

Canine Uterine Rupture with Septic Peritonitis Results from Adenocarcinoma in a 2-year-old Maltese Dog

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ABSTRACT

A 2-year-old female Maltese dog was presented with a history of anemia and vaginal hemorrhagic discharge. Physical examination revealed severe vaginal hemorrhagic discharge, abdominal pain, pale mucous membranes, low blood pressure and dehydration. Results of serum biochemistry, hematology, venous blood gas, and electrolyte canine C-reactive protein (CRP) test revealed severe normocytic normochromic anemia, severe neutropenia, a high level of CRP, hypoglycemia, and imbalanced electrolytes. Abdominal ultrasound examination showed focal hypoechoic defect with loss of layering in uterine horn wall. A laparotomy revealed a clear reddish fluid in the abdomen, the fistula of left and right uterine horn, the purulent discharge from fistula, and symptoms of septic peritonitis near by the fistula site. The bitch underwent ovariohysterectomy and recovered without complication. Histopathological diagnosis of the uterine fistula site was adenocarcinoma.

(Key Words : Uterine rupture, Septic peritonitis, Adenocarcinoma)

INTRODUCTION

The rupture of uterine is an emergency situation and unusual complication in bitches. Although uncommon in the bitch, the uterine rupture is sometimes reported as a consequence of dystocia or delicacy of the uterine walls in pyometra, forced extraction of an oversized fetus, improper oxytocin or PGF_{2a} administration, uterine trauma and uterine torsion (McEntee, 1990; Stone et al., 1993; Linde-Forsberg and Eneroth, 1998; Johnston et al., 2001; Davidson, 2003; Jackson, 2004; Pretzer, 2008).

The prevalence of a periparturient uterine rupture in bitches nowadays is not known (Hajurka et al., 2005). In human, the prevalence of total uterine rupture has been reported about 0.07% (Gardeil et al., 1994).

The clinical sign varies individually, abdominal distention and pain, vaginal discharge, dehydration, hypothermia, and shock (Hayes, 2004; Hajurka et al., 2005; Payan-Carreira et al., 2012; Voorwald et al., 2012). The uterine rupture can be diagnosed by the patient's history, clinical symptoms, laboratory tests, abdominal ultrasound, and exploratory laparotomy (González-Domínguez et al., 2010; Voorwald et al., 2012).

Uterine neoplasia in the bitch is considered a rare occurrence, accounting for only 0.4% of all canine tumors, and between 1 to 19% of all the female genital tract tumors (Johnston et al., 2001). The leiomyomas, benign tumors, is the most frequently occurred more than the 90% of all uterine canine tumors. Malignant uterine tumors are considered extremely rare in the bitch and the most common malignant neoplasia is leiomyosarcoma (Murphy et al., 1994).

The present report documents a clinical case of canine uterine rupture with septic peritonitis results from adenocarcinoma in a 2-year-old Maltese dog.

CLINICAL CASE

A 2-year-old female Maltese dog with a history of anemia and vaginal hemorrhagic discharge was presented to the Chonnam National University Veterinary Teaching Hospital. On the history, the owner reported that the bitch had whelped 4 premature puppies five days ago. After parturition, the symptoms of the dog had become worse gradually, reduced appetite, occasional vomiting and general dullness, and increased vaginal

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discharge. In view of this signs, a complete physical examination, serum hematology, biochemistry, venous blood gas and electrolyte, canine C-reactive protein (CRP) test, and abdominal ultrasound were performed. Physical examination revealed severe vaginal hemorrhagic discharge, abdominal pain, pale mucous membranes, low blood pressure and dehydration. Results of serum biochemistry and hematology, venous blood gas and electrolyte, and canine CRP test are given in Table 1. The remarkable findings were severe normocytic normochromic anemia, severe neutropenia, a high level of CRP, hypoglycemia, imbalanced electrolytes, and revealing the systemic inflammatory response syndrome (SIRS). Abdominal ultrasound revealed a thickening of right uterine horn with irregular border and focal hypoechoic defect with loss of layering in left uterine horn wall,

hyperechoic peritoneal fluid, pancreatic enlargement, and mesenteric edema (Fig. 1). In peritoneal fluid analysis, rod-shaped bacteria, degenerative neutrophil and significantly lower glucose concentration (lower than 10 mg/dl) in peritoneal fluid compared to peripheral blood glucose were confirmed. On the basis of these results and history, a diagnosis of the septic peritonitis due to the uterine rupture was made and an emergency surgery with intravenous fluid therapy and antibiotics was proposed. A ventral midline laparotomy was performed and an amount of clear reddish fluid in the abdomen was found and aspirated during the surgery. The two sites of large fistula in the distal part of left uterine horn were found and the purulent discharge from fistula was leaked to abdominal cavity. Also, brownish pigmentations of the mesentery, a part of small

Table 1. Biochemical and hematological parameters at presentation

Parameter	Values	Reference values	Parameter	Values	Reference values
RBC ($M/\mu l$)	2.37	5.65-8.87	ALKP (U/l)	928	23-212
HCT (%)	15.2	37.3-61.7	AMYL (U/l)	>2500	500-1500
MCV (fL)	64.1	61.6-73.5	BUN (mg/dl)	47	7-27
MCH (pg)	23.6	21.2-25.9	GLU (mg/dl)	44	74-143
MCHC (g/dl)	36.8	32.0-37.9	LIPA (U/l)	3823	200-1800
WBC ($K/\mu l$)	4.03	5.05-16.76	CRP (mg/l)	> 210	0-20
NEU ($K/\mu l$)	0.22	2.95-11.64	Na (mmol/l)	130.9	140-150
MONO ($K/\mu l$)	2.5	0.16-1.12	K (mmol/l)	2.95	3.5-5.8
PLT ($K/\mu l$)	103	148-484	Cl (mmol/l)	105.2	109-120

RBC, red blood cells; HCT, hematocrit; MCV, mean corpuscular volume; MCH, mean corpuscular hemoglobin; MCHC, mean corpuscular hemoglobin concentration; WBC, white blood cells; NEU, neutrophil; MONO, monocyte; PLT, platelets; ALKP, alkaline phosphatase; AMYL, amylase; BUN, blood urea nitrogen; GLU, glucose; LIPA, lipase; CRP, c-reactive protein; Na, sodium; K, potassium; Cl, chloride.

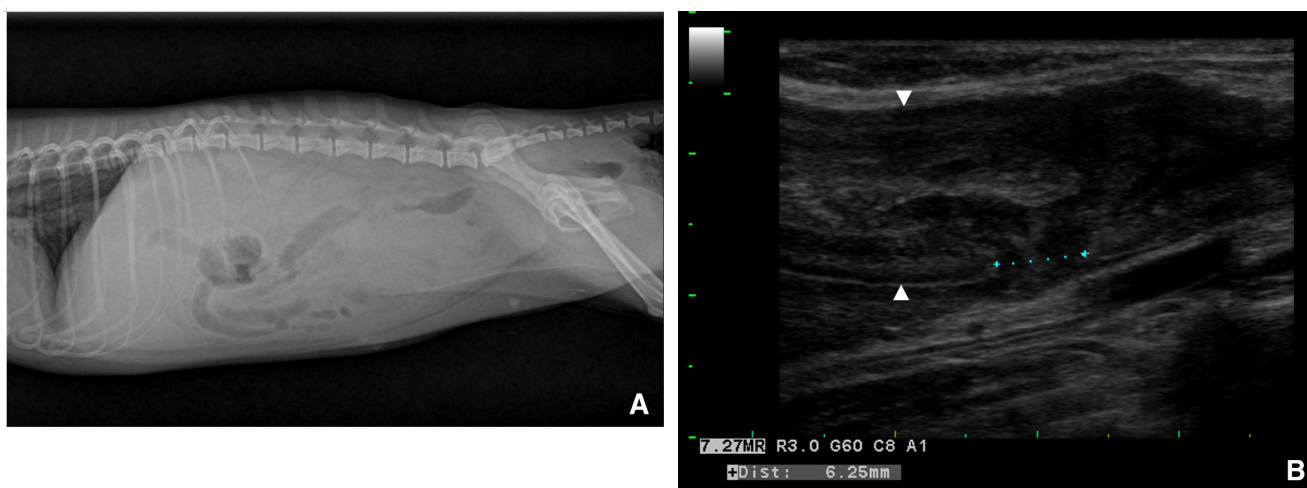


Fig. 1. Abdominal radiography and ultrasonography of this case. (A) There was decreased serosa detail on lower abdomen. (B) Focal hypoechoic defect with loss of layering in uterine horn wall was verified (white arrow heads-uterine border).

intestine, and the tail of the pancreas was observed near by the fistula site. And there were two sites of small fistula in the proximal and distal right uterine horn (Fig. 2). Therefore, the ovariectomy (OHE) was performed and the abdomen was repeatedly washed with warm sterile normal saline and the septic peritonitis was managed with open peritoneal drainage. After surgery, the dog had blood transfusion treatment and critical care during seven days. Recovery was rapid and uneventful. Samples of the uterus were fixed in 10% formalin and subjected to histopathological examination. In Histopathological findings, severe diffuse necrosis was prominent in the mucosa and submucosa. In some lesion, necrosis extended into muscular layer. Throughout the necrotic lesions, tubular structures lined by simple cuboidal to stratified cuboidal to short columnar cells were found. In these necrotic lesions, multiple small nests of

polyhedral to spindle cells were observed. Some of these cells was anaplastic showing multinucleated or hyperchromatic bizarre nuclei and ample eosinophilic cytoplasm. Tumor cells found in tubular structure as well as non-tubular structure were positive for cytokeratin. Therefore, histopathological diagnosis was adenocarcinoma in the uterine fistula site. Following this diagnosis, preventive chemotherapy was proposed but the owner refused proposed then. The dog was reassessed at 18 months after surgery. The owner reports that the dog still alive and was bright, alert and responsive.

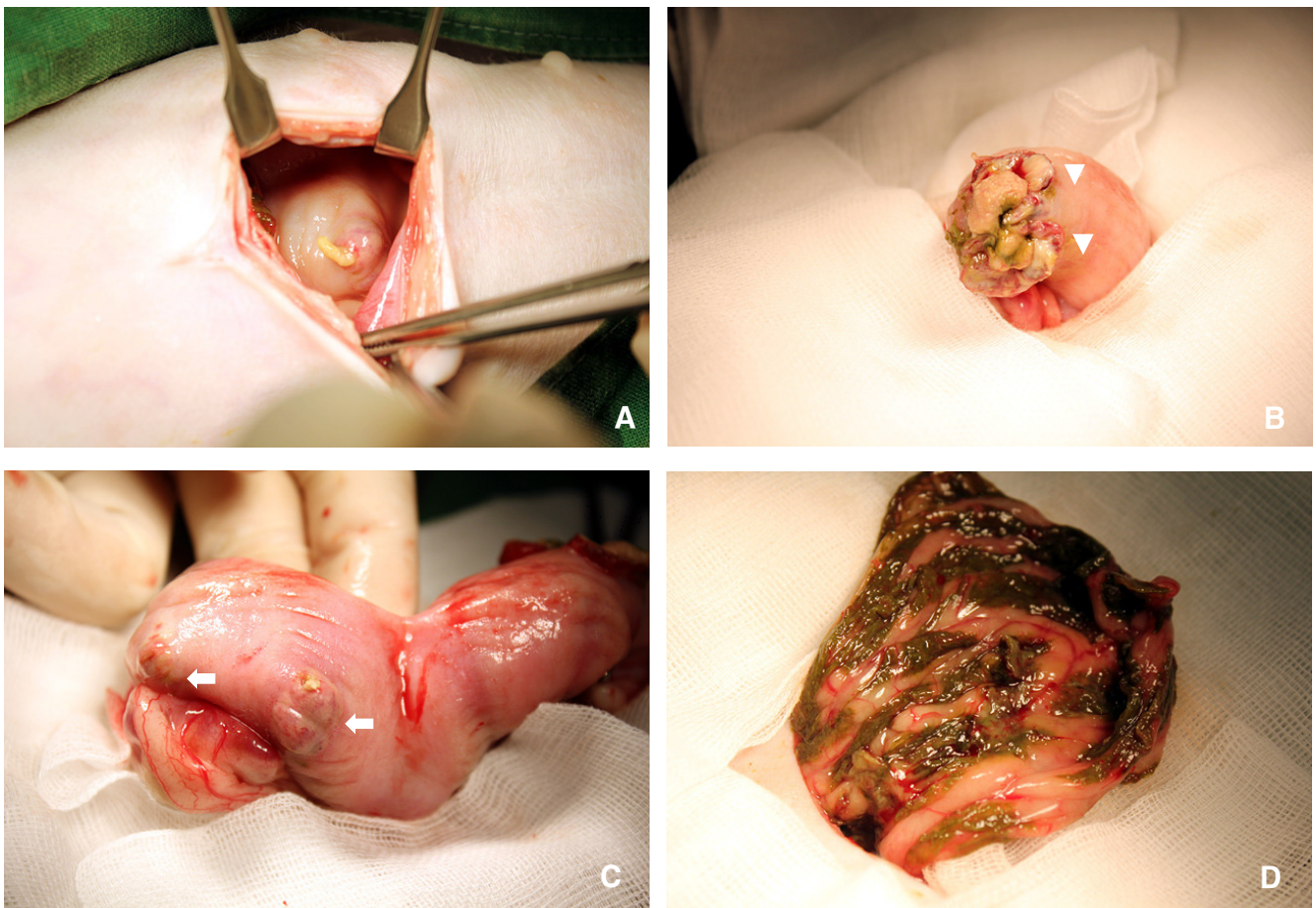


Fig. 2. Uterine rupture in a Maltse bitch. (A) A leaking purulent discharge from uterine fistula was observed right after laparotomy. (B) Photograph depicting two sites of large fistula at the distal aspect of the left uterine horn (white arrow heads). (C) Gross appearance of two sites of small fistula in the proximal and distal aspect of right uterine horn (white arrows). (D) A brownish pigmentation of the mesentery was observed near by the fistula site.

DISCUSSION

In women, uterine rupture is an emergency complication. Various factors increase this risk such as: congenital uterine anomalies, multiple gestations, previous myomectomy, labor induction, obstructed labor, abnormal fetal position, uterine trauma and previous uterine scar including (previous cesarean section, abdominal and laparoscopic surgeries) (Golan et al., 1980; Gardeil et al., 1994; Hockstein, 2000; Zeterogu et al., 2005; Murphy, 2006; Seracchioli et al., 2006).

Uterine rupture in the bitch is a rare complication. It is practically to occur when improper oxytocin or PGF_{2 α} administration, manual manipulation of fetuses during dystocia, obstructive dystocia, fetal death, cystic endometrial hyperplasia-pyometra complex, uterine torsion or prolapse, and trauma during late pregnancy or labor (Oelzner and Munnich, 1997; Hajurka et al., 2005; Morey, 2006; Humm et al., 2010; Linde-Forsberg, 2010; Bodh et al., 2014). In the present case, the premature birth was considered to be the trauma during the third trimester of gestation, which can lead to uterine rupture caused by weakened site in the uterine wall due to malignant uterine tumors.

The clinical signs are generally dependent on the extent of the rupture, the existence of hemorrhage, the contamination of the abdominal cavity with uterine and fetal fluids, or the retention of a fetus in the uterus (Payan-Carreira et al., 2012). In dogs with septic peritonitis, abdominal fluid glucose concentration was always lower than the peripheral glucose concentration. A blood-to-fluid glucose difference greater than 20 mg/dl was 100% sensitive and 100% specific for the diagnosis of septic peritonitis (Bonczynski et al., 2003). In this case, we observed the clinical signs of severe vaginal hemorrhagic discharge, low blood pressure and dehydration, abdominal pain, and pale mucous membranes. And, laboratory test revealed severe hemorrhagic anemia, severe neutropenia, a high level of CRP, hypoglycemia, and imbalanced electrolytes. Also, we confirmed focal hypochoic defect with loss of layering in left uterine horn wall via ultrasonographic test. Furthermore, peritoneal fluid analysis indicated rod-shaped bacteria, degenerative neutrophil and low glucose concentration (lower than 10 mg/dl) in peritoneal fluid. Therefore, we inferred that septic peritonitis was caused by uterine rupture during labor.

For a successful treatment, early and correct diagnosis is very important, because of these situations have to be treated as an emergency (Payan-Carreira et al., 2012). The impeccable

therapeutic approach for uterine rupture is OHE combined with intravenous fluids and antibiotic therapy, and the detection of fetus in the uterus is an undisputed indication for OHE (Serin and Parin, 2009; Linde-Forsberg, 2010). In the present case, we performed emergency OHE. At surgery, fistulas were found in the left and right uterine horns, and purulent exudates were leaked into the abdominal cavity through the fistula. Also, symptoms of peritonitis were observed near by the fistula site.

Adenocarcinoma is rare in the domestic animals with exception for cattle and rabbits (Kennedy et al., 1998). In the bovine, uterine tumors have been reported to be the third most commonly observed in slaughterhouse material (Baldwin et al., 1992). In contrast, bitch uterine neoplasia is rare, accounting for only 0.4% of all canine tumors (Cave et al., 2002). In the bitches, the leiomyomas as the most predominant type of tumor was reported accounting for 85 - 90% of all uterine neoplasia. The most common malignant uterine tumor is leiomyosarcoma, and reports on bitch adenocarcinoma are occasional (Madewell and Theilen, 1987; Cave et al., 2002; Pena et al., 2006; Pires et al., 2010). Clinical signs of uterine neoplasia generally depend on the tumor size, the presence of metastatic disease or any concurrent illness (Cave et al., 2002). A typical symptoms were chronic abdominal enlargement and reduced appetite, vaginal discharge (Cave et al., 2002; Pena et al., 2006). Also, this clinical signs are common to the cystic endometrial hyperplasia/pyometra complex and to mucometra, which can also occur concomitantly with endometrial carcinoma (Cave et al., 2002; Pena et al., 2006). These features may be related to canine reproductive physiology that evidence long estrogenic and progesteronic phases, predisposing to the cystic endometrial hyperplasia/pyometra condition (Pires et al., 2010). In this case, the patient showed that reduced appetite, occasional vomiting and general dullness, increased vaginal hemorrhagic discharge. For treatment, surgery remains the primary treatment modality in dogs. Nevertheless, the optimal therapeutic regimen for canine uterine carcinoma has not been determined (Cave et al., 2002).

In conclusion, this report is a presentation of canine uterine rupture with septic peritonitis results from adenocarcinoma. Early and definitive diagnosis of uterine rupture through clinical signs, radiography, ultrasonography and laparotomy can help in ensuring a successful outcome for a bitch.

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