A Case Report on Pyometra in a Spitz Dog

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Session: 2016-2017

A clinical report submitted for the partial fulfillment of the requirements for the degree of Doctor of Veterinary Medicine (DVM)

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November-2022

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ABSTRACT

A 5-year-old female spitz dog with a history of anorexia, lethargy, fever, polydipsia and purulent vaginal discharge for past 3 days was presented in Teaching and Training Pet Hospital and Research Center, Purbachal, Dhaka. An abdominal ultrasonography was performed that revealed distended uterus with an anechoic to hyperechoic fluid. Based on the history, clinical signs, physical examination and laboratory results the condition was diagnosed as open cervix pyometra which was successfully corrected by ovario-hysterectomy.

Key words: pyometra, open cervix, ovario-hysterectomy, spitz dog

CHAPTER 1

INTRODUCTION

Accumulation of purulent or mucopurulent materials within the uterus is called pyometra. It is a secondary bacterial infection of uterus that occurs due to the hormonal imbalance of female reproductive tract. Pyometra is one of the most common and fatal reproductive disease in canine that requires emergency veterinary attention as it leads to severe septicemia and toxemia if remain untreated (Koo.,2011). Middle aged and older female dogs are more susceptible to pyometra however, it can occur in female dogs of any ages. Before 10 years of age the incidence of pyometra is approximately 24% in female dogs (Hagman., 2000).

Pyometra occurs during diestrus period due to increase level of estrogen and progesterone (Jitpen et al., 2014). The cervix remain open for a prolonged period of time when estrogen level are excessive that makes the uterus more susceptible to infection by opportunistic bacteria. Excess estrogen also increase the stimulatory effects of progesterone on uterus and cause over proliferation of endometrium and endometrial gland. That results in increase uterine glandular secretion and decreased myometrial contraction (Jisna and Sivaprasad., 2020). Progesterone also reduce local cellular immunity of uterus and creates a favorable condition within the uterus for infection (Shiju et al., 2014). After bacterial infection by opportunistic bacteria of vaginal microflora there is an accumulation of purulent materials within the uterus that gradually leads to pyometra. Among the opportunistic pathogens *Escherichia coli* is most commonly found in pyometra (Hagman and Greko., 2005) as *Escherichia coli* is the normal commensal of vaginal microflora and cause ascending infection to uterus in favorable condition.

Pyometra can also develop due to subacute endometritis followed by cystic ovarian hyperplasia (Bigliardi et al., 2004). Cystic ovarian hyperplasia also cause mucometra as a results of thickening of endometrium and accumulation of viscid uterine fluid within the uterus (Bosschere et al., 2001). In canine cystic ovarian hyperplasia-pyometra complex can also develop as a consequence of an abnormal response of uterus to repeated prostaglandin stimulation during the diestrus phage of estrus cycle (Feldman and Nelson., 2004).

There are two types of pyometra: open cervix pyometra and close cervix pyometra. Close cervix pyometra is more serious and fatal than open cervix pyometra as the condition remain unnoticeable for a long time. By this time there is systemic involvement due to endotoxin produced by *Escherichia coli* and other opportunistic pathogens within the uterus. Clinically the bitch shows sign of anorexia, lethargy, polydipsia, fever, distended abdomen. Vaginal discharge may be present or absent depending on the type of pyometra. In case of open cervix pyometra there is purulent to mucopurulent vaginal discharge can be found but no such discharge will be seen if the cervix remain closed indicating close cervix pyometra.

Though pyometra is a common and fatal reproductive disease in dogs it can be effectively cured by ovario-hysterectomy (Feldman and Nelson., 2004). The present study focuses on the correction of pyometra in a spitz dog by ovario-hysterectomy.

CHAPTER 2

MATERIALS AND METHODES

2.1 Case history

A 5-year-old female spitz dog weighing 6.75 kg was admitted to Teaching and Training Pet Hospital and Research Center, Purbachal, Dhaka with history of anorexia, lethargy, fever and purulent vaginal discharge for past 3 days.

2.2 Clinical findings

Physical examination revealed 103.4 F rectal temperature; heart rate was 130/ minute; respiration rate was 24/ minute; mucous membrane was pale; capillary refill time < 2 seconds. The dog was depressed and purulent discharge was seen on the skin and hair under tail indicating open cervix pyometra (Figure 1). An abdominal ultrasonography was performed and revealed distended uterus with an anechoic to hyperechoic fluid (Figure 2) indicating accumulation of pus within the uterus. An ovario-hysterectomy was recommended.

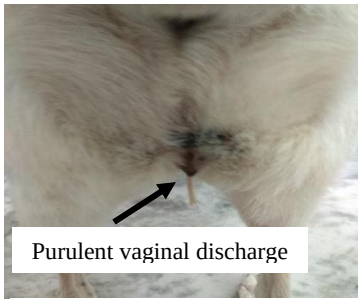

Fig 1: Purulent vaginal discharge hanging from the vulva.

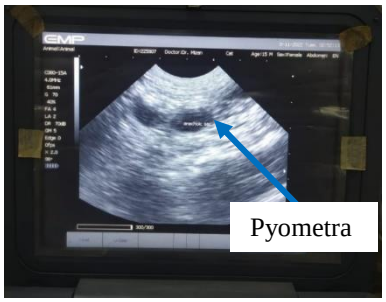

Fig 2: Ultrasound of the abdomen (transverse plane). Thickening of the uterine wall filled with anechoic fluid.

2.3 Treatment

The case was corrected by ovario-hysterectomy according to standard procedure.

2.3.1 Premedication and anesthetics

Xylazine hydrochloride (Xylaxin, Indian Immunologicals Ltd, India, 1 mg/kg body weight) was intramuscularly administered as premedication. For induction and maintenance combination of diazepam (Sedil, Square Pharmaceuticals Ltd, Bangladesh, 0.5 mg/ kg body weight) and ketamine

hydrochloride (Ketalar, Popular Pharmaceuticals Ltd, Bangladesh, 5 mg/kg body weight) was intravenously used.

Fig 3: Xylazine hydrochloride

Fig 4: Diazepam

Fig 5: Ketamine hydrochloride

2.3.2 Suture materials

During the surgery both absorbable and no absorbable suture materials were used. In order to close the muscle layer and subcutaneous fascia absorbable suture material vicryl (Vicryl, 2-0, Ethicon, Johnson and Johnson Ltd, India) was used. Non absorbable suture material silk was use to close the skin for better strength.

Fig 6: Suture material's (Vicrly and Silk)

2.3.3 Surgical procedure

After general anesthesia the dog was placed on a surgical table and controlled in dorsal recumbency. A 6-8 cm long incision was made on the middle beginning over the umbilicus and extended caudally. Skin, subcutaneous tissue, linea alba and peritoneum was incised using a surgical scalpel. Then both ovary and uterus was located by inserting finger through the incision. The suspensory ligament of the ovary was ruptured by traction and withdrawn from abdominal cavity. A double ligature with vicryl (Vicryl, 2-0, Ethicon, Johnson and Johnson Ltd, India) was made in the ovarian blood vessel and attachment between the ligature and ovary was then severed. The severed portion was carefully checked for hemorrhage before returning it to the abdomen. After removing one ovary, the other ovary was located and removed in the similar manner. Then the body of the uterus was withdrawn from abdomen and ligated using vicryl. The uterus was severed just cranial to the ligature and carefully checked for hemorrhage before returning it to the

abdomen. The muscle layer was closed by simple continuous suture using vicryl and skin was closed by horizontal mattress suture using silk. 500ml 5% dextrose saline was intravenously infused throughout the surgical procedure.

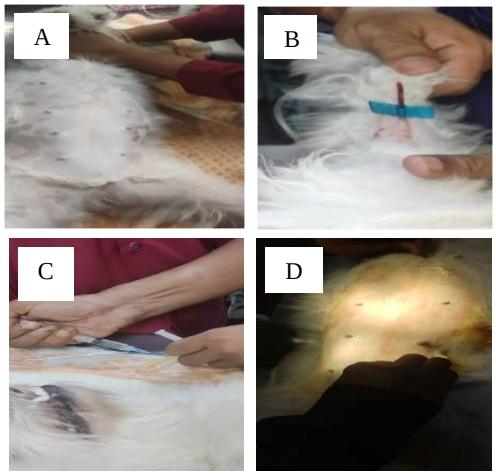

Fig 7: Preparation of the animal.

A) Shaving, B) I/V saline, C) Applying anesthetics, D) Surgical site.

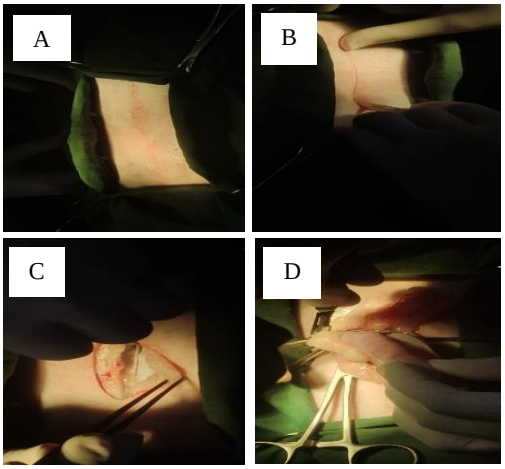

Fig 8: Removal of the ovaries.

A) Draping, B) Skin incision, C) Muscle incision, D) Remove ovary.

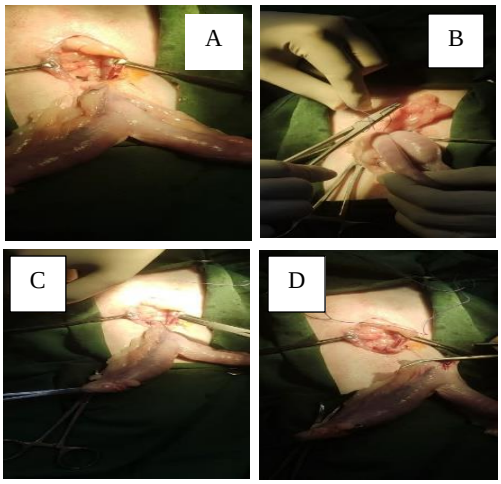

Fig 9: Removal of the uterus.

A) Voluminous uterus, B) Uterine horns, C) Ligation of uterine body, D) Remove uterus.

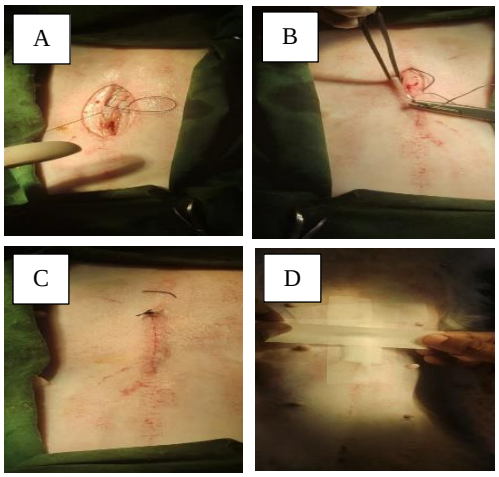

Fig 10: Closing of incision.

A) Muscle suture, B) Subcutaneous fascia suture, C) Skin suture, D) Bandage.

2.3.4 Post-operative care

As postoperative care broad spectrum antibiotics ceftriaxone (Trizon vet, 500mg, ACME, Pharmaceuticals Ltd, Bangladesh, 30 mg/kg body weight) was administered intramuscularly for 7 days and painkiller meloxicam (Melovet, 10ml vial, TECHNO, Pharmaceuticals Ltd, Bangladesh, 0.2 mg/kg body weight) was administered subcutaneously for 3 days. Povidone iodine (Betadine 5%, Mundipharma, Bangladesh) was applied in the lesion for 7 days. The dog was advised to restrict exercise and remain in confinement for 12 days postoperatively for complete healing. Skin suture were removed on 14^{th} postoperative day. No postoperative complications were observed in either anesthesia recovery or wound healing. A remarkable improvement in the physical conditions and disappearance of all clinical sings of the dog was seen after the surgery.

CHAPTER 3

RESULTS AND DISCUSSION

Pyometra is a secondary bacterial infection of uterus that occurs due to the hormonal imbalance of female reproductive tract. In this case, the dog had an open cervix pyometra that allowed to drain sanguinopurulent vaginal discharge as main a clinical sign. After surgery, the uterus was examined grossly. On gross examination uterine horns were found voluminous and flabby (Figure 15). An incision was made with scalpel over the uterine horns to investigate the voluminous portion and purulent fluid came out from both uterine horns. The fluid accumulation may be due to ascending infection of uterus by opportunistic bacteria of vaginal microflora especially *Escherichia coli* and *Streptococcus spp*. The endometrial wall was thickened, corrugated and irregular. Decreased myometrial contraction, hyperplasia of endometrial gland and inhibition of leukocyte response due to excess progesterone is responsible for bacterial proliferation within the uterine lumen that results in development of pyometra (Sugiura et al., 2004).

During luteal phage estrogen level remain high that causes dilatation of cervix for a prolong period of time. This dilated cervix allows opportunistic bacteria to infect the uterus. Excess estradiol increase the stimulatory effect of progesterone and cause over proliferation of endometrium and endometrial gland that results in increase uterine glandular secretion. Excess progesterone also reduce local cellular immunity of female reproductive tract. The combination of reduced local immunity and favorable uterine condition allows opportunistic bacteria of normal vaginal microflora to ascend into the uterus (Gyan et al., 2020) and results in bacterial proliferation within the uterine lumen. Smith- (2006) found that uterine inoculation by *Escherichia coli* on day 11 to 20 after luteinizing hormone peak can cause pyometra in canine species as uterus remain most susceptible to infection by this time. Pyometra can also develop due to subacute endometritis followed by cystic ovarian hyperplasia. Cystic ovarian hyperplasia also cause mucometra as a results of thickening of endometrium and accumulation of viscid uterine fluid within the uterus (Bosschere et al., 2001). In canine cystic ovarian hyperplasia-pyometra complex can also develop as a consequence of an abnormal response of uterus to repeated prostaglandin stimulation during the diestrus phage of estrus cycle (Feldman and Nelson., 2004).

Pyometra can be managed either by hormonal therapy (Prostaglandin) or surgically (Ovario-hysterectomy). Ovario-hysterectomy is considered as the best choice for management of pyometra as prostaglandin treatment had some adverse side effect ranging from simple allergy to anaphylactic reaction. If the patient is not fit for surgery, only than it should be treated with prostaglandin (Mahesh et al., 2014). Due to persisting infection within the uterus ovario-hysterectomy is more complicated and have higher risk of infection than routine spaying. Proper preventive measure should be taken to prevent the spreading of contamination from uterus during surgery. If the bitch is intended to use for further breeding it should be catheterized using foley catheter and uterine discharge should be drained out properly. Then the uterus should be lavage using 20-30 ml normal saline and a broad spectrum antibiotic should be provided. After completing antibiotic treatment the bitch should be mated on next cycle. Recurrence of pyometra in medicinally treated bitch is common, so after mating the bitch should be monitored and observed carefully for any sign of recurrence of pyometra. As recurrence of pyometra in medicinally treated bitch is common the bitch should be spayed as soon as its breeding life concluded (Baithalu et al., 2010).

Prevention of pyometra is difficult due to normal aging process of uterus and dominance of progesterone during estrus. Aged bitch have higher possibility to develop pyometra than younger dogs as their endometrium is more exposed to progesterone production. In order to prevent the occurrence of pyometra it is recommended that any bitch not being used for breeding or future breeding should be spayed before six months of age (Foster and Smith., 2006).

In this study, both uterine horns found voluminous and flabby due to the accumulation of pus within the uterus indicating pyometra. After observing the patient condition ovario-hysterectomy was considered as the best management method for this case and performed successfully without any complications during and after surgery. Gyan et al., 2020 and Malik et al., 2015 also corrected pyometra in a great dane dog by ovario-hysterectomy and recommended the method as the best way for correcting canine pyometra successfully.

Xylazine hydrochloride (Xylaxin, Indian Immunologicals Ltd, India, 1 mg/kg body weight) was intramuscularly administered as premedication. Xylazine is an alpha-2 adrenergic agonist that show its agonist activity at presynaptic alpha-2 adrenergic receptor that results in decrease in release of norepinephrine from adrenergic nerve terminals in central nervous system and periphery.

This cause sedation, decreased sympathetic activity, analgesia and hypotension. It act as good muscle relaxant and provide moderate to heavy sedation. Vomiting is frequently seen in dog and cat in case of premedication with xylazine. Similar drug was used by Biswas et al., 2012; Malik et al., 2015 and Gyan et al., 2020 to correct pyometra in dog by ovario-hysterectomy as premedication and found effective as premedicating agent.

Combination of diazepam (Sedil, Square Pharmaceuticals Ltd, Bangladesh, 0.5 mg/ kg body weight) and ketamine hydrochloride (Ketalar, Popular Pharmaceuticals Ltd, Bangladesh, 5 mg/kg body weight) was intravenously used as main anesthetics during the surgery. Diazepam works primarily on limbic system, thalamus and hypothalamus. It act as a good sedative and have muscle relaxation property but have very poor analgesic effect. On the other hand, ketamine is a dissociative anesthetics and have glutamate antagonist effect which inhibits neurotransmission. Ketamine is a very good analgesic and have sedation property but doesn't have muscle relaxation effect. So the combination of diazepam and ketamine provide maximum anesthetic effect and can be used safely. This combination has been used by Biswas et al., 2012; Malik et al., 2015 and Gyan et al., 2020 to get maximum anesthetic effect in case of oravio-hysterectomy in their study.

The surgery was performed according to the standard ovario-hysterectomy procedure described by Djemail. B. et al., 2010; where the incision was made on the middle beginning over the umbilicus and both ovaries and uterine body were removed completely after ligation. Then the incision was closed by simple continuous suture as it is comparatively easy, less time consuming and eliminate the risk of peritoneal infection. Same surgical procedure, suture pattern and suture materials has been used by Malik et al., 2015 and Gyan et al., 2020 where Biswas et al., 2012 used catgut (Mersutures, 2-0, Ethicon, Johnson and Johnson Ltd., India) instead of vicryl to close the muscle layer as vicryl is expensive compared to catgut. Catgut have higher level of tissue reaction surrounding the tissue due to foreign protein in nature results in higher irritability. For this reason it is recommended to use vicryl instead of catgut where possible (Hanna., 2022).

Ceftriaxone (Trizon vet, 500mg, ACME, Pharmaceuticals Ltd, Bangladesh, 30 mg/kg body weight) was administered intramuscularly for 7 days as postoperative treatment to prevent secondary bacterial infection. Ceftriaxone is a third generation antibiotic from cephalosporin family that selectively and irreversibly inhibits bacterial cell wall synthesis by binding to trans peptidases. It is a bactericidal antibiotic and indicated to prevent variety of bacterial disease and

secondary bacterial infection. Meloxicam (Melvet, 10ml vial, ACME, Pharmaceuticals Ltd, Bangladesh, 0.2 mg/kg body weight) was administered subcutaneously for 3 days as pain killer after the surgery. Meloxicam is a non-steroidal anti-inflammatory drug that inhibit cyclooxygenase enzyme to prevent prostaglandin synthesis which is a mediator of inflammation. This drug in indicated in fever, pain and inflammation hence, commonly used as postoperative painkiller.

Povidone iodine was applied into the wound as an antiseptic in order to prevent bacterial contamination into the wound as well as enhance the wound healing process. Same postoperative treatment has been used by Biswas et al., 2012; Malik et al., 2015 and Gyan et al., 2020 in their study during the management of pyometra in canine. Another broad spectrum antibiotic amoxicillin/clavulanate potassium (Aventiclav 125mg, Aventix, Burlington, Ontario, 12.5 mg/kg body weight) was prescribed postoperatively by Katherine.,2017 to prevent secondary bacterial infection. The patient recovered remarkably after the treatment without any postoperative complications hence, the surgical procedure and postoperative treatment is recommended for correction of pyometra in dog.

CHAPTER 4

CONCLUSION

Ovario-hysterectomy is the best recommended treatment for pyometra. The study demonstrate a successful clinical management of pyometra in a spitz dog by ovario-hysterectomy without any complications. From this study, it is seen that pyometra in canine species should be corrected surgically instead of medicinally as medicinal treatment have high chance of recurrence and have some adverse side effects. The dog should be spayed at six months of age in order to prevent this disease.

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ACKNOWLEDGEMENTS

All praises are due to the Almighty who has kept me in good health and enable me to complete this study.

I would like to express my gratitude towards the pet owner who helped me to get those valuable data during postoperative follow-up period.

I feel great pleasure to express my deepest sense of gratitude and indebtedness to my honorable supervisor, **Professor Dr. Bibek Chandra Sutradhar**, Department of Medicine and Surgery, Chattogram Veterinary and Animal Sciences University for his generous advice and guideline to complete my report successfully.

I am greatly thankful to my honorable vice chancellor Professor **Dr. Gautam Buddha Das**, honorable director of external affairs Professor **Dr. A.K.M Saifuddin** and honorable Dean, Faculty of veterinary Medicine, CVASU, Professor **Dr. Alamgir Hossain** for providing me such a wonderful opportunities to work with.

Author, November 2022.

BIOGRAPHY

I am MD. Ismail, son of MD. Osman Gani and Kulsuma Begum. I passed my SSC from Bangladesh Marine Academy high School, Anwara Chattogram in 2014 (GPA 5.00) and passed my HSC from BEPZA Public School and College, Bondortilla Chattogram in 2016 (GPA 5.00). Now I am an intern veterinarian under the Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University. In future I would like to work as a veterinary practitioner. I have keen interest in molecular biology and microbiology and would like to do research in near future.