



ECTOPIC PREGNANCY DIAGNOSED POST CAESAREAN SURGERY IN A THREE YEAR OLD BOERBOEL BITCH

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ABSTRACT

A three year old nulliparous Boerboel bitch presented with complaints of fever and inappetence six weeks after an elective caesarean section was diagnosed with an extrauterine foetus. A per-cutaneous abdominal ultrasound revealed a foetal sac showing a well-developed skeletal structure and the absence of foetal movement or heartbeat. During laparotomy, a foetal sac containing a dead foetus was located between the spleen and the stomach. The foetal sac was excised following ligation of its mesenteric attachment to the spleen. The previously operated uterus was observed to have involuted but revealed a small bud observed on the middle portion of the left uterine horn. The histological findings of the foetal sac revealed fibro-adipose tissue with numerous congested vessels. It was concluded that the Boerboel bitch had a secondary abdominal ectopic pregnancy and recommended that owing to the difficulty of diagnosing the condition before or during routine elective caesarean surgery, post-operative abdominal ultrasound would have been instructive.

Key words: Boerboel; dog; ectopic; extrauterine; foetus; pregnancy

INTRODUCTION

Extrauterine (ectopic) pregnancy is an abnormal pregnancy state in which a conceptus develops and attaches in an abnormal location outside the uterus [7]. It is a relatively common condition in humans but rare in animals [3]. Ectopic pregnancy has been reported in rabbits [4], cats [3] and dogs [9]. Four main types of extrauterine pregnancy based on location have been reported in human and other animals with various subtypes. These include: (1) tubal, (2) abdominal, (3) cervical and (4) ovarian ectopic pregnancies. In humans, the development of a gestational sac on an ovary [10] and implantation of a foetus on a cervical canal [2] have been reported but never in animals. Tubal extrauterine pregnancy occurs due to an implantation of the foetus within the oviduct [2]. It is the most common type of ectopic pregnancy in humans, but is rarely found in domestic animals because of the different physiology of the

uterus between humans and animals. Abdominal ectopic pregnancy is the most common type of ectopic pregnancy in animals, including bitches [4]. An abdominal ectopic pregnancy occurs when the foetus is implanted or existed in the abdominal cavity [2]. All reported cases of ectopic pregnancies in bitches were abdominal ectopic pregnancies [1].

An abdominal ectopic pregnancy can also be described as primary or secondary. Primary abdominal ectopic pregnancies occur as a result of entering and the implantation of a fertilized egg forming a placental relationship on the peritoneal or omental surface through the oviductal fimbria [4]. The placental attachment in the primary form may also be on the mesentery, liver, spleen and the large and small intestines [2]. The secondary abdominal ectopic pregnancy is considered to have occurred as a consequence of the rupture of the wall of the upper reproductive tract, thereby creating a communication between the uterus or oviduct and the peritoneal cavity with subsequent propulsion of the already gestating foetus into the abdominal cavity [3]. The majority of reported cases of abdominal ectopic pregnancies in bitches are considered to be secondary [7, 8].

Canine ectopic pregnancies are uncommon and the aetiology is not clearly understood, but it has been reported to be caused by uterine rupture due to road accidents, infection, uterine torsion and inappropriate obstetrical technique during the peri-parturient period [7]. Until now, most cases of canine ectopic pregnancy have been diagnosed in bitches that have whelped normally. There has been no report of canine ectopic pregnancy after caesarean section in bitches. This report presents the diagnosis and management of an unusual case of ectopic pregnancy in a three year old Boerboel bitch, six weeks after an elective caesarean surgery was performed.

Case Presentation

A three year old nulliparous Boerboel bitch was presented with fever and anorexia. The bitch had an elective caesarean operation six weeks earlier in another veterinary hospital during which five healthy puppies were removed. According to the owner, the bitch had been doing fine until about two days prior to presentation when the dog was observed with reduced appetite. At presentation, the dog was alert with pink mucous membrane. Rectal temperature (40.3°C) was elevated, while the heart rate ($88\text{ beats}\cdot\text{min}^{-1}$) and respiratory rate ($24\text{ breaths}\cdot\text{min}^{-1}$) were within the normal range. The

dog's abdomen was moderately enlarged and palpation revealed a mid-abdominal mass. Other parameters were within normal limits. An abdominal ultrasound performed with a portable ultrasound machine (Kaixin KX 2000R, Xuzhou, China), revealed a foetal sac with a well-developed skeletal structure and the absence of a foetal heart beat (Fig. 1). Thus, a diagnosis of a retained foetus was made and an exploratory laparotomy was scheduled to determine the location and removal of the retained foetus. Blood was obtained from the cephalic vein for the determination of selected haemato-biochemical parameters. The results showed severe lymphocytic (absolute lymphocyte count: $21.5 \times 10^3\cdot\text{l}^{-1}$) leukocytosis (total leukocyte count: $42.9 \times 10^3\cdot\text{l}^{-1}$), while other parameters were normal.

ETHICAL CONSIDERATIONS

Informed owner's consent and ethical approval (FUNAAB/COLVET/CREC/2020/09/02) were obtained.

Case Management

The dog's ventral abdomen was prepared aseptically. Premedication was done with $3\text{ mg}\cdot\text{kg}^{-1}$ intramuscular injection of 5 % tramadol (Tramadol®, Gland Pharma, India) and one hour later with a combination of intramuscular



Fig. 1. Transcutaneous abdominal ultrasound of a three year old Boerboel dog with ectopic pregnancy showing a foetal sac (red arrows) and foetal skeletal structure (black arrow)

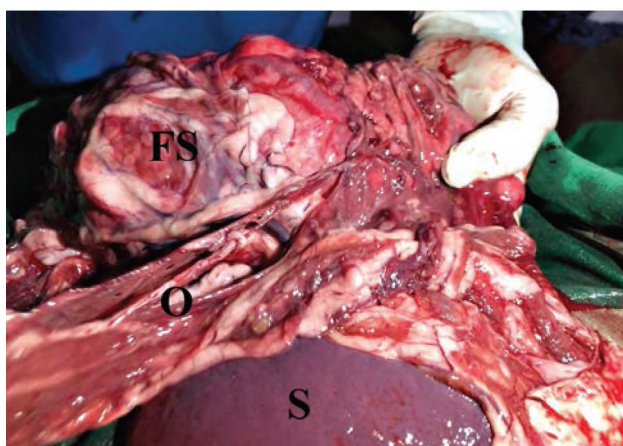


Fig. 2. Intraoperative picture of a three year old Boerboel dog with ectopic pregnancy showing a foetal sac (FS), omentum (O) and spleen (S)



Fig. 3. Intraoperative picture of a three year old Boerboel dog showing the uterine horn with a bud at the left horn (black arrow)

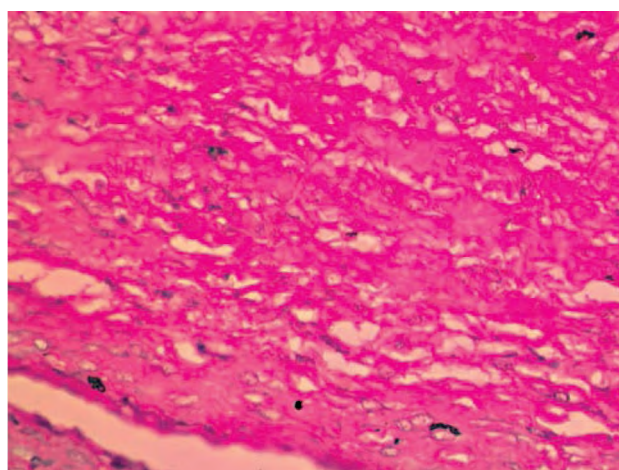


Fig. 4. Histology of the ectopic foetal sac from a three year old Boerboel dog showing fibroadipose tissue with numerous congested blood vessels. H and E, Magn. $\times 100$

injections of 0.04 mg.kg^{-1} of atropine sulphate (Atocan®, Sishui Xierkang Pharma, China) and 0.5 mg.kg^{-1} of Xylazine Hydrochloride (Xylased, Bioveta, Ivanovice, Czech Republic). Venous access was secured at the cephalic vein and circulating blood volume maintained with Lactated Ringers solution at the rate of 5 ml.min^{-1} . Anaesthesia was induced with a loading dose of 4 mg.kg^{-1} intravenous injection of propofol (Hyprovan 200®, Celon Laboratories PVT LTD, Telangana, India) and maintained with constant infusion of propofol at the rate of $0.12 \text{ mg.kg}^{-1}.\text{min}^{-1}$. After anaesthesia induction, the dog was positioned in dorsal recumbency and a standard ventral midline incision was made to gain access into the abdominal cavity. The foetal sac was located between the spleen and the stomach

(Fig. 2) and a stab incision was made on the sac, and the incision was extended to expose a mummified foetus, after which the foetus was removed. The foetal sac was excised following ligation of its omental attachment to the spleen. Haemorrhage was controlled and the abdominal cavity was explored. The uterus was observed to have involuted and the hysterotomy incision around the inter-cornual junction had healed with no evidence of dehiscence. However, a small bud measuring about 0.5 cm was observed around the middle portion of the left uterine horn (Fig. 3). The abdominal incision was then closed routinely.

Postoperatively, tramadol injection at 4 mg.kg^{-1} and Amoxicillin injection (Amoxinject LA R, Bremer Pharma, Warburg, Germany) at 15 mg.kg^{-1} were administered intramuscularly for one week. The resected foetal sac was fixed in 10 % formalin for histopathology. Histologic findings (Fig. 4) revealed mesenteric fat, loose connective tissue, smooth muscles and numerous congested vessels. On the basis of the abdominal ultrasound, operative findings and histopathological examination, a final diagnosis of secondary abdominal ectopic pregnancy was made.

DISCUSSION

Most reported cases of extrauterine pregnancy were usually an incidental finding [7]. They are often associated with previous normal parturition and have been reported several months after normal parturition [11]. In this case, the ectopic pregnancy was diagnosed six weeks after an

elective caesarean section was performed in the bitch. This case is possibly the first report of ectopic pregnancy after a caesarean section. The cranial location of the foetal sac between the spleen and the stomach might have probably been responsible for its non-recognition preventing subsequent removal during the elective caesarean surgery. It might also have been difficult to recognize the ectopic pregnancy as different from the uterine pregnancy in this dog during routine pregnancy ultrasonographic or radiographic examination because of the multiple number of conceptuses. Although, radiographic examination is occasionally done to predict the expected number of puppies to be removed during caesarean surgery, this information might not be available to the surgeon at the time of the elective caesarean surgery. Owing to this unusual experience, we suggest that abdominal cavity be explored properly before routine closure of abdominal incision or an immediate postoperative abdominal ultrasound should be done after an elective caesarean surgery is performed to detect the presence of any extrauterine foetuses.

Abdominal ectopic pregnancy is described to be secondary when a foetus enters the abdominal cavity because of rupture of the uterine wall, usually as a result of trauma or injury, creating a communication between the uterus or oviduct and the peritoneal cavity with subsequent propulsion of already gestating foetus into the abdominal cavity [11]. The bud on the left uterine horn might be the possible point of uterine rupture that led to the detachment of the foetus and possible relocation between the spleen and the stomach. The exact cause of uterine bud is unknown but might be associated with a tear prior to the elective caesarean section. Histopathological examination was not performed on the uterus because it appeared normal and intact grossly. However, it has been reported that the myometrium is regenerative with little or no scar tissue [7].

It is often difficult to diagnose extrauterine pregnancy in the bitch because the majority of dogs seems healthy and may not show any clinical signs [1]. However, ectopic pregnancy can be diagnosed using imaging techniques such as radiography, ultrasonography, diagnostic laparoscopy, endometrial biopsy and computed tomography [7]. Although ultrasonography is the most preferred diagnostic imaging modality, it may be difficult to separate an extrauterine foetus from those in the uterine location, making its diagnosis prior to elective caesarean surgery difficult. Thus, advanced imaging modalities such as computed tomography or mag-

netic resonance imaging (MRI) can play important roles [5]. A differential diagnosis of ectopic abdominal pregnancy should be made for any intact bitch with a mid-abdominal mass in a recently whelped bitch or bitches with recently performed caesarean section.

Several management methods have been reported for human ectopic pregnancies such as surgical treatment, and medical treatment [6]. Medical treatment involves the administration of methotrexate and is indicated only in patients in which the foetal sac is intact. Surgical resection of the foetal sac following laparotomy is indicated in patient with a ruptured extrauterine foetal sac and is the only reported treatment in the literature for ectopic pregnancies in animals [11]. In this bitch, the ectopic pregnancy was surgically resected. This allowed for exploration of the abdominal cavity.

In conclusion, canine ectopic pregnancies associated with caesarean surgery are rare in dogs. The patient described in this case had a secondary abdominal ectopic pregnancy with no scar tissue grossly visible in the uterus but a presence of a bud on the left uterine horn. An ectopic pregnancy should be included in the differential diagnosis of a dog presenting with an abdominal mass. Surgical resection of the foetus is recommended whether clinical signs are present or not. We also recommend that post-operative abdominal ultrasound should be done following caesarean surgery owing to the inability to detect this case during the initial caesarean section.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

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