Closed-Cervix Pyometra in Young Dogs; 2 Cases

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ABSTRACT

Canine pyometra generally occurs in intact female dogs of more than four years of age. However, in rarely cases, pyometra can occur in young bitches. In the present report, two cases of pyometra in thirteen and eighteen months of age were presented. In both cases, absent of vaginal discharge represented that both patients had closed-cervix pyometra and diagnosis was somewhat complicated. In complete blood count, elevated level of leukocyte with left shift was found in both cases. Serum chemistry analysis showed elevation of alkaline phosphatase in both cases. Additionally, mild elevation of aspartate transferase and total protein were also found in 2nd case. Radiographic and ultrasonographic findings show the enlargement of uterus and accumulation of fluid contents inside the uterine lumen. Ovariohysterectomy followed by antibiotics and anti-inflammatory drugs for post-surgery medication was performed for treatment. After a week, both patients fully recovered. To reduce mortality of pyometra in young intact female dogs, radiography or ultrasonography should be indicated immediately in the bitches showing severe infectious inflammation.

(Key words : pyometra, closed-cervix type, young dog)

INTRODUCTION

Canine pyometra is a common, however fatal disease in intact sexually matured bitches. Clinical reports indicate that approximately 75% of all nulliparous bitches have been diagnosed as pyometra in their life. The pyometra is developed after repeated stimulation of progesterone during the luteal phase of the estrous cycle. Clinically, this disease is diagnosed at 4 weeks to 4 month after estrus. During this period, high level of progesterone concentration induce increase of endometrial gland secretion and endometrial proliferation, decrease of myometrial contractility, and causes closure of the cervix. On the other hand, progesterone suppresses local cellular immunity of uterine tract during luteal phase. The combination of reduced local immunity and favorable uterine condition for pathogens make uterus more susceptible to bacterial colonization during this phase. Thus, after bacterial infection in uterus during this period purulent material is accumulated within the uterine lumen and consequently pyometra occur.

Many studies indicate the incidence of pyometra generally occur in bitches of more than 4 years of age. However, in rare cases, bitches in 1 to 2 years of age are diagnosed as pyometra. In this report, 2 cases of pyometra in young bitches (13 and 18 months of age) were presented.

CLINICAL CASE

In case 1, 13 month old intact female Yorkshire terrier dog was referred with a history of anorexia and polyuria for 3 to 4 days. From history taking, previous treatment of hormones or other medication was not found. There was no specific finding from physical examinations. However, from complete blood count (CBC) and differential count results, increased white blood cell (WBC) numbers (37,430 /ul) and high proportion of band cells (5%) were found (Table 1). Initially, we thought that the patient had infection in bladder or other urinary tract. Thus, ultrasonographic-guided cystocentesis for urinalysis was attemped. During a procedure, enlargement of uterine horn was found and pyometra was diagnosed. From serum chemistry result, increased value of alkaline phosphatase (ALP, 520 U/L) was found.

In case 2, 18 month old intact female Miniature schunauzer dog was referred for rechecking surgical correction of patella luxation. During radiologic examination of hind limb, uterine

† This study was supported by Research Institute for Veterinary Science, SNU foundation (Benefactor, RNL BIO), TS corporation, Nestle Purina PetCare, Natural Balance Korea and Korean MEST through BK21 program.

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Table 1. Complete blood count results of the present cases

	Reference range	Case 1	Case 2
WBC (1/ul)	6,000～17,000	37,430*	94,300*
RBC (10^4)	550～850	502+	520+
Hb (g/dl)	10～18	13.7	12.9
PCV (%)	35～55	34.9+	34+
MCV (fL)	58～73	69.5	66
Platelet (10^4)	12～60	10.7+	17.7
Monocyte (%)	2～10	16*	1+
Lymphocyte (%)	10～40	9+	11
Seg. neutrophil (%)	50～80	70	76
Band Cell (%)	0～1	5*	12*
Eosinophil (%)	0～7.5	–	–
Basophil (%)	0～15	–	–

WBC; white blood cell, RBC; red blood cell, Hb; hemoglobin, PCV; packed cell volume, MCV; mean corpsular volume, Seg. neutrophil; segmented neutrophil.
* Higher value than reference range.
+ Lower value than reference range.

Table 2. Serum biochemical profiles of the present cases

	Case 1	Case 2	Reference range
ALT (U/l)	34	12	10～100
AST (U/l)	22	68*	0～50
ALP (U/l)	520*	155*	8～100
BUN (mg/dl)	13.7	13	7～27
Creatinine (mg/dl)	0.4+	0.8	0.5～1.8
Glucose (mg/dl)	64+	79	74～143
Albumin (g/dl)	3.1	2.6	2.3～4.0
T. protein (g/dl)	6.5	8.6*	5.2～8.2
GGT (U/l)	11*	6	0～7
Calcium (mg/dl)	11.1	10.3	7.9～12.0
Phosphorus (mg/dl)	3.3	3.1	2.4～5.5
Na^+ (mEq)	148	155*	142～154
K^+ (mEq)	4.5	3.4+	4.0～5.4
Cl^- (mEq)	117	118	105～119

ALT; alanine aminotransferase, AST; aspartate aminotransferase, ALP; alkaline phosphatase, BUN; blood urea nitrogen, T. protein; total protein, GGT; gamma glutamyl transferase.
*:Higher value than reference range.
+:Lower value than reference range.

enlargement was also found at the corner of the radiography. Additionally, strikingly high number of WBC (94,300 /ul) and proportion of band cells (12%) were detected in CBC results and increased ALP (155 U/l) also found in serum chemistry results. Thus, we suspected possibility of pyometra. Slightly elevated aspartate transferase (68 U/l) and mildly elevation of total protein (8.6 g/dl) were also detected. Abdominal radiograph and ultrasonograph were performed to confirm the pyometra. As shown in Fig. 1 and 2, enlargement of uterus with fluid accumulation were detected.

In both cases, ovariohysterectomy was performed for the treatment of pyometra. The patients were anesthetized by standard protocol described previously with modifications. Briefly, patients were premedicated by cephalexine (cephalexine, Kukje, 30 mg/kg) intravenously, atropine sulfate (Atropine, Daehan, 0.1mg/kg) subcutaneous and acepromazine (Sedaject, Samwoo, 0.02 mg/kg) intravenously and then induced anesthesia with 6 mg/kg of intravenous propofol (Anepol, Hana). General anesthesia was maintained with isoflurane (Forane, Choongwae, 2%) in oxygen. The ventral abdomen was clipped and prepared for aseptic surgery, and then midline laparotomy was performed. Ovaries on both side and uterus with fluid contents were removed (Fig. 3).

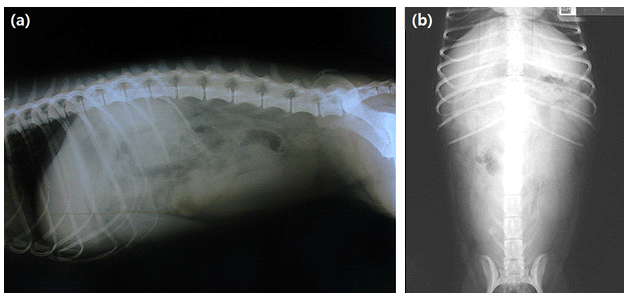

Fig. 1. Abdominal radiographs of case 2. Tubular shape soft-tissue density structure revealed enlargement of uterus. (a) lateral view, (b) ventrodorsal view.

After surgery, antibiotics (Cephalexin, Dongkoo, 30 mg/kg b.i.d.) and serratiopeptidase (Danajin, Cellart, 1 mg/kg b.i.d.) were given orally for 1 week. Patients were rechecked CBC 1 week after surgery. In both cases, WBC counts reduced back to normal range (16,010 and 15,500/ul for Case 1 and 2, respectively).

Bacterial identification of uterine pus was also performed after surgery using Vitek analyzer. More than 99% of the bacteria were identified as *Escherichia coli*.

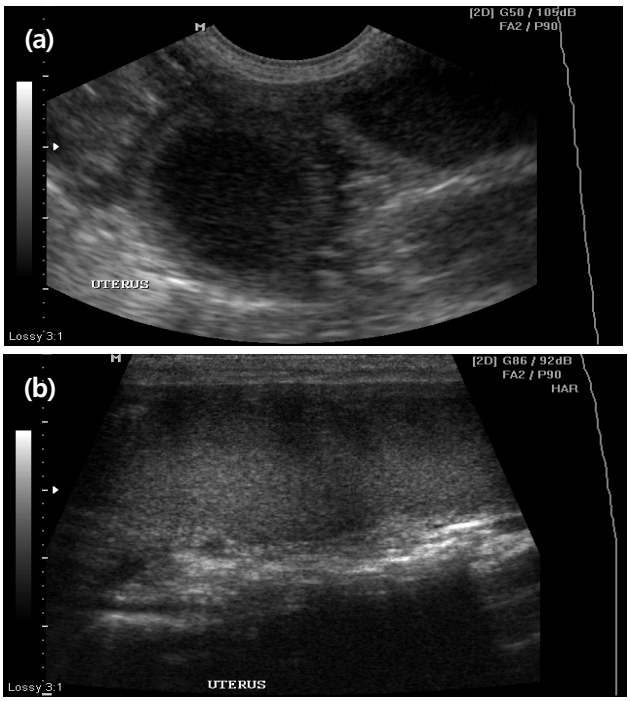

Fig. 2. Ultrasonography of enlarged uterus in case 2. The uterus is thick walled and distended with echogenic contents. (a) transverse and (b) sagittal sonogram.

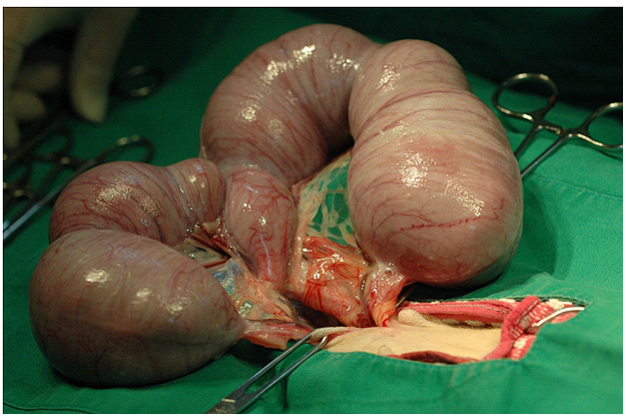

Fig. 3. Photography of enlarged uterus after ovariohysterectomy in case 2.

DISCUSSION

It is generally understood that pyometra occurs in more than 4 years old intact and/or nullipara female dogs. The previous reports show that pyometra can be occurred as early as 4 months of ages. However, pyometra in young dog is usually derived from exogenous hormone treatment such as estrogen or progestins for estrus cycle modification or pregnancy termination. In some cases, pyometra in young bitches also occurred because of congenital anatomic abnormalities of the vagina and vestibule, such as strictures and septums. However, naturally occurring pyometra in young bitches is very rare cases. Thus, it is somewhat hard to diagnose pyometra in young bitches without clear signs. In the present report, we also had misdiagnosed (or suspected) the patients as urinary tract infection and postoperative infection for case 1 and 2, respectively, before we took radiograph and ultrasonograph.

Blood and serum analysis can be used to support to diagnose pyometra in young bitches. Since pyometra is a typical bacterial infection disease, elevated leucocyte counts with markedly left shift morphologies is a very definite sign of pyometra. In the present report both cases also show high WBC counts and high proportion of band cell in CBC and differential count findings, respectively.

Elevated serum ALP could be observed in dogs with pyometra. Previous reports show that in approximately 50 to 75% of pyometra cases show mildly elevated ALP in clinical blood chemistry findings. Both of the present cases also show elevation of ALP. These findings reveal that hepato-cellular damage in response to toxemia induced by bacterial infection.

It should be noted that both of the present cases show closed-cervix pyometra. Generally, closed-cervix pyometra is a more severe disease compared to open-cervix pyometra and the prognosis is also poorer. In addition, closed-cervix type pyometra did not show any vaginal discharge, which makes more difficult to confirm the patient as pyometra, particularly in young bitches. Since closed-cervix pyometra is a medical emergency, and patients can be fatal from septic shock within few days, it is recommended to get radiograph and/or ultrasonograph immediately in young and intact bitches showing severe sign of inflammation. Enlarged and fluid filled uterus is easily distinguished in radiograph and ultrasonograph of closed-cervix pyometra. Once closed-cervix pyometra is confirmed, patients should be treated quickly. Clinically, ovariohyterectomy is the only choice for treatment of dogs with closed-cervix pyometra.

Comparing two patients in the present report, case 2 showed more severe condition. Case 2 showed more severe elevations WBC and band cell counts. Elevated arspartate transferase with high ALP values revealed that more severe hepatic damages. Elevated total protein level represents dehydration derived from sepsis. Unbalance condition of electrolyte also found in case 2 and this possibly affect prognosis of the patient. However, surgery was successfully done in both cases, and patients were

well recovered.

Escherichia coli is the most commonly cultured organism from the uterus of the dog with pyometra. In the present case, young bitch also infected with *Escherichia coli*. Thus, infected route expected similar as ordinary cases in older bitches.

In conclusion, thirteen and eighteen months old intact bitches were diagnosed as closed-cervix pyometra. Ovariohysterectomy was performed for both patients and then antibiotics and anti-inflammatory drugs were orally given. Both patients recovered after surgery. Since closed-cervix pyometra is emergency case, it is recommended that radiograph or ultrasonograph should be taken immediately for confirmation of pyometra in young intact female dogs showing severe infectious inflammation.

ACKNOWLEDGEMENT

The authors are grateful to Dr. Jung-Hee Yoon and Dr. Jun-Young Kim for technical support of radiography and ultrasonography.

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(접수: 2011. 11. 29 / 심사: 2011. 11. 30 / 채택: 2011. 12. 7)