

Uterine Rupture with Retained Placenta in a Primiparous Bichon Frise Bitch

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Abstract: This report describes a case of postpartum uterine rupture associated with retained placenta and sequential acute metritis, not dystocia. A 14-month-old Bichon Frise bitch presented with continuous vaginal bleeding. She delivered five puppies 3 days ago and expelled four placentas on the next day. After then, anorexia, acute depression with continuous vaginal haemorrhage developed. Plain radiography showed decreased serosal detail, and ultrasonography showed irregularly thickened uterine wall and ascites. Blood-tinged peritoneal fluid was an exudate with bacteria. Ovariohysterectomy was curative for the patient, and four full-thickness perforated holes were identified on both sides of the uterine horns.

Key words : bitch, puerperal haemorrhage, retained placenta, postpartum metritis, uterine rupture.

Introduction

Uterine rupture (UR) is unusual in bitches and queens. The incidence of UR in 652 dogs with pyometra was just 3.2% (10), and there was no ruptured uterus in the studies of 182 and 337 cases of dystocia (5). UR in gynaecology accounted for 0.035% of 117,685 vaginal childbirths and 0.62% of nonelective caesarean deliveries (9). Although UR occurs most commonly as a result of dystocia, other pre- and periparturient causes include trauma, gross dilation due to excessive foetal size, cervical non-dilation, inappropriate obstetrical technique or excessive use of oxytocin and prostaglandin, compromised uterine wall (infection, dead foetus, metritis, uterine torsion), and previous caesarean section or as a sequela of pyometra (1,2,9,10). Spontaneous uterine rupture usually occurs in late gestation or during labour (3).

The clinical signs and prognosis of UR vary according to the cause, portion, size, or nature of the rupture (1). UR might be sterile and asymptomatic, or it can accompany lifethreatening puerperal haemorrhage or secondary peritonitis sometimes, with or without a peritoneal foetus (5,8,10,12,14). Abdominal distension with severe pain and rapid deterioration of the patient's general condition can be marked (8). UR is suspected with diagnostic imaging techniques but confirmed by abdominal exploration (13). Early diagnosis is paramount, and patient stabilization is essential. However, it can occasionally be an emergency condition requiring surgical intervention. Unilateral resection of the affected horn with the corresponding ovary is possible for a valuable breeding bitch, but complete ovariohysterectomy is recommended because a surgically repaired uterus is predisposed to infertility or rerupture in subsequent pregnancy (6). Intravenous fluid therapy and systemic antibiotics are indicated (8). This report describes the occurrence, treatment, and progress of the postpartum uterine rupture induced by retained placenta accompanying secondary peritonitis in a bitch.

Case

A 14-month-old primiparous Bichon Frise bitch weighing 5 kg presented with a history of continued vaginal bleeding for 2 days after parturition. Three days before presentation, she delivered 5 puppies uneventfully and had a good appetite, activity, and mothering. Four placentas were expelled on the day after parturition, and after that, vaginal haemorrhage began, accompanied by acute lethargy and anorexia. Hyperthermia (40.7°C) and bloody diarrhoea developed 1 day before referral.

Dehydration (7%) and hypochromic microcytic iron deficient anaemia with 13.5% PCV were noted. Plain abdominal radiographs (XPLORER-900, Median International Co., Ltd. Korea) revealed loss of serosal detail, and ultrasound (iU22, Philips Medical system, Bothell, USA) showed an irregularly thickened uterine wall with hypoechoic fluid in the lumen and echogenic abdominal effusion. Blood-tinged peritoneal fluid collected by ultrasonography-guided abdominocentesis was exudate with bacteria on fluid analysis (nucleated cell count: 40,000/mm³, total protein: 3.8 g/dl, direct smear: degenerative neutrophils, phagocytized bacteria, rods, and cocci). Bacterial culture and sensitivity test was not performed.

After stabilization with blood transfusion and fluid resuscitation, exploratory laparotomy was performed (Fig 1). The omentum, small intestine, and uterus were flooded in bloody ascites and entwined together with blood clots. Full-thickness ruptured holes covered with clots were identified on both sides of the uterine horns. The serosal surface of the intestine was grossly erythematous but without evidence of adhesion or perforation. Ovariohysterectomy was performed,

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Fig 1. Transmural rupture of the uterus in a dog. Multiple transmural ruptures (arrows) were noted on the placental sites of the bilateral uterine horns. One site was still bleeding and was clamped (A, B). Four ruptured site are indicated with arrows (C). Intra-luminal view of the uterus (D). I; small intestine, O; omentum, U; uterus.

and the peritoneal cavity was lavaged copiously with warm saline. An active drainage device was placed before abdominal closure.

Initial post-operative care consisted of 0.45% saline-based maintenance fluid, amoxicillin-clavulanic acid (Clavamox[®], 12.5 mg/kg PO, Pfizer Animal Health Korea Ltd.) and metronidazole (Metrynal inj.[®], 15 mg/kg IV, Daehan Pharm.) with gastrointestinal protectants. Butorphanol (Butophan®, 0.5 mg/ kg IV, Myungmoon Pharm. Co.) was administered as a postoperative analgesic. Vitamin K_1 (Vitamin K_1 inj.[®], 2 mg/kg SC, Daehan Pharm.) was administered once. The haematocrit level was restored to 32.9% on POD 2. The patient recovered without complications and showed good mothering.

Four ruptured uterine lesions were observed on two placental sites of the bilateral horns. The size of the disruptions was approximately 1~1.5 cm in diameter. With histopathologic examination, chronically retained placental tissue with focal ulceration or perforation of the outer muscular uterine wall was suspected (Fig 2). The tissue was partially necrotic or autolysed, and there was almost no endothelial lining. Focal haemorrhage was identified along one side, possibly the peritoneal aspect with a breached muscular tunic. Cellular inflammation was mild and scattered, mostly plasmacytic and neutrophilic.

Discussion

Post-partum UR, as in this report, is a more uncommon presentation. In the present case, it is possible to suggest that delayed and insufficient placental expulsion (retained placenta) and retrograde infection through the open cervix induced acute endometritis, which attributed to vulnerability, maceration, and perforation of uterine wall, eventually leading to continuous metrorrhagia. Leakage of inflamed uterine fluid through perforations resulted in secondary peritonitis



Fig 2. Histopathologic sections of a ruptured uterus with endometritis in a dog (H&E stain). Retained placental (foetomateral) membranes (A, \times 20). Inflammation/fibrin in the muscular wall with perforation of the outer wall $(B, \times 40)$. Necrotic placental membrane along the lumen (C, \times 100).

and a subsequent deterioration of the patient's condition.

Puerperal haemorrhage results from vascular erosion in the subinvolution of placental sites, uterine rupture, vaginal injury, or coagulation disorders (7). Permissible haemorrhage after delivery should never exceed a scant drip from the vulva (13). Oxytocin (5~20 IU/kg, IM) can be administered initially, but ovariohysterectomy is inevitable when intractable haemorrhage persists (7).

Placental expulsion occurs in the third stage of labour; each placenta is expelled after each birth, usually within 15 minutes, and all placentas are discharged by 4~6 hours (13). It might not be easy to obtain an accurate count of the expelled placentas due to the owner's excitement for the birth, and the bitch might eat the placenta before it is identified if she is not observantly monitored. Retained placenta is suspicious when all placentas are not expelled within 4-6 hours and there is thick, dark, putrid/foul smelling lochia, continuous genital haemorrhage, or rectal temperature higher than 39.5°C. Extraction by careful 'milking' of the uterine horn or by using forceps is sometimes possible. Treatment with oxytocin 1-5 IU (bitch) or 0.5 IU (queen) SC or IM 2-4 times daily for up to 3 days can help expulsion of retained placentas (13).

Acute metritis refers to an inflammation of the endo/mvometrium in the immediate post-partum period that elicits systemic illness in dams (7). Dystocia and obstetrical manipulation, prolonged delivery, retained foetuses or placental membranes, and unsanitary parturition might be involved (13). A highly distended uterus is considered an ideal culture medium for bacterial colonization, and infection usually develops through the open cervix in an ascending manner; Escherichia coli, Staphylococcus spp., Proteus spp., or Streptococcus spp., are frequently isolated (7). Clinical signs include fever, dehydration, depression, anorexia, poor lactation and poor mothering. Vaginal discharge is purulent or sanguino-purulent, foul smelling, and reddish to brown and should be distinguished from normal lochia. Metritis can be fatal if not treated, leading to death with septicaemia and toxaemia. Treatment consists of immediate administration of intravenous fluids and antibiotics, and evacuation of uterine contents (PGF2 α). The incidence of postpartum metritis in women after vaginal childbirth is 0.9~3.9% and is up to 95% in women who undergo non-elective caesarean delivery (7). Metritis can occur after normal parturition, natural mating or artificial insemination or following an abortion (4). A doughy, enlarged uterus might be palpated, and soft distinct masses indicate a retained placenta.

There was a similar case of profuse metrorrhagia due to UR with fibrino-purulent necrotizing metritis in a 2-year-old French Bulldog. However, UR was induced by prolonged delivery for 24 hours and ascending bacterial infection. There was no evidence of foetal membrane retention, and disruption of the uterine wall occurred in the surgical site of a previous caesarean section (7).

Another uterine rupture was reported in an 18-month-old poodle, a third-time dam, 4 days after delivery. Acute suppurative endometritis (pyometra) resulted from bacterial infection (*E. coli, Proteus spp.*, and *Enterococcus spp.*), but there was no retained placenta or lethal haemorrhage (15).

Secondary septic peritonitis might be an emergency condition requiring immediate surgical intervention based on a rapid and precise diagnosis. Abdominocentesis is useful for analysis of the peritoneal effusion and confirming the nature of the peritonitis (11). Not all cases show consistent prognosis according to the various aetiologies; however, mortality is considered relatively high, up to 50%. Management includes patient stabilization, fluid therapy, antibiotics and analgesics, and surgical intervention with abundant lavage and drainage. The underlying cause should be corrected as well. In association with parturition, peritonitis is a critical complication related to UR with dystocia and foetal expulsion into the abdominal cavity or maceration (2,7,10). Fortunately, the omentum can sometimes adhere to the ruptured site and play a protective role for the peritoneal cavity against the bacteria and contaminating uterine contents (7,8). Accordingly, peritonitis can be circumscribed, with minimal or no symptoms (8).

This case is interesting because UR developed after completion of favourable whelping of five live pups, not associated with dystocia. Moreover, the bitch was primiparous; therefore, there was no history of caesarean delivery. In addition, there was no history of pyometra or previous trauma. However, acute metritis secondary to delayed placental expulsion (> 24 hours) and inappropriate detachment induced perforation of a weakened uterine wall resulting in subsequent metrorrhagia. Ovariohysterectomy was successful for restoration of the patient's condition. Periparturient history, sudden onset of clinical symptoms, surgical exploration, and histopathologic findings are sufficient to explain this postpartum UR resulting from a retained placenta and acute metritis. Although a bacterial culture was omitted in this case, the dam showed a good prognosis with supportive care.

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