

MANAGEMENT OF CANINE REPRODUCTIVE CONDITIONS INVOLVING THE UTERUS - CLINICAL CASE REVIEW

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Diseases of reproductive organs requiring surgical interventions are very common in female dogs. To avoid breeding nuisance, many owners do not breed or neuter their pets. Non-breeding of the animals contributes to many diseases out of which cystic endometrial hyperplasia- pyometra complex (CEHPC) is most common. Though some hormone and growth factors are associated with the occurrences of conditions like fibroma, poor surgical management also results in conditions, such as stump pyometra. In this review, the reasons behind the occurrence and management of cystic endometrial hyperplasia- pyometra complex (CEHPC), vaginal hyperplasia, mummification of fetus, maceration of fetus, stump pyometra, and uterine fibroma are discussed.

Keywords: Cystic, Dog Endometrial, Fetus, Fibroma, Hyperplasia, Macerated, Mummified, Pyometra, Stump Uterus, Vaginal.

Amidst various clinical cases, canine gynecological attribute to large number of treatment campaigns, involving the uterus of bitch (Antonov, 2019). Wide ranges of hormonal actions and seasonal estrous cycle brings up enormous fluctuations and changes in a female dogs uterus; cystic endometrial hyperplasia- pyometra complex (CEHPC) and stump pyometra (Martins *et al.*, 2015), Mummification of fetus and maceration of fetus were also reported (Lefebvre, 2015). Uterine fibroma are also reported there (Barozzi *et al.*, 2021).

In this article, we have reviewed twelve numbers of (12) cases of canine reproductive conditions of different breeds, age (mean = 5.75 years which includes cystic endometrial hyperplasia- pyometra complex (n=5), vaginal hyperplasia (n=1), mummified fetus (n=2), stump pyometra (n=2), uterine fibroma (n=1) and macerations of fetus (n=2) reported to the clinical complex of the West Bengal University of Animal and Fishery Sciences. The distribution of breeds of dog were Labrador Retriever (n =4), Spitz (n=3),

German Shepherd (n=2), Pomeranian (n=1), Mongrel (n=2). The pathological conditions were identified and confirmed based on history, clinical signs, and diagnostic procedures involving x-ray, and ultrasonography. Proper surgical planning was done to approach these issues, followed by their management and execution.

Materials and Methods

Cystic endometrial hyperplasia- pyometra complex (CEHPC): The bitches of different ages, breeds and estrus stages were presented with the symptoms of inappetence, fever, dehydration, vomiting, lethargy, abdominal distention and vaginal exudation.

Vaginal hyperplasia: The bitch was reported with complain of discharge of vaginal fluid mixed with blood and often pus. The clinical signs revealed an exposed vagina with increased gross mass and size along with purulent secretions. Mummified fetus: The bitches had history of mating 80 days before the reported date as per the owner, and

clinical examination revealed distended abdomen, along with enlarged mammary glands and firm and compacted abdomen.

Stump pyometra: The bitches had history of being neutered 6 to 9 months before. Clinically there was secretion of thick, greyish white discharge from vagina. The animals appeared dull and depressed with the high temperature of $>103.2^{\circ}\text{F}$, and polydipsia.

Uterine fibroma: The animal was lethargic and reluctant to move. The bitch was reported with greyish uterine discharge, along with constipation and polydipsia. On palpation, the abdomen appeared to have a firm mass-like distention near the site of the bladder.

Macerated fetus: The bitches were reported with over distended abdomen with foul and foetid black pervaginal discharge, physically palpable abdominal mass and subnormal body temperature.

Diagnosis:

All the animals were diagnosed based on clinical signs, radiography and ultrasonographic examination. The bitches suspected for CEHPC had haematologically suppressed haemoglobin, elevated neutrophil, increased ESR and leukocytopenia. Radiographic examination revealed presence of distended tubular structure of increased opacity located in the cranio-dorsal aspect of urinary bladder.

Ultrasonographically, sacculated, distended uterus containing anechoic content and thickened endometrium were seen (**Fig. 1**). Vaginal hyperplasia was identified by the exposed vaginal mass (**Fig. 2**), and haematological examination showed a significant increase in neutrophil count and hypochromic normocytic anemia. The mummified fetus could be confirmed in USG, based on findings like absorbed amniotic fluid around the fetus and correlating the history of mating (**Fig. 3**). Stump pyometra was confirmed on USG, where distended uterine body containing anechoic fluid dorsal to the neck of urinary bladder coupled with the abnormal blood parameters viz elevated neutrophil count, increased ESR, and PCV were observed. (**Fig. 4**). Uterine fibroma showed a solid hyperechoic mass-like structure with few anechoic pockets in uterine body wall upon ultrasonography and elevated alkaline phosphatase (ALP) along with thrombocytosis, and leukocytosis (**Fig. 5**), post-operatively histopathology of the biopsied tissue confirmed the diseased condition. Macerated fetus in one bitch was confirmed observing disintegrated bones spread in a sac within uterus and radiolucent pockets of gas coupled with hyperechoic cylindrical images of various sizes within distended uterine sac without appreciable fluid, and any motion of content in M mode ultrasonography (**Fig. 9A, B and 10**).

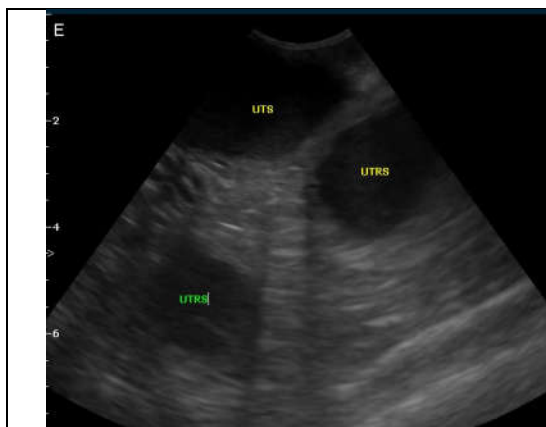


Figure 1: USG images of endometrial hyperplasia-pyometra complex (CEHPC)



Figure 2: USG image of vaginal hyperplasia

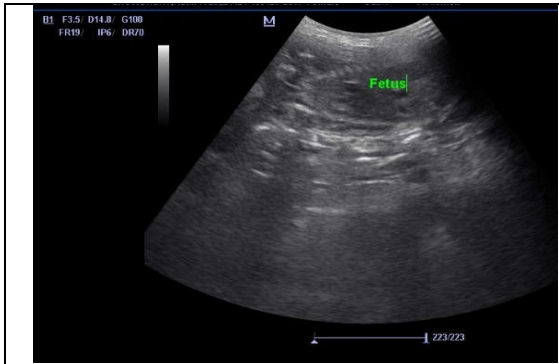


Figure 3: USG image of mummified fetus

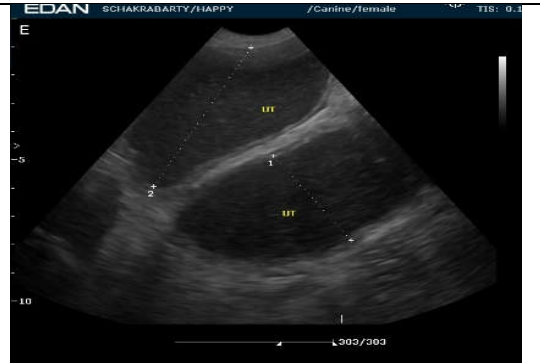


Figure 4: USG image of stump pyometra

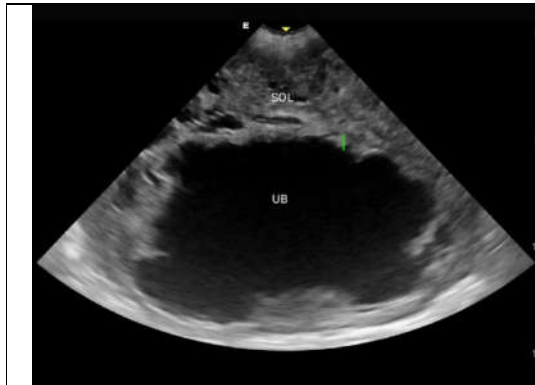


Figure 5: USG image of uterine fibroma.



Figure 6: Operative images of mummified fetus



Figure 7: Operative images of stump pyometra

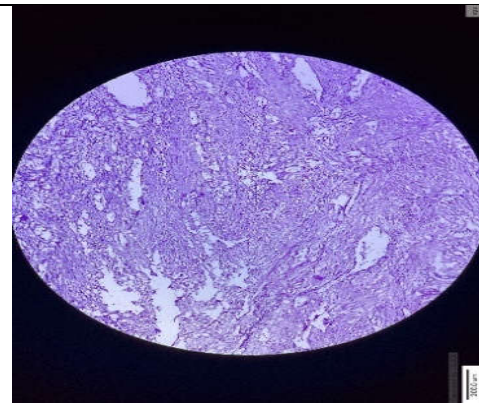


Figure 8: Histological slide of uterine fibroma

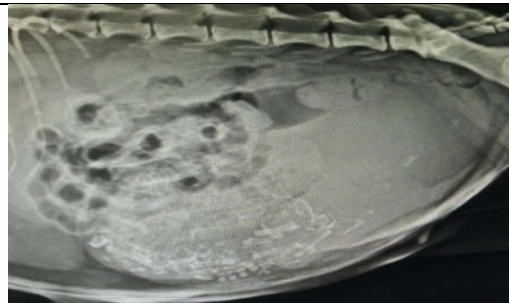
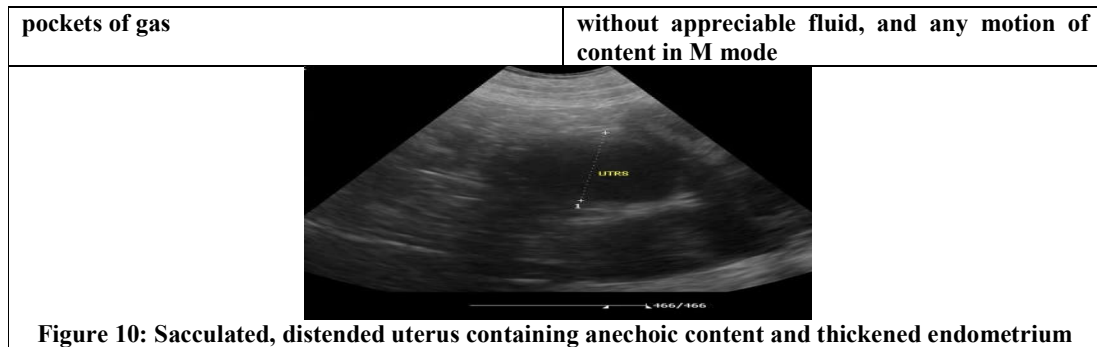


Figure 9A: Macerated fetus disintegrated bones spread in sac within uterus and radiolucent



Figure 9B: Hyperechoic cylindrical images of various sizes within distended uterine sac



Surgical Treatment

All the animals were advised for the surgical intervention, and detailed pre-operative blood work was carried out to rule out the risk factors viz, anemia, renal, liver involvement, etc. Preoperative preparation: Animals were fasted for 12 hours and withdrawn water for 6 hours before surgery along with oral laxatives the day before the surgery. The surgical sites were thoroughly shaved and cleaned using chlorhexidine antimicrobial solution and 5 % betadine in routine manner. Anaesthetic protocol: The cases were premedicated with atropine sulfate @ 0.04 mg kg⁻¹ subcutaneously thereby butorphanol @ 0.1 mg kg⁻¹ intramuscularly was given after 10 minutes, there after intravenous diazepam injection @ 0.5 mg kg⁻¹ body weight was administered. The induction was carried out with the use of Propofol @ 3 mg kg⁻¹ and maintained by isoflurane inhalant anaesthesia. Injection ceftazidime and meloxicam were used as an antibiotic and analgesia @ 30 mg kg⁻¹ and @ 0.2 mg kg⁻¹ respectively. Operative protocol: All the cases were ovariohysterectomized except the case of stump pyometra, where only the remnant of the uterine stump was excised following routine antisepsis. The incision was given in the midline, 2-3 cm below the umbilicus through linea alba. Following the laparotomy, the procedure of ovariohysterectomy (**Fig. 6 and 7**) was done. In the cases of stump pyometra after laparotomy the remnant of uterine stamp was identified and excised out. In the bitches with vaginal hyperplasia, pre-operatively the edematous vagina was repositioned manually after reducing the

oedema by cleaning the mass with saline and 50% dextrose solution. The animal was ovariohysterectomized following the standard procedure and to prevent the recurrence of the protrusion, vulvar suture was performed following the Buhner technique. All the animals had an uneventful anaesthetic recovery, and they were handed over to the owner after the post-operative assessment. Post-operative treatment- The animals were prescribed fluid therapy for 3 days following surgery along with ceftazidime as an injectable antibiotic @ 30 mg /kg. bwt. intravenously for 5 days twice a day and meloxicam @ 0.2 mg/kg. bwt. respectively for 3 days subcutaneously. Animals were advised liquid diet along with a commercial recovery diet for the first two days followed by a normal diet thereafter. Dressing was advised on the third, fifth, seventh- and ninth-day post-surgery. Sutures were removed after 10 days of surgery, and all the patients were reported with good recovery and parameters after the tenth day of surgery. In the case of uterine fibroma, the condition was confirmed by the post-operative biopsy of the collected sample from the uterine mass (**Fig. 8**).

Results and Discussion

Reproductive issues, especially related to the uterus, and the occurrence of clinical incidence associated with that are very common in bitch. This article discussed the probable causes and management to redress the conditions successfully. Cystic endometrial hyperplasia pyometra complex (CEHPC) is a progressive pathological condition of the uterine lining. Pyometra

may be an infection overlying cystic endometrial hyperplasia (CEH). CEH usually precedes the development of pyometra if untreated. Cystic endometrial hyperplasia pyometra is mediated by progesterone and potentially aggravated by estrogens. Progesterone mediates CEHPC by inducing endometrial glandular proliferation and enlargement as well as distention of the endometrial glands with secretions. The bacteria most frequently isolated from the uterus in pyometra include the most common organisms isolated from the vagina of normal bitches: *Escherichia coli*, *Staphylococcus aureus*, *Streptococcus* spp, and *Pseudomonas* spp. as also elicited by Hagman, 2018.

The cases reported were all nulliparous, and similar to the reports of several authors (Kumar *et al.*, 2019). A Labrador Retriever was reported with the conditions in this study. The dogs were less than 5 years of age, and other studies have also shown such occurrence in middle aged dogs and in animals that were previously treated with any hormonal therapy. In the present study, there was no history of hormonal therapies but probably age factor was an issue of occurrence of such condition.

Though in this case, there was no history of canine herpes virus (CHV) infection and doesn't support any of the symptoms associated with CHV. Stump pyometra is mainly caused due to the infection and pus-associated distention of the remaining uterine tissues. The case reported had a previous history of neutering.

Conclusions

It is necessary for the owners to neuter the bitch at correct time, if they want to withdrawing their pets from future breeding. This will lead to the estrogen and progesterone withdrawal at early age, and

further will prevent the occurrence of the CEHPC, vaginal hyperplasia, and fibroma. It is also necessary to observe if any clinical or disease condition while carrying the fetus, and to track the pregnancy carefully. While neutering the complete removal of ovaries and uterine tissues can prevent the occurrence of stump pyometra. Extra care should be given to the small breed bitch, while performing the procedure as the occurrence is high among them. A proper planning of reproductive health management can avoid the occurrence of such conditions.

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