

Research Article

A Study on Different Diagnostic Approach for Early Recognition of Canine Pyometra

Rohit Juneja^{1*}, Dinesh Jhamb², Anklesh Katara³, Arpita Sain⁴, Deepak⁵, Vachna Ram⁶, Krishna N. Bansal⁶ and Mitesh Gaur²

¹Veterinary Officer at Veterinary Hospital Pundlota, Nagaur, Department of Animal Husbandry, Jaipur, Rajasthan, India

²Assistant Professors, Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Science, Navania, Udaipur, Rajasthan, India

³Assistant professor, Department of Veterinary Gynaecology and Obstetrics, M.B. Veterinary College, Dungarpur, Rajasthan, India

⁴Ph.D Scholar, Department of Veterinary Microbiology, Indian Veterinary Research Institute, Izatnagar, Bareilly U.P, India

⁵Assistant Professors, Department of Veterinary Gynaecology and Obstetrics, International Institute of Veterinary Education and Research, Rohtak, Haryana, India

⁶M.V.Sc Scholars, Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Science, Navania, Udaipur, Rajasthan, India

*Corresponding author: arorarohit929@gmail.com

Received: 24-09-2021

Revised: 26-11-2021

Accepted: 05-12-2021

ABSTRACT

The study aimed to evaluate ultrasonographic findings, radiography, and blood profile in 24 bitches presented for treatment of pyometra. Clinical symptoms such as anorexia, vaginal discharge, depression, polyuria/polydipsia, vomiting, and abdominal distension were seen. Among these various types of diagnostic approaches, ultrasonography a powerful tool for the early detection of uterine abnormalities. Before any clinical alterations could be noticed, ultrasonography allowed the diagnosis of pathologic abnormalities. Pyometra must be identified, diagnosed, and treated as soon as possible to achieve a successful outcome.

Keywords: Pyometra, Clinical symptoms, Diagnostic approach, Ultrasonography.

Among the various gynaecology disorder Cystic Endometrial Hyperplasia–Pyometra (CEH–Pyometra) is the most common and important endometrial disorder in non-castrated bitches. About 80% of all bitches are diagnosed with pyometra before 10 years of age (Juneja *et al.* 2021). Pyometra or chronic purulent endometritis is an important disease depicting of pus in the uterus. (Chastain *et al.* 1999). Vaginal discharge, depression, polyuria, polydipsia, abdominal distension, vomiting, and anemia are among the clinical symptoms that pet owners have seen (Juneja *et al.* 2021a). There are two forms of pyometra: open cervix pyometra (with a vaginal discharge) and close cervix pyometra (without a vaginal discharge), depending on the cervix's patency (Dow, 1958; Schlafer and Gifford,

2008; Shukla, 2012; Jitpean *et al.* 2017). Pyometra in bitch with closed cervixes is fatal because septicemia and toxemia may develop quickly and, if untreated, can cause the death of bitch (Smith, 2006).

History, clinical examination (physical and gynecologic tests), laboratory analysis (including haematological and blood biochemistry tests), histopathology, and frequently a combination of radiography and/or uterine ultrasonography can all be used to identify canine pyometra.

How to cite this article: Juneja, R., Jhamb, D., Katara, A., Sain, A., Deepak, Ram, V., Bansal, K.N. and Gaur, M. (2021). A Study on Different Diagnostic Approach for Early Recognition of Canine Pyometra. *Theriogenology Insight: An International Journal of Reproduction of Animals*, 11(02): 13-17.

Source of Support: None; **Conflict of Interest:** None



MATERIALS AND METHODS

Total 24 bitches were selected and investigations were carried on 16 pyometric and 8 normal bitches presented to Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Science, Navania, Udaipur and Veterinary Polyclinic, Udaipur. For diagnosis, haematology, histopathology, radiography, histopathology and ultrasonography was performed.

- (a) Haematology- after the blood collection in EDTA vials and plain vials blood parameters were determined by using Mindray automatic CBC hematology analyzer (BC-2800Vet) and by using a commercial kit (CPC diagnostic, ichem).
- (b) Radiography- Radiographic evaluation, was recorded by using Epsilon (EP-100) X-ray machine with 40-45 KVP and 6-8 mAs. The bitches fasted overnight and plain radiographs were taken in the lateral recumbent position in the next morning.
- (c) Histopathology- Histopathology-24 samples of fragments of uterine walls from bitches with pyometra were collected for histopathological examination and placed in vials containing 10% formaldehyde. The fragments were fixed in 10% formaldehyde, embedded in paraffin, and cut into 5 mm sections. Under a light microscope, the sections were examined for histological alterations after being stained with haematoxylin and eosin (H & E), placed on a glass slide, and covered with a cover slip (Singh and Sulochana, 1996).
- (d) Ultrasonography- In bitches the uterus was examined by sector probe ultrasonography (EMP-2000Vet) as per standard method. For scanning 5-7.5 MHz, trans-abdominal probe was used depending upon the size of the dog.

RESULTS AND DISCUSSION

Haematology

Leukocytosis ranged from moderate ($>20 \times 10^3$ per cmm) in one case to marked ($>50 \times 10^3$ per cmm) in 13 cases to extreme ($<50 \times 10^3$ per cmm) in 2 cases. TLC in dogs typically ranges from 6,000 to 17,000 cells per millimetre. The current investigation has

found significant leucocytosis, which is regarded as a classical indicator of pyometra in bitches. Increase in WBC count was reported by several authors (Sridevi *et al.* 2000; Murugavel *et al.* 2001). In 4 cases, the percentage of neutrophils was below 80%, in 6, between 80% and 80%, and in 6, between 80% and 99%. Neutrophils generally range from 60 to 70 percent of total blood cells. In present study, neutrophilia was recorded which was similar findings of Ramsingh *et al.* 2013, Bharathidasan *et al.* (2020).

So, moderate to extreme leukocytosis and neutrophilia in these cases may help to diagnosis these cases as pyometra.

Abdominal Palpation

Enlarged uterus in seven bitches and uterine horn is unclear in four bitch due to tense abdomen. Similar findings were also reported by feldman and Nelson (1987).



Fig. 1: Showing enlargement of abdominal cavity due to extensive enlargement of uterine horn in close cervix pyometra

Histopathology

The bitches with CEH-Pyometra complex showed these different histological features, revealed endometrial cystic hyperplasia with infiltration of inflammatory cells, hyperplastic changes in uterine mucosa, myometrial thinning (Plate 1). The histologic changes due to infection vary with the bacterial cause and time of infection (Jubb *et al.* 2003). Histopathological diagnosis is the "goldstandard" in the diagnosis of pyometra.

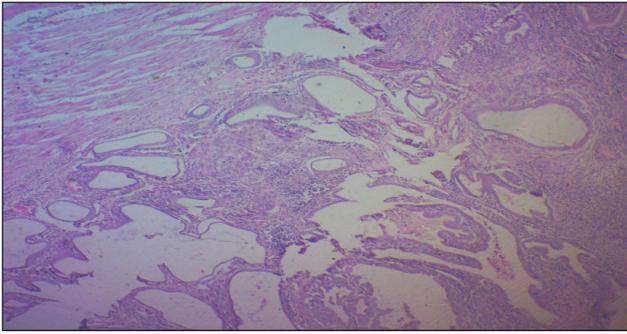


Plate 1: Photomicrograph of Pyometra affected uterus showing cystic dilation of endometrial gland and endometrial hyperplasia with myometrium thinning (H&E-4X)

Radiography

Radiographically the uterus was seen as fluid dense tubular structure in the ventral and caudal abdomen (Saharan *et al.* 2019) (Prasad *et al.* 2017). Marked uterine enlargement resulting into displacement of intestinal loops was seen in 8 bitches while lobulated appearance of uterus was in 3 bitches (Fig. 2).



Fig. 2: Lateral radiograph of the abdominal cavity showing Uterine body and horns. Note the body and horns of the uterus containing multiple small nodules with mineral density

The uterine distension was more pronounced in closed cervix pyometra and mild in open cervix



Fig. 3: Ultrasonograms of the uterus with closed-cervix pyometra. Showing the uterine wall is thin and the luminal cavity contain anechoic fluid

pyometra with uniform distended sacculated uterine horn It induced pronounced digestive viscera displacement (Hernandez *et al.* 2003).

Ultrasonography

Depending on the level of involvement and type of contents, pyometra's ultrasonographic characteristics changed. While moderate involvement showed a hypoechoic approximately rounded structure ventral or ventrolateral to the anechoic urinary bladder in transverse section, extensive involvement showed a round hypoechoic to anechoic area, placed side by side covering the whole abdomen (Ramsingh *et al.* 2013). When pyometric bitches were examined by ultrasound, the uterine lumen was found to be distended and there were varying amounts of echogenic fluid in the anechoic flocculent region with convoluted and tubular horns.

Ultrasonographic appearances showing uterine horns contained hyperechoic or anechoic material that showed movement in open cervix pyometra (Fig. 4). The uterine wall was thicker in open cervix pyometra as compare to closed cervix pyometra. The luminal cavity included smaller amounts of anechoic fluid than that of closed-cervix pyometra.

Ultrasonographic appearances showing thickened uterine wall had cystic and focal hyperechoic structures in closed cervix pyometra. The thickened endometrium contained many focal hyperechoic structures that represented tortuous glandular ducts. The luminal cavity included anechoic fluid with strong distal enhancement (Fig. 3).



Fig. 4: Ultrasonogram of uterus with open cervix pyometra showing uterine wall is thickened and irregular and contains multiple tiny anechoic cysts. A small amount of anechoic fluid is present in the uterine lumen

The most effective method for identifying canine pyometra is ultrasound (Bigliardi *et al.* 2004). Pyometra-related uterine findings on ultrasound revealed a variety of patterns, including thicker or CEH-positive uterine walls, hypoechoic or hyperechoic fluid in the uterine lumen (Fayrer-Hosken *et al.* 1991; Nyland *et al.* 2002; Troxel *et al.* 2002). The luminal cavity of open-cervix pyometra in the current study contained less anechoic fluid than closed-cervix pyometra. This is brought on by ongoing uterine fluid leaking. According to these findings, bitches with closed cervix pyometra are in a more critical condition than those with open cervix pyometra.

CONCLUSION

Pyometric bitches who exhibit abdominal distention must be treated as a medical emergency needing emergency treatment to prevent uterine rupture (Smith, 2006) (Lee *et al.* 2016). Before any clinical changes become visible, pathologic alterations might be detected by ultrasonography. Pyometra must be identified, diagnosed, and treated quickly for a successful outcome.

ACKNOWLEDGMENTS

The author would like to thank the Department of Veterinary Gynaecology and Obstetrics, College of veterinary and animal science, Navania, Udaipur and Veterinary Polyclinic, Udaipur for providing all the facilities and guidelines during the course of search.

REFERENCES

Bharathidasan, M., Dhanakaran, V., Deepika, S., Kokila, S., Thangaraj, M., Saravanamuthu, D. and Ramprabhu, R. 2020. Surgical management of comorbid pyometra and cystic calculus in a Spitz dog. *J. Entomol. Zool. Stud.*, **8** (2): 1701-1703.

Bigliardi, E., Parmigiani, E., Cavirani, S., Luppi, A., Bonati, L. and Corradi, A. 2004. Ultrasonography and cystic hyperplasia-pyometra complex in the bitch. *Reprod. Domest. Anim.*, **39**(3): 136-140.

Chastain, C.B., Panciera, D. and Waters, C. 1999. Associations between age, parity, hormonal therapy and breed, and pyometra in Finnish dogs. *Small Anim. Endocrinol.*, **9**(8).

Coggan, J.A., Melville, P.A., Oliveira, C.M.D., Faustino, M., Moreno, A.M. and Benites, N.R. 2008. Microbiological and histopathological aspects of canine pyometra. *Braz. J. Microbiol.*, **39**: 477-483.

De Bosschere, H., Ducatelle, R., Vermeirsch, H., Van Den Broeck, W. and Coryn, M. 2001. Cystic endometrial hyperplasia-pyometra complex in the bitch: should the two entities be disconnected. *Theriogenology*, **55**(7): 1509-1519.

Dow, C. 1958. The cystic hyperplasia-pyometra complex in the bitch. *Vet. Rec.*, **70**: 1102-1108.

Fayrer-Hosken, R.A., Mahaffey, M., Miller-Liebl, D. and Caudle, A.B. 1991. Early diagnosis of canine pyometra using ultrasonography. *Vet. Radiol.*, **32**(6): 287-289.

Feldman, E. and Nelson, R. 1987. Canine and feline endocrinology and reproduction WB Saunders Company, Philadelphia, USA, **1**.

Hernandez, J.L., Besso, J.G., Rault, D.N., Cohen, A.H., Guionnet, A., Begon, D. and Ruel, Y. 2003. Emphysematous pyometra in a dog. *Vet. Radiol. Ultrasound*, **44**(2): 196-198.

Jitpean, S., Ambrosen, A., Emanuelson, U. and Hagman, R. 2016. Closed cervix is associated with more severe illness in dogs with pyometra. *BMC Vet. Res.*, **13**(1): 1-7.

Jubb, K.V.F. and Kennedy, P.C. 2003. *Pathology of domestic animals*. Eds Jubb, Kennedy & Palmer, 4th edn. Academic press. San Diego, pp. 382-384

Juneja, R., Jhamb, D., Gaur, M., Nirwan, S.S., Pargi, K., Kumar, K. and Saini, B.S. 2021. A retrospective study of incidence of canine reproductive cases in Udaipur district. *J. Entomol. Zool.*, **9**: 166-169.

Juneja, R., Jhamb, D., Nirwan, S.S., Gaur, M. and Singh, G. 2021a. Study on the factors affecting occurrence of pyometra in reported canine clinical cases of Udaipur region. *Haryana Vet.*, **60**(2): 279-281.

Lee, J.A., Kim, I.H., Hwang, D.Y. and Kang, H.G. 2016. Ultrasonography, Affected Age, Hematology and Clinical Signs according to Open or Closed Cervix in Dogs with Pyometra. *J. Vet. Clinics*, **33**(6): 362-367.

Murugavel, K., Sentil Kumar, P. and Alphonse, R.M.D. 2001. Pyometra in Doberman bitch. *Indian J. Anim. Reprod.*, **22**(6): 91-92.

Nyland, T.G. and Mattoon, J.S. 2002. Ovaries and uterus. In: *Small Animal Diagnostic Ultrasound*, 2nd ed, Elsevier health sciences, Saunders, Philadelphia, pp. 231-249.

Prasad, V.D., Kumar, P.R. and Sreenu, M. 2017. Pyometra in bitches: A review of literature. *Res. Rev.: J. Vet. Sci. Tech.*, **6**(2): 12-20.

Ramsingh, L., Rao, K.S. and Muralimohan, K. 2013. Clinical Management of Pyometra in Bitches. *IOSR J. Pharm.*, **3**(1): 13-14.

Renton, J.P., Boyd, J.S. and Harvey, M.J. 1993. Observations on the treatment and diagnosis of open pyometra in the bitch (*Canis familiaris*). *J. Reprod. Fertil., Suppl.*, **47**: 465-469.

Saharan, S., Mathew, R.V., Kumar, S., Sindhu, N. and Jain, V.K. 2019. Surgical management of cystic endometrial hyperplasia-pyometra complex in canines: study of ten cases. *Haryana Vet.*, **58**: 106-107.

Schlafer, D.H. and Gifford, A.T. 2008. Cystic endometrial hyperplasia, pseudo- placentational endometrial



- hyperplasia and other cystic conditions of the canine and feline uterus. *Theriogenology*, **70**: 349–358.
- Shukla, S.P. 2012. Recent advances in canine pyometra. *Ind. J. Canine Pract.*, **4**(1): 25-29.
- Singh, U.B. and Sulochana. 1996. Histology and histological techniques. 2nd Edn.
- Smith FO. 2006. Canine pyometra. *Theriogenology*, **66**: 610- 612.
- Sridevi, P., Balasubramanian, S., Devanathan, T.G. and Pattabiraman, S.R. 2000. Low dose prostaglandin F₂ alpha therapy in treatment of canine pyometra. *Indian Vet. J.*, **77**(10): 889-890.
- Troxel, M.T., Cornetta, A.M., Pastor, K.F., Hartzband, L.E. and Besancon, M.F. 2002. Severe hematometra in a dog with cystic endometrial hyperplasia/pyometra complex. *J. Am. Anim. Hosp. Assoc.*, **38**(1): 85-89.
- Voges, A.K. and Neuwirth, L. 1996. Ultrasound diagnosis-cystic uterine hyperplasia. *Vet. Radiol. Ultrasound*, **37**: 131-132.

