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Pyometra in a German Shepherd Dog: A Clinical Case Report

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ABSTRACT

A 9-year-old virgin German shepherd was admitted with continuous sanguinopurulent vaginal discharge, distended abdomen, and cachexia. The dog was clinically diagnosed with pyometra and successfully cured by ovario-hysterectomy. The results of histo-pathological examination showed that the endometrial glands were larger than normal and that part of the endometrial wall had sloughed off and become infiltrated with mostly neutrophils. This is the first case report of endometritis and cystic endometrial hyperplasia in a virgin German shepherd in Bangladesh.

Key words: Sanguinopurulent, ovario-hysterectomy, german shepherd, neutrophil, endometritis

INTRODUCTION

Typically, pyometra occurs in a bitch one to two months following estrus due to elevated progesterone level whether she was bred or not (Nelson and Feldman, 1986). Clinically, the bitch may present with inappetence, depression, polydipsia, lethargy and abdominal distension. She may or may not have vaginal discharge and fever and will often have an elevated White Blood Cell (WBC) count. The incidence of pyometra in dogs is approximately 24% before 10 years of age (Hagman, 2000). During this time, progesterone levels are elevated and help to create the ideal conditions for infection. This progesterone-primed condition stimulates uterine glandular secretions within the uterus, which suppresses uterine contractions (Cox, 1970) and inhibits the effect of infection-fighting blood cells in the uterus. The effects are cumulative in that each estrous cycle results in more glandular activity and higher levels of inflammatory cells and fluid or mucous within the uterus. After the establishment of a bacterial infection, which may originate from vaginal infection, urinary tract infection, or fecal contamination, the bacteria enter the uterus and multiply. In approximately 90% of cases, *Escherichia coli* is a main causal agent (Susi *et al.*, 2006). This bacterium produces endotoxins (that are capable of initiating the cytokine cascade and the release of many inflammatory mediators. *E. coli* is thought to be the cause of the local and systemic inflammatory reactions associated with pyometra. Cystic Endometrial Hyperplasia (CEH) often precedes the disease, but can also be found in many older bitches with no signs of pyometra. The clinical manifestations of canine pyometra are well known. Some breeds are more prone to uterine infection like golden retriever, miniature schnauzer, Irish terrier, Saint Bernard, Airedale terrier, Cavalier King Charles spaniel, rough collie, Rottweiler and Bernese mountain dog and some are low susceptible to developing the disease include Drovers, German shepherds, miniature

dachshunds, dachshunds (normal size) and Swedish hounds (Egenvall *et al.*, 2001). Severe pyometra sometimes leads to fatal and systemic infection and infertility. Scientific reports on canine pyometra are not frequent in Bangladesh, but common reproductive problems in pets have been reported (Juyena *et al.*, 2005). Different treatment methods have been applied during pyometra treatment but the popular and effective method is ovario-hysterectomy (OHE) (Feldman and Nelson, 2004; Johnston *et al.*, 2001). The present study was discussed about histopathological conditions during pyometra in a bitch.

CASE HISTORY

A 9-year-old virgin German shepherd was admitted to the SA Quadery Teaching Veterinary Hospital, Chittagong Veterinary and Animal Sciences University, Bangladesh, with a several-day history of sanguinopurulent vaginal discharge was referred by a District Veterinary Hospital, Chittagong Metropolitan Area, Bangladesh. The clinical examination revealed that the dog was dull and depressed, licked her backside (vagina) and was uncomfortable. Her daily food intake was low, but other behaviors were quite normal. On physical examination, the dog was found to be quite normal with the exception of vaginal discharge and a deteriorated body condition. Systemic antibiotics in the form of Ceftriaxone (Eracef® Vet, 1 g vial, Popular Pharmaceuticals Ltd., Bangladesh) were administered, but there was no improvement. Hematological examination revealed a high WBC count (65%), indicating the presence of infection. OHE was considered to be the best treatment for pyometra with either an open or closed cervix. The most common reason given for surgical removal of the uterus and ovaries is prevention of disease recurrence.

OHE was aseptically performed according to a standard procedure. Premedication was administered in the form of intramuscular atropine sulfate (Atropine®, Techno drug, Bangladesh, 0.04 mg kg⁻¹) and xylazine hydrochloride (Xylaxin®, Indian Immunologicals Ltd, India, 1 mg kg⁻¹) intramuscularly. Induction and maintenance involved a diazepam (Sedil®, Square Pharmaceutical Ltd., Bangladesh) and ketamine hydrochloride (Calipsol®, Gedeon Richter Ltd., Budapest, Hungary) combination (0.5 and 5 mg kg⁻¹, respectively). After exposing the abdomen by laparotomy, the uterine and ovarian blood vessels were properly secured and the ovaries, uterine horns and uterus were completely removed. The abdominal wall was closed with catgut (Mersutures®, 2-0, Ethicon, Johnson and Johnson Ltd., Baddi, H.P. 173-206, India) according to a standard procedure. During the entire operative period, 5% dextrose saline was intravenously infused. Postoperatively, the broad-spectrum antibiotic ceftriaxone (Eracef® Vet, 1 g vial, Popular Pharmaceuticals Ltd., Bangladesh) was administered for 7 days and the painkiller ketoprofen BP (Ketoflam®, Opsonin Pharma, Bangladesh) was administered for 3 days.

RESULTS AND DISCUSSION

The uterine horns and ovaries were subjected to postoperative gross and histo-pathological examination. The gross examination revealed that the uterine horns were flabby the endometrial wall was thick and profuse sanguinopurulent discharge had accumulated in the uterine horn (Fig. 1). This may have been due to inflammation of the myometrium and endometrium wall. The endometrial layer was corrugated and a small cyst-like structure was found on the endometrium (Fig. 2). Some of the endometrial wall had been sloughed off. Interestingly, in the left ovary there was a persistent corpus luteum and in the right ovary there was a large ovarian cyst (Fig. 3). It seems that progesterone and estrogen had been secreted simultaneously. Generally, pyometra occurs after estrogen stimulation followed by prolonged progesterone dominance. Progesterone-primed conditions influence hyperplasia of the endometrium and endometrial glands, decrease myometrial contractions and inhibit the local leukocyte response to infection, which allows for



Fig. 1: Sanguino-purulent pus was coming out from uterine horn after stabbing of canine uterine horn



Fig. 2: Corrugated endometrium wall with small cyst like structure on endometrium



Fig. 3: Large ovarian cyst with persistent corpus leutium (CL) (left) and only persistent CL (right) are present on ovary

bacterial proliferation within the uterine lumen. Ovarian cystic fluid also contains estradiol, which enhances the number of estrogen and progesterone receptors in the endometrium that activated the endometrium gland to secrete endometrial fluid. During the early luteal phase, the increased progesterone concentration suppresses cellular immunity (Sugiura *et al.*, 2004). *E. coli* is the most prevalent organism that causes pyometra in the dog and cat (Beutin, 1999; Coggan *et al.*, 2008) and is normally present in the urine and feces of affected bitches (Tsumagari *et al.*, 2005). Estradiol causes cervical dilation during estrus and therefore allows bacteria that are part of the normal flora of the vagina (especially *E. coli* and *Streptococcus* spp.) to ascend into the uterus. The combination of reduced local immunity and favorable uterine conditions for these pathogens allow for bacterial colonization and proliferation. Recently, it was reported that inoculation of *E. coli* into the uterus on days 11 to 20 and 20 to 30 after the luteinizing hormone peak caused canine pyometra, because at that time the uterus is most susceptible to infection (Smith, 2006).

Subacute endometritis followed by CEH is believed to cause pyometra. Endometrial hyperplasia is the result of cystic deformation of endometrial glands and stromal proliferation of fibroblasts with inflammatory reaction (De Bosschere *et al.*, 2001). However, the CEH–pyometra complex also develops as a consequence of an abnormal response of the uterus to repeated progestational stimulation during the luteal phase of the estrous cycle (Feldman and Nelson, 2004). CEH is also associated with mucometra; it results from endometrial thickening with the accumulation of viscid uterine fluid caused by hyperplastic and hypertrophic endometrial glands. CEH is not associated with clinical signs unless the uterine content becomes infected; this is referred to as pyometra (Barton, 1992). In the present study, histo-pathological examination of the affected uterus revealed multifocal erosions and ulcerations in the superficial epithelial layers of the endometrium, which was infiltrated with a large number of viable and degenerated neutrophils, tissue debris and extravascular erythrocytes (hemorrhage) (Fig. 4). The endometrial glands were expanded and haphazardly arranged with a hyperplastic, crowded epithelial lining, giving it the characteristic lesions of CEH. Diffuse cellular infiltration with neutrophils and extravasated erythrocytes in the endometrial stroma (Fig. 5) were correlated with the clinical presence of sanguinopurulent vaginal discharge. The cystic hyperplastic glands were the probable cause of the grossly voluminous uterine

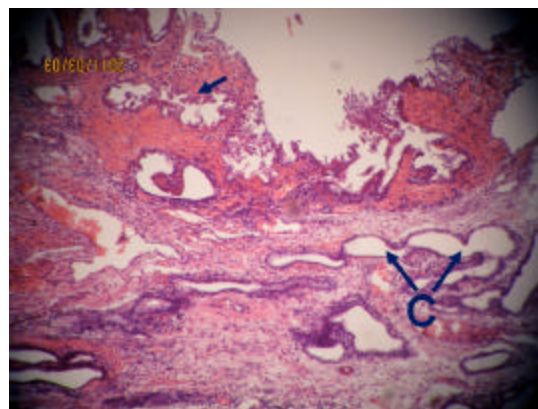


Fig. 4: Ulceration of the functional endometrium with diffuse hemorrhage in the mucosal surface (aero). Note the cystic endometrial hyperplasia (C) of endometrial glands

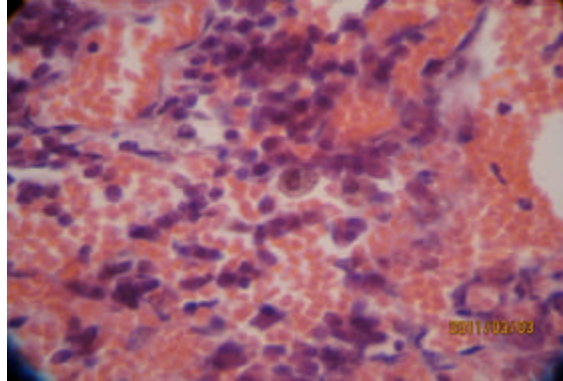


Fig. 5: Cellular infiltration in the endometrial stroma with predominant neutrophils, lymphocytic cells and profuse extravasated erythrocytes

content and thickened uterine wall. These hyperplastic uterine glands might be involved in the secretion of more uterine fluid, which causes the voluminous uterine content.

CONCLUSION

In conclusion, OHE is usually the recommended treatment for pyometra associated with CEH in bitches. To the author's knowledge, this is the first report of CEH and endometritis in a virgin German shepherd dog in Bangladesh.

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