



ISSN: 2456-2912

VET 2024; 9(4): 509-513

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Received: 06-05-2024

Accepted: 13-06-2024

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Pyometra in a jungle cat: Necropsy and histopathology findings

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DOI: <https://dx.doi.org/10.22271/veterinary.2024.v9.i4h.1591>

Abstract

Pyometra is a lethal disease characterized by the accumulation of pus within the uterus. The condition is commonly reported in dogs and has been reported captive large felids, but it has not been documented in the jungle cat (*Felis chaus*). This article presents an analysis of necropsy and histopathology findings from a geriatric female jungle cat afflicted with pyometra at the Zoological Garden, Trivandrum. The cat, which had been undergoing treatment for poor health, collapsed in the zoo hospital, prompting further investigation. Postmortem examination revealed a distended uterus filled with greenish thick cheesy material, alongside morphological changes in the kidney, epicardial blood vessels and the lungs exhibiting areas of emphysema and atelectasis. Histopathology confirmed pyometra. The death of the jungle cat was attributed to cardiopulmonary failure and renal dysfunction, presumably due to toxemia associated with pyometra. This case report emphasizes the importance of considering pyometra as a potential differential diagnosis in felids, particularly in cases involving reproductive or systemic health issues. To the best of our knowledge, this study represents the first documentation of closed cervix pyometra in jungle cats, supported by histopathological evidence.

Keywords: Pyometra, wild felids, *Felis chaus*, histopathology, necropsy

Introduction

The jungle cat (*Felis chaus*), classified as of least concern by the International Union for Conservation of Nature (IUCN), presents an intriguing subject for studying reproductive biology within the felid family. These medium-sized felids exhibit a varied diet, primarily comprising small mammals, birds, and amphibians, displaying partial omnivorous behaviour. Pyometra, characterized by the accumulation of purulent material within the uterine cavity, is a well-documented ailment in domestic felines. The condition is also reported in geriatric lioness and igress (Carlson *et al.*, 2022) [1]. Despite its relatively lower prevalence, pyometra can affect cats across a wide age range, from one year to as old as 20 years. This disorder stems from inflammation of the uterine wall, often compounded by ascending infections with vaginal microbes (Johnston *et al.*, 2001) [2]. Sustained progesterone exposure induces cystic hyperplastic changes within the endometrium, leading to fluid accumulation in the uterus and endometrial glands. Additionally, immune suppression and reduced myometrial contraction create an environment conducive to bacterial colonization and infection establishment (Greene, 2012) [3]. While pyometra is more commonly associated with dogs, its prevalence in cats remains notably lower (McCain *et al.*, 2009) [4], attributed to differences in reproductive physiology, mainly the lack of prolonged progesterone exposure in cats due to their status as induced ovulators (Greene, 2012) [3]. Earlier theories linking pyometra with immune-complex glomerulonephritis have been revisited, expanding our understanding of the disorder's pathogenesis. The occurrence of pyometra in jungle cats remains considerably rare and understudied. In this study, we present a comprehensive analysis of necropsy and histopathological findings from a female jungle cat (*Felis chaus*) afflicted with pyometra.

2. Materials and Methods

2.1 Signalment

Animal	Species	Age	Sex	Parity	Body weight
Jungle cat	Feline	17 years	Female	Unknown	3.4kg

2.2 Anamnesis

The subject of investigation was a geriatric female jungle cat residing in the zoological garden of Trivandrum, India. Having exhibited signs of declining health, the feline was undergoing treatment before succumbing to death within the confines of the zoo hospital. The animal had a history of illness characterized by weakness, lethargy, poor appetite, and severe cachexia. Upon admission to the zoo hospital, the cat appeared weak, dull, and emaciated.

Treatment was initiated with parenteral administration of Amoxicillin Sulbactam (12.5 mg/kg body weight), Enrofloxacin (5 mg/ kg body weight) and supportive therapy of intravenous normal saline (10 mL/ kg body weight) and B complex vitamin. Despite medical intervention of two weeks, the animal succumbed. Following the death of the jungle cat, its necropsy was done.

3. Results

3.1 Necropsy Findings

Postmortem examination revealed significant pathological findings including poor body condition, generalized hair loss, and dental attrition consistent with advanced age (Fig.1). Lower incisors were worn out till the base, lower canines were worn out exposing the root canal and few molars were also absent. From the dentition, the age of cat was estimated to be nearly 17 years. Examination of the respiratory system showed collapsed lungs with diffuse areas of emphysema and atelectasis, suggesting respiratory compromise (Fig.2). Distended uterine horns containing thick, viscous purulent material with a mild greenish tinge were evident, indicating possible uterine pathology (Fig.3 and Fig.4). Gross architectural loss of the kidneys was evident. Renal cortex had the appearance of gyri of the brain and was pale compared to the medulla (Fig.5 and Fig.6). Examination of heart revealed absence of epicardial fat, moderately congested epicardial blood vessels, and no evidence of blood clots in the ventricles and auricles suggesting that rigor have passed.

3.2 Histopathology Findings

Tissue samples from the uterus, kidney, liver, and lungs were collected and preserved in 10 per cent formalin for histopathological examination. Haematoxylin and eosin (H&E) staining was performed to visualize cellular morphology and tissue architecture. Histopathology of collected samples substantiated the diagnosis of pyometra, shedding light on the underlying pathological processes. Histopathology of the uterine tissue revealed moderate endometrial thickening primarily attributed to mixed inflammatory cell infiltration, comprising neutrophils, macrophages, and lymphocytes (Fig. 9). Severe vascular congestion was evident across all layers of the uterus, indicative of disrupted blood flow. Dilated endometrial glands containing desquamated epithelial cells and inflammatory cells were observed, along with vacuolated endometrial

glandular epithelium, suggesting cellular degeneration. Furthermore, some endometrial glands were entirely replaced by inflammatory cells, indicative of extensive inflammatory activity. Histopathological examination of the kidney revealed glomerular atrophy with extensive tubular necrosis and interstitial fibrosis (Fig.7). Severe vascular congestion and haemorrhages in the interstitium with pronounced mononuclear cell infiltration in focal areas were noted. Histopathology of heart tissue revealed extensive myocardial necrosis along with vascular congestion, haemorrhages, and focal mixed inflammatory cell infiltration and that of liver showed biliary hyperplasia and vascular congestion along with mild portal fibrosis and MNC infiltration supporting the condition of systemic toxemia (Fig.8).

4. Discussion

Feline pyometra, characterised by inflammation of the uterine wall and bacterial involvement, is an important reproductive disorder in female cats. The condition results from progesterone stimulation of the uterus and ascending infection with vaginal microbes through the relaxed cervix during oestrus (Wadas *et al.*, 1996) [5]. Most commonly isolated bacteria from pyometra affected uteri is *E. coli* (Johnston *et al.*, 2001) [2].

Domestic cats being induced ovulators, with low progesterone dominance due to seasonality, the occurrence of pyometra in domestic cats are rare when compared to canines (Greene, 2012 [3]; Hagman *et al.*, 2014) [6]. In sexually intact female cats, the prevalence of pyometra increases with age (Tanjila *et al.*, 2021) [7].

Common clinical signs in pyometra affected queens include purulent vulvar discharge (if cervix is open), anorexia, dehydration, lethargy, pyrexia, abdominal distension, polydipsia, and polyuria. In cats, polyuria and polydipsia is less common than in dogs (Johnston *et al.*, 2001) [2]. Extragenital lesions include degenerative changes in the kidney, spleen, liver, and congestion of the lungs (Johnston *et al.*, 2001) [2]. The disease is more severe in the case of closed cervix pyometra, leading to systemic illness and potentially fatal complications such as endotoxemia and bacteraemia (Hollinshead and Krekeler, 2016) [8]. Pathological changes similar to glomerulonephritis in human have been documented (Fransson, 2023) [9]. Feline closed cervix pyometra should be addressed as emergency cases requiring immediate surgery. Antimicrobial therapy should be initiated immediately and adjusted as necessary based on culture and sensitivity tests. quinolones can reach higher concentration in uterine fluid. Aminoglycoside groups are not recommended due to its potent nephrotoxic effect (Greene, 2012) [3].

Higher concentration of endotoxins can lead to disseminated intravascular coagulation, fatal shock and multiple organ failure (Okano *et al.*, 1998) [10]. Azotemia has been reported in a significant proportion of dogs affected with pyometra (Fransson, 2003) [9].

Histological changes associated with pyometra include endometritis, endometrial atrophy, cystic endometrial hyperplasia, and polyps in the uterus. Glandular hyperplasia and suppurative endometritis with neutrophil infiltration of endometrial glands and inter-glandular space has been reported. (Gayakawad *et al.*, 1998) [11].



Fig 1: Carcass of jungle cat showing severe cachexia

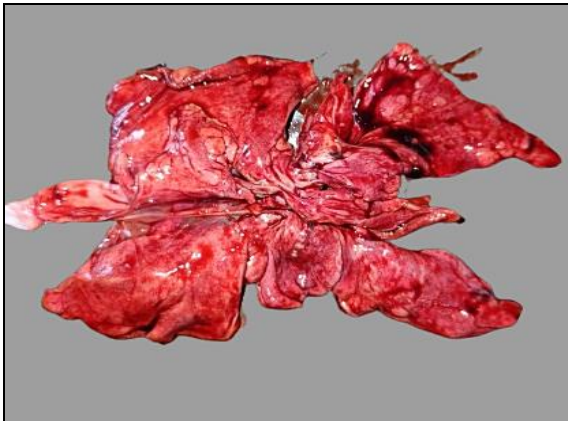


Fig 2: Lesions in lungs of jungle cat: Diffuse areas of emphysema and atelectasis



Fig 3: Uterus of jungle cat: Distended uterine horns and body

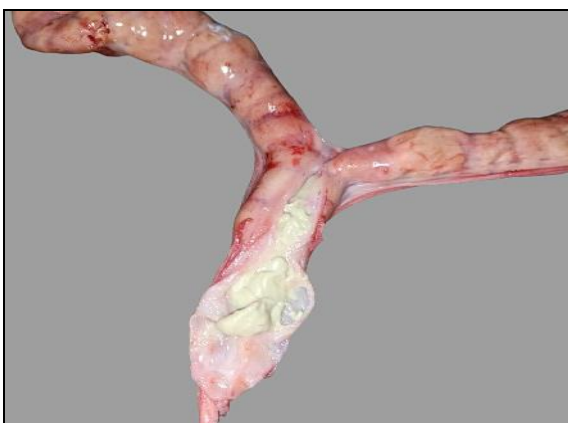


Fig 4: Uterus of jungle cat: Caseous pus from uterine body

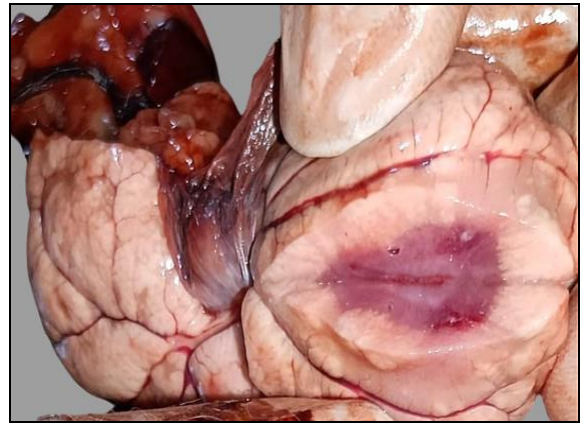


Fig 5: Kidney of jungle cat: Gross architectural loss



Fig 6: Kidney of jungle cat: Pale renal cortex

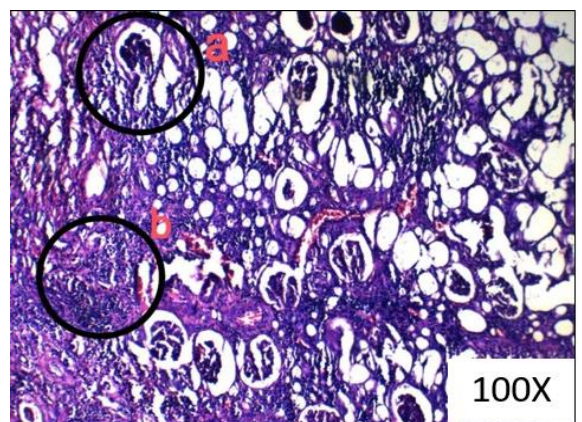


Fig 7: Histopathology of kidney of jungle cat
a) Glomerular atrophy
b) Interstitial fibrosis and mononuclear cell infiltration

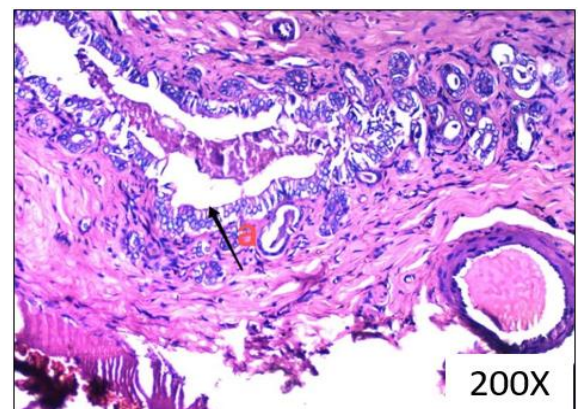


Fig 8: Histopathology of liver of jungle cat
a) Biliary Hyperplasia

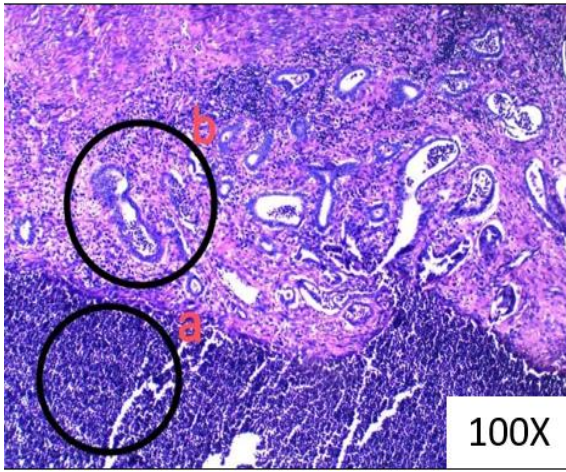


Fig 9: Histopathology of uterus of jungle cat

- a) Extensive inflammatory cell infiltration predominantly neutrophils
 b) Dilated endometrial glands containing neutrophils and necrotic debris

Histological changes associated with pyometra include endometritis, endometrial atrophy, cystic endometrial hyperplasia, and polyps in the uterus. Glandular hyperplasia and suppurative endometritis with neutrophil infiltration of endometrial glands and inter-glandular space has been reported. (Gayakawad *et al.*, 1998)^[11].

Diagnosis can be made based on signalment, previous oestrus, clinical signs, physical examination, ultrasonography, and hematobiochemical analysis. The gold standard for diagnosing pyometra is histopathology. The recommended treatment for feline pyometra is ovariohysterectomy together with fluid therapy and antibiotics. The decision to continue with medical therapy or surgical intervention is according to the physical status and breeding potential of animal (Tanjila *et al.*, 2021)^[7].

Pyometra should be treated as a medical emergency in cats and dogs due to the potential for rapid deterioration resulting from sepsis. Immediate treatment should focus on uterine evacuation, fluid administration, and antimicrobial therapy. Fluid therapy should be continued throughout medical management. Antimicrobial therapy should be promptly initiated and adjusted based on the culture and sensitivity results of uterine contents. Aminoglycosides are contraindicated in pyometra due to their significant renal toxicity. Enrofloxacin and other quinolones are preferred as they achieve high concentrations in uterine fluid (Greene, 2012)^[3].

In cases of open cervix pyometra, uterine evacuation can be achieved with PGF₂α at 0.05-0.5 mg/kg body weight subcutaneously once or twice daily for two to five days. Synthetic prostaglandins have not been used in cats. Natural PGF₂α is not recommended in cats with closed cervix pyometra due to the risk of uterine rupture. PGF₂α is generally effective in treating open cervix pyometra in dogs and cats, but successful medical management of closed cervix pyometra in queens has not been reported. Aglepristone, an anti-progestin, at 15 mg/kg body weight subcutaneously on days one, two, and seven can also be administered (Greene, 2012)^[3].

In this case, the Jungle cat was suffering from illness for two weeks. There were no signs of discharge from the vulva. Despite medical treatment with antibiotics, fluids and supportive therapy, the Jungle cat succumbed. The death can be attributed due to the systemic toxemia causing multiple

organ failure, as evident from gross and histopathology finding.

5. Summary

The Jungle cat was having severe weakness and cachexia. During the entire period of treatment, cat had shown no signs of vulval discharge. After the death of Jungle cat, a postmortem examination was conducted, and tissue samples were sent for histopathological analysis. Gross lesions observed included pus-filled uterine horns, structural loss in the kidneys, and in lung, conditions such as atelectasis and emphysema. Prominent histopathological findings revealed glomerular atrophy, extensive tubular necrosis, and interstitial fibrosis in the kidneys, severe congestion throughout the layers of the uterus, dilated endometrial glands, endometrial thickening from mixed inflammatory cell infiltration, and extensive myocardial necrosis. Biliary hyperplasia and portal fibrosis were indicative of severe systemic toxemia. These histopathological findings confirmed the diagnosis of pyometra, elucidating the underlying pathological mechanisms. This study provides valuable insights into the veterinary care and management of captive wild felids, underscoring the importance of vigilance in addressing reproductive health issues in such populations.

6. Acknowledgements

The authors sincerely thank Dr. Anand.J.R, BVSc & AH, for his sincere efforts and indispensable technical support in completing the draft.

7. Conflict of Interest

Not available

8. Financial Support

Not available

9. References

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How to Cite This Article

Nafel MS, Mohanan AV, Vijayan A, Silpamol PS, Aleena R, Salima A, *et al.* Pyometra in a jungle cat: Necropsy and histopathology findings. *International Journal of Veterinary Sciences and Animal Husbandry.* 2024;9(4):509-513.

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