Ultrasonography helps distinguish pyometra from early pregnancy by assessing uterine wall and lumen characteristics. (Pretzer, 2008) [5].

History and physical examination

Case history: A ten year old female dog was presented at Veterinary Clinical Complex, Rewa with the history of anorexia, frequent vomiting and vaginal discharge since one month.

Clinical examination: On Palpation; abdomen was distended with small swelling at inguinal area and higher body temperature. Which indicate potential uterine enlargement due to fluid

accumulation, likely secondary to pyometra. The inguinal swelling may suggest the presence of an enlarged, fluid-filled uterine horn extending into the lower abdomen. Additionally, the higher body temperature points to a possible systemic infection or inflammation, which is commonly associated with pyometra. (Ettinger *et al*, 2016) [1].

Radiological Investigation: Taking all the symptoms into consideration, Ultrasonography was done, where we found highly distended anechoic uterine loops. Which suggests the presence of a significant accumulation of fluid within the uterine lumen, which is consistent with conditions like hydrometra, mucometra, or pyometra. In the context of CEH-pyometra complex, this finding typically indicates an advanced stage where cystic endometrial hyperplasia has led to fluid retention and possibly the development of pyometra. (Thrall, 2012) [6].

Pathological Investigation: On haematological assessment, haemoglobin was 8 gm % and leucocytosis. Which indicate the presence of anemia (low hemoglobin) and an inflammatory response (elevated white blood cell count). Anemia can result from chronic inflammation, blood loss, or reduced erythropoiesis. Leukocytosis suggests an active infection or severe inflammation, commonly seen in pyometra cases due to the presence of bacteria and associated immune response. (Slatter, 2003) [3].

Anaesthesia

Pre-Anesthetic Evaluation: Before proceeding with surgery, a thorough pre-anesthetic evaluation was conducted. This includes a detailed physical examination to assess the overall condition of the patient, including hydration status and cardiovascular stability. Additionally, it is crucial to perform comprehensive blood work, including a complete blood count (CBC), serum biochemistry to evaluate liver and kidney function and an electrolyte profile to identify any abnormalities. These evaluations help in identifying and correcting pre-existing conditions that could complicate anesthesia. Stabilization of the patient done using IV fluids DNS -150ml I/V and RL -150ml I/V to address dehydration, electrolyte imbalances and hypotension before the induction of anesthesia. (Tranquilli *et al*, 2013) [4].

Pre-Medication: Pre-medication helps to reduce stress, provide analgesia and facilitate a smooth induction and recovery. An antiemetic, Ondansetron (1 mg/kg SC), was administered 30 minutes before induction to prevent vomiting, which is particularly important for patients in a compromised state. Intramuscularly Atropine sulphate injected @0.04 mg/kg as Anticholinergics then after 5-10minutes for sedation, Diazepam was injected intravenously at the rate of 0.5 mg/kg.

Induction: For induction, IV anesthetic agents was using as combination of Ketamine (5 mg/kg IV) and Diazepam (0.5 mg/kg IV). This combination provides good muscle relaxation and hemodynamic stability, making it an appropriate choice in high-risk patients.

Maintenance: Surgical plane was maintained by the administration of Ketamine hydrochloride @5 mg/kg Intravenously as and when required. Close monitoring was done throughout the procedure to ensure the patient remains at an appropriate anesthetic depth.

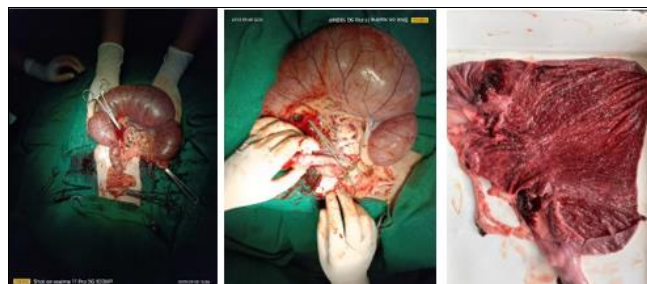
Intra-Operative Monitoring: Monitoring during surgery is critical to detecting and addressing any anesthetic or surgical complications. The patient was monitored continuously using an ECG for heart rate and rhythm, non-invasive or invasive blood pressure monitoring to maintain a systolic blood pressure above 90 mmHg and pulse oximetry to keep oxygen saturation (SpO₂) above 95%. Temperature was also monitored and active warming devices was used to prevent hypothermia. (Kalundia, 2024) [8].

Fluid Therapy: Balanced crystalloids Lactated Ringer's Solution was administered at a rate of 5-10 mL/kg/hr IV during surgery. we Maintained adequate hydration and blood volume; it was critical to support organ perfusion and patient stability during the procedure. (Tranquilli *et al*, 2013) [4].

Surgical procedure

The animal was positioned in dorsal recumbency for the surgical procedure, which involves placing the patient on its back with the ventral (belly) side facing upward. This position is standard for abdominal surgeries as it provides optimal exposure of the abdominal cavity, allowing the surgeon to access the organs easily. Additionally, dorsal recumbency ensures minimal organ displacement and maintains a stable positioning throughout the procedure.

A ventral midline incision was made caudal to the umbilicus to access the uterine body and loops. By making the incision behind the umbilicus, we approached the target site accurately and efficiently, which was crucial for successful resection and reducing surgical time.



During the surgical procedure, it was observed that the uterine loops were cystically enlarged, indicating severe pathological changes such as cystic endometrial hyperplasia (CEH). One of the uterine horns was found herniated at the inguinal region. Herniation in such cases can occur due to increased intra-abdominal pressure or weakened abdominal musculature, resulting in displacement of the uterus through the inguinal canal. This complication required careful manipulation to avoid rupture and potential spillage of infected contents.

An ovariohysterectomy was performed to remove the diseased uterus and ovaries. Due to the herniated uterine loop, a kelotomy was also required. A kelotomy is a surgical procedure that involves making an incision through the abdominal wall to access and retrieve a herniated organ. This additional step was necessary to ensure complete removal of the herniated uterine horn without causing further damage or contamination to the surrounding tissues.

The total weight of the resected uterine tissue, including the cystic and pus-filled segments, was approximately 3.4 kg. The volume of pus contained within the uterus was around 3 liters, indicating a severe and advanced stage of pyometra. Such a significant accumulation of pus can lead to systemic complications, including sepsis and organ failure, if not

promptly addressed. Removing the affected organ and its contents was critical in stabilizing the animal and preventing further deterioration of its condition. (Slatter, 2003)^[3].

Post operative care

In the post-operative care plan, daily antiseptic dressing and fluid therapy were recommended to ensure proper healing and to prevent potential complications. Antiseptic dressing involves cleaning the surgical site with an appropriate antiseptic solution, such as chlorhexidine or povidone-iodine, to minimize the risk of infection. The wound was kept clean and dry and sterile gauze or bandages was applied to protect the incision from contaminants.

Fluid therapy was advised to maintain the animal's hydration status and support its recovery. Surgical procedures, particularly those involving pyometra, can result in significant fluid loss due to the accumulation of infected material within the uterus and the associated systemic inflammatory response. Fluid therapy helps to restore electrolyte balance, support organ function and promote overall recovery. The type and volume of fluids (e.g., balanced crystalloids like Lactated Ringer's Solution) were tailored to the patient's needs, based on factors such as weight, clinical status and laboratory findings.

A course of antibiotics and anti-inflammatory drugs was prescribed for 7 days to manage infection and reduce inflammation post-surgery. Antibiotics are crucial in preventing secondary bacterial infections, especially considering the septic nature of pyometra. The duration of the antibiotic course is aimed at ensuring complete eradication of any residual bacteria, which is vital for a smooth recovery. (Fransson and Ragle, 2003)^[7]

Anti-inflammatory drugs, such as non-steroidal anti-inflammatory drugs (NSAIDs) or corticosteroids, were administered to alleviate pain and reduce postoperative swelling and inflammation. These medications help to control the animal's discomfort, improve its appetite and encourage early mobilization. The combination of antibiotics and anti-inflammatory drugs for a week provides a comprehensive approach to managing post-surgical pain, infection and inflammation, promoting a faster and more comfortable recovery for the animal.



Conclusion

Ovariohysterectomy was successfully performed and the excised cystic tissue was submitted for histopathological examination, which confirmed a diagnosis of cystic endometrial hyperplasia-pyometra complex. Following the procedure, the animal made a full recovery, responding well to post-operative care and treatment.

The primary treatment for pyometra, after stabilizing the patient with IV fluids and antibiotics, is an

ovariohysterectomy, but this may not be suitable for valuable breeding females. For young, stable breeding bitches or queens with open-cervix pyometra, medical management using prostaglandins (e.g., natural PGF_{2α} or synthetic cloprostenol) can be effective. These drugs stimulate uterine contractions and induce luteolysis, facilitating the expulsion of uterine contents. Prostaglandin use is limited to open-cervix cases to reduce the risk of peritonitis from increased intrauterine pressure.

Prostaglandins don't resolve underlying cystic endometrial hyperplasia and recurrence rates for pyometra are high. Owners should be aware that fertility may remain compromised and recurrence rates range from 20% to 80% in bitches and 14% in queens.

Conflict of Interest

Not available

Financial Support

Not available

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How to Cite This Article

Tandia N, Kumar D, Singh P, Singh H, Sharma Y, Mali V, *et al.* Surgical management of cystic endometrial hyperplasia-pyometra complex in ten-year-old dog. International Journal of Veterinary Sciences and Animal Husbandry. 2024;9(6):87-89.

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