

## Pyometra with Irreducible Inguinal Herniation of both Uterine Horns and Ovaries in a Boston Terrier Dog

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### ABSTRACT

An 8-year-old Boston terrier was brought to Kitasato University Veterinary Teaching Hospital with chief complaints of swelling in the vicinity of the right rear mammary gland, lethargy, and anorexia. The results of various examinations suggested a juxta-mammary abscess, resection of which led to the diagnosis of an irreducible inguinal hernia. The hernial sac contained pyometra of both uterine horns and ovaries. The uterus and ovaries were removed without having to make another incision in the abdominal wall. The postoperative course has been uneventful.

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### Introduction

Pyometra is a disease induced by bacterial infection superimposed on cystic endometrial hyperplasia caused by progesterone stimulation. Since pyometra is encountered relatively frequently in general clinical practice, many reports have been published on the pathogenesis, pathological features and treatment plan for this disease (Root Kustritz, 2005). On the other hand, inguinal hernia is a protrusion of abdominal viscera, commonly the digestive tract and adipose tissue, through the inguinal canal, which has been reported to occur commonly in aged, non-spayed female dogs (Fossum, 2002). However, only few studies have reported inguinal hernial sac that contained pyometra (Waters *et al.*, 1993; Byers *et al.*, 2007; Gogny *et al.*, 2010). In the current study, a case of inguinal hernia with pyometra in both uterine horns and ovaries were successfully receded without the need for open abdominal surgery, as outlined below.

### Case Presentation

An 8-year-old, nullipara, non-spayed, female Boston terrier weighing 8.5 kg exhibited swelling in the vicinity of the right rear mammary gland about 3 years earlier. The swelling had grown slowly over the previous 2 months (Fig. 1). The dog became lethargic, anorexic, and unwilling to take a walk several days earlier, and was brought to Kitasato University Veterinary Teaching Hospital, Japan.

### Physical and Clinical Examination

On palpation, the swelling was warm and fluctuated. Although the date of estrus was unknown, no swelling nor pus discharge was noted on the vulva. Urination and defecation were normal. Blood tests showed an increased white blood cells count (WBC 29,700 / $\mu$ l) and C-reactive protein (CRP) level (15 mg/dl), a normal red blood cell count (RBC  $705 \times 10^4$  / $\mu$ l), and normal hemoglobin (16.2 g/dl) and hematocrit levels (48%). There were no significant changes in body temperature (39.2°C).

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Fig. 1. Appearance of swelling site.

### Ultrasonography findings

Ultrasound revealed accumulated fluid, suggesting an abscess adjacent to the mammary gland.

### Antimicrobial susceptibility test

In antimicrobial susceptibility test, the needle aspirate (220 ml) was sensitive to Ampicillin (+++), Chloramphenicol (++), Enrofloxacin (++), Marbofloxacin (++) and Orbifloxacin (+).

### Treatment

The dog was treated by the administration of the antibiotic drug Orbifloxacin (5 mg/kg SID, Victas; Dainippon Sumitomo Pharma, Osaka, Japan) for 1 week, followed by 2 weeks of therapy with Ampicillin sodium (20 mg/kg BID, Viccillin; Meiji Seika, Tokyo, Japan) and Enrofloxacin (5 mg/kg SID, Baytril; Bayer, Tokyo, Japan) based on the sensitivity test results, with improvement in the clinical symptoms. Blood tests showed improvements in the WBCs count (10,600 / $\mu$ l) and CRP level (1.7 mg/dl), and no abnormal values were recorded except for a slight increase in alkaline phosphatase (ALP) (343 U/l) activity. However, since the abscess itself remained almost unchanged, it was resected at the owner's request. Anesthesia was induced with atropine sulfate (0.025 mg/kg IV, atropine; Mitsubishi Tanabe Pharma, Japan), butorphanol tartrate (0.1 mg/kg IV, Vetorphale; Meiji Seika, Tokyo, Japan) and propofol (6 mg/kg IV, animal propofol; Mylan Seiyaku, Tokyo, Japan) and maintained with 2.0% isoflurane (Isoflu; Dainippon Sumitomo Pharma, Osaka, Japan). An attempt to resect the abscess revealed an irreducible hernial sac. An incision of the hernial sac showed that it contained both uterine horns with pyometra and ovaries (Fig. 2), which were successfully removed through the hernial orifice without having to make an incision in the abdominal wall or elsewhere. Subsequently, the hernial orifice was closed with unabsorbable suture. After surgery, the dog received Ampicillin sodium (20 mg/kg BID) and has had an uneventful course.

### Histopathological findings

Pathological examination of the removed uterus revealed pyometra and leiomyosarcoma. In addition, a large number of *Streptococci* was found in the pus.

### Discussion

Ultrasound of the swelling in the vicinity of the rear mammary gland showed that the hernial contents were not

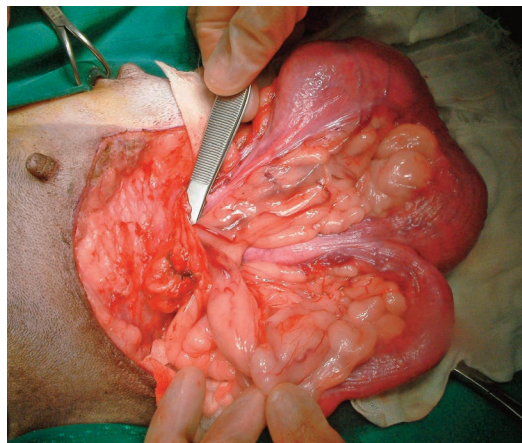


Fig. 2. An incision in the hernial sac revealed a pus-filled uterus and ovaries.

belonged to the digestive tract nor to the adipose tissue, but observed as a large amount of fluid collection. There were no signs of swelling or pus discharge on the vulva and no signs of urinary tract disturbance. Needle aspiration confirmed the presence of pus, leading to the diagnosis of a juxta-mammary abscess, for which treatment was started. However, an attempt to resect the abscess confirmed the presence of pyometra and ovaries in the hernial sac. Needle aspiration for pyometra is generally contraindicated because of the risk of peritonitis or sepsis due to the spillage of pus into the abdominal cavity (Root Kustritz, 2005). That was not the case in this dog; however, we consider that abscess aspiration required very careful manipulation.

Among the blood chemistry tests, determination of the WBC count, and ALP and CRP levels is useful (Okano et al., 1998; Root Kustritz, 2005) in particular, a strong correlation between CRP and systemic inflammatory response syndrome (SIRS) has been reported (Dabrowski et al., 2007; Fransson et al., 2007). In addition, the level of CRP is known to increase in infection and pancreatitis and after surgery or experimental Lipopolysaccharide administration (Tvarijonaviciute et al., 2011). *Escherichia coli* causes the majority of cases of pyometra, which associated with an increase in the blood endotoxin level, the latter has a direct effect on the prognosis of the disease as reported by Okano et al. (1998), who speculated that, in pyometra, the release of endotoxin from the uterus induced increases in both SIRS and CRP level. In the dog from this study, the CRP level was high at the initial examination, but low at the time of surgery. However, ALP activity was increased only at the time of surgery. This was presumably due to the fact that pyometra in the present study caused by *Streptococci*, consequently, the administration of appropriate antibiotics based on antimicrobial sensitivity test successfully controlled the infection.

In the present case, the uterine horns and ovaries were resected through the hernial orifice without the necessities for another incision in the abdominal wall or elsewhere, this may be attributed to the stretching of the infundibulopelvic ligament and surrounding tissue by the protruded genitalia that in turn facilitated greater mobility of the ovary.

Review of literatures revealed few detailed reports (Waters et al., 1993; Byers et al., 2007; Gogny et al., 2010) in which pyometra was recorded as one of the content of an inguinal hernia, making the present case unique. The findings in this case suggest that, in the diagnosis and treatment of a mass in the vicinity of the rear mammary gland, the possibility of pyometra should be fully considered.

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### Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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