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Case Report

SUCCESSFUL MANAGEMENT OF FOETAL MACERATION IN A PRIMIGRAVID AMERICAN PIT BULL

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ABSTRACT
Uterine inertia with open cervix is one of the factors predisposing retained dead foetus to foetal maceration. In most cases, such conditions lead to uterine infection, exposing the bitch to severe postpartum metritis, fetid uterine discharge, toxemia or septicemia. This case report described the successful management of foetal maceration in a post term primigravid American pitbull following early intervention. The bitch was not presented with the complaint that after successful mating and exhibiting visible signs of pregnancy, the bitch whelped nor had labour up to 73 days post mating. Prior to presentation, the client observed clear mucous vaginal discharge from the bitch, subsequent malodorous vulval discharge and greenish vulval exudate. Clinical examination involving mammary gland assessment, ultrasonography and microbial culture and sensitivity test using vaginal swab, amongst others, pointed to pregnancy and possible retained dead fetus *in utero*. The case was managed using tablet ciprofloxacin, 15 mg/kg PO q12h for five days, tablet metronidazole 10mg/kg PO q12h for five days, injection Oxytocin, 10 I.U, IM q24h for two days, and B complex injection, 3ml administered intramuscularly for three days. The uterus was flushed using normal saline once daily for three days. Foetal maceration was confirmed on observation of tissue autolysis and peeling of the skin of the dead foetus voided following treatment. The case was managed appropriately, evidenced by the recovery and good fertility performance of the bitch thereafter. This presented case emphasizes the need for early diagnosis and intervention for preservation of the fertility and health of dogs.

Keywords: foetal maceration, retained dead foetus, primigravid

INTRODUCTION
. Foetal maceration occurs as a consequence of failure of expulsion of an aborting foetus at the late gestation, probably due to uterine inertia, failure of the genital tract to contract and dilate sufficiently or due to abnormal disposition of the dead foetus (Drost, 2007). Sporadic cases of foetal maceration in dogs have been reported, and the condition is said to progressively lead to uterine infection with severe postpartum metritis, fetal emphysema, fetid uterine exudates and signs of toxaemia or speticaemia (Orfanau *et al*., 2010; Fasulkov *et al*., 2014; Erdoğan *et al*., 2019). Cases involving no overt signs of clinical illness also exist (Fasulkov *et al*., 2014). Before foetal maceration occurs, bacterial cells invade the uterus through the dilated cervix, infect the dead foetus, leading to putrefaction and autolysis of the soft tissues, and in some cases leave the foetal bones within the uterus (Long, 2009). The extent of putrefaction and lysis of the tissues depends on the period of occurrence and time of intervention. This case report describes the successful management of foetal maceration in a post term primigravid American pitbull following early intervention.

CASE DESCRIPTION

CASE PRESENTATION
A primigravid American pitbull (Figure I) aged one year and three months, was presented to the Veterinary Teaching

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Hospital, Michael Okpara University of Agriculture, Umudike with the complaint of delayed parturition. The bitch had no history of whelping as that was its first mating post attainment of puberty. The vaccination and deworming history was up to date. The owner complained that after successfully mating the bitch and observing visible signs of pregnancy (such as vomiting, poor appetite, depression, fever, engorged mammary glands), the bitch neither whelped any pup nor showed any sign of labour up to 73 days post mating. Three days prior to presentation, the client noticed a clear mucous vaginal discharge from the bitch which was subsequently followed by malodorous discharge from the vagina. On the day of presentation, the bitch also exuded a greenish fluid from its vagina, just before it was brought to the clinic.

Figure I: The primigravid American pitbull

CLINICAL EXAMINATION

The bitch was in good body condition and weighed 32kg. Examination of the external genitalia showed a non-engorged, non - inflammed vulva with fetid serosanguinous discharge. The vaginal mucosa appeared normal with no lacerations, necrotic areas or swelling. The cervix was dilated upto 3 cm. There was no abdominal distension, and no palpable hard mass was felt on abdominal palpation. The bitch did not show any clinical manifestations of approaching whelping, with no sign of labour. Milk was expressed from all the mammary glands on application of mild pressure. Clinical parameters showed normal mucous membrane, heartbeat at 89 beats per minute, pulse rate, 75 beats per minute, and capillary refill time, <2 seconds, all within the normal physiological range for canine species. Tentative diagnoses of retained foetal membranes, retained dead foetus or foetal maceration were made.

DIAGNOSIS

Diagnostic investigation was carried out using microbial culture and sensitivity testing of the uterine/vaginal discharge, haematological examination and ultrasonography. Culture and sensitivity test of the discharge revealed heavy growth of *Staphylococcus aureus* and *Escherichia coli* which were very sensitive (+++) to Tarivid®, Pefloxinand Ciprofloxacin, less sensitive (++) to Augumentin® and Gentamycin but resistant to Streptomycin, Ampicillin and Septrin (Figure II).

Haematological examination showed significantly decreased packed cell volume (24%), haemoglobin concentration (8.0 gm/dl) with normal leucocyte count (8.0 X $10^9/L$) (see Table I) (Figure II).

TABLE I: LABORATORY RESULT FOLLOWING HAEMATOLOGICAL EXAMINATION OF THE PATIENT

Parameters	Value obtained	Normal Range in Dogs
Haemoglobin (g/dL)	8.0	11.9–18.9
Packed cell volume (PCV) (%)	24	35–57
Total leucocyte Count (x 10^9/L)	8.0	5.0–14.1
Neutrophils (x 10^9/L)	49	0 - 3
Lymphocytes (x 10^9/L)	50	8 - 21
Monocytes (x 10^9/L)	01	2 - 10
Eosinophils (x 10^9/L)	00	0 – 9
Basophils (x 10^9/L)	00	0 - 1

Normal ranges for Dogs obtained from MSD Veterinary Manual (2023)

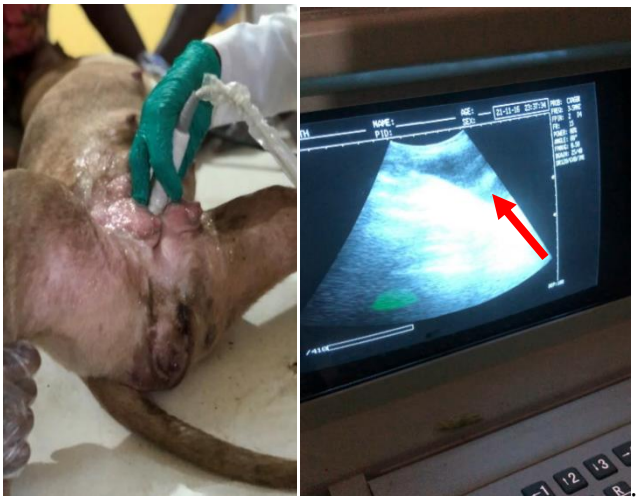

Figure II: Ultrasonographic Examination and Ultrasound image. Red arrow: image of non-viable foetus *in utero*

TREATMENT AND MANAGEMENT

Given the clinical observations, the bitch was placed on a broad spectrum antibiotic - ciprofloxacin (tablets), 15 mg/kg

PO q12h for five days, tab metronidazole 10mg/kg PO q12h for five days, injection Oxytocin, 10 I.U, IM q24h for two days, and B complex injection, 3ml administered intramuscularly for three days. The treatment was instituted while the laboratory results were awaited. The uterus was flushed using normal saline. The client was asked to present the patient the next day for follow up treatment and assessment. The laboratory results were presented two days after the treatment was instituted. The result showed high sensitivity of the microbes to ciprofloxacin. Therefore, the treatment was sustained.

FOLLOW UP TREATMENT AND OBSERVATION

The bitch was presented for follow up observations and further treatment the next day being the day after the first administration (day 1) of tab ciprofloxacin, tab metronidazole, oxytocin injection (IM) and vitamin B complex injection (IM). The client reported that the patient had voided a sac – like fluid filled tissue at home after treatment. The Clinical examination of the patient showed that it was in good body condition with elevated, though normal heart and pulse rates at 120 and 112 beats per minute, respectively. The uterus was further flushed with normal saline, since the fetid discharge persisted, and other treatment continued as stated. By the following day, the patient had voided a dead foetus (Figure III), and the fetid vaginal exudate had drastically reduced.

Figure III: Voided dead foetus undergoing maceration

Yellow arrow: areas of peeled skin and tissue autolysis. The foetus, on observation, was already undergoing tissue autolysis at the ventral areas of the lower abdominal region, the lumbar region and upper hind limb (yellow arrow in Figure III), proposed to be a sign of foetal maceration. Treatment continued as stated with further follow up appointments.

OUTCOME OF TREATMENT

The bitch recovered after treatment. She was successfully mated after heat detection and whelped eight live pups.

DISCUSSION

Retained dead fetuses, in cases where abortion cannot occur due to uterine inertia or intrauterine infections even with cervical dilation, may go through autolysis of their soft tissues, separating the tissues from the bones as a result of bacterial contamination and invasion of the dilated cervix, eventually resulting in foetal maceration (Bhattacharyya *et al*., 2015). Sporadic cases of foetal retention and maceration have been reported in dogs (Fasulkov *et al*., 2014; Erdoğan *et al*., 2019; Peker *et al*., 2021), and the condition in some cases, progressively leads to uterine infection, and in some rare cases, no systemic infection (Orfanau *et al*., 2010; Fasulkov *et al*., 2014). Uterine infection in such conditions may be associated with severe postpartum metritis, fetal emphysema, fetid uterine discharge, toxemia or septicemia (Feldman & Nelson, 2004; Orfanau *et al*., 2010). Yee Khong (2015) reported that fetal maceration takes place upon intrauterine fetal death (IUFD) and is characterized by enzymatic autolysis of cells and degeneration of connective tissue with evidences of desquamation and discoloration of the skin, and an eventual skin peeling. These features were observed on the foetus voided by the patient in this present report (yellow arrow in Figure IV), indicating that tissue autolysis had set in, though still at the early stage, considering the extent of autolysis observed. The extent of tissue autolysis depends on the length of time allowed for bacterial activity. The vaginal discharge observed in the present case was fetid and haemorrhagic. Similar observations were made by Johnston *et al.* (2001) and Bodh *et al.* (2014) in their reports on foetal maceration.

Vaginal culture is a very useful tool in the diagnosis of uterine infections, even though, it is not definitive as the result could show an array of vagina microflora. However, overgrowth of high numbers of an organism may be suggestive of an etiologic agent. In the current case, heavy growth of two bacteria – *E. coli* and *S. aureus* were observed. The normal ranges for packed cell volume and haemoglobin levels in dogs are 35–57% and 11.9–18.9g/dL, respectively, while the total leucocyte count falls within the range of 5.0–14.1 x $10^9/L$ (MSD Veterinary Manual, 2023). These values could be affected by late pregnancy as low PCV and HB values at this stage result from hemodilution and slight anemia which are consequences of increased plasma volume usually observed during the last stage of pregnancy (Dimço *et al*., 2013). Treatment of foetal

maceration may be surgical, involving removal of the fetuses, sometimes accompanied by hysterectomy or ovariohysterectomy, or non-surgical (medical) in fresh cases where foetal bones are not embedded within the uterus (Feldman & Nelson, 1996). Medical treatment in the management of retained dead foetus is advocated where the preservation of reproductive capacity of the bitch is intended. In such cases, parturition is induced using progesterone antagonists either alone or with prostaglandins and in some cases, treatment is done with oxytocin (Fontbonne *et al.*, 2009; Fieni & Gogny, 2009). Oxytocin was administered in this current case to induce whelping because of the dilated cervix in the bitch. Oxytocin acts directly on the smooth muscles of the uterus to induce rhythmic contractions. Ciprofloxacin is a broad-spectrum fluoroquinolone antibiotic suitable for treating gram-negative bacterial infections such as urinary tract infections, sexually transmitted infections, pneumonia, etc. It is also an appropriate treatment option in patients with mixed infections or patients with predisposing factors for gram-negative infections. Ciprofloxacin was recommended for treatment in this case as genital tract infections may have been one of the prominent causes of the reported case. Ciprofloxacin dosage recommendation for dogs ranges from 5 to 15 mg/kg PO q12h, to 20 to 25 mg/kg PO once a day in veterinary drug handbooks (Papich, 2017). Metronidazole is a nitroimidazole antimicrobial, amoebicidal and antiprotozoal agent used mostly for anaerobic bacteria and protozoa (Abdel Ziz *et al.*, 2016). Earlier and recent studies of Werk & Schneider (1988) and Abdel Ziz *et al.* (2016) support the concurrent use of metronidazole and ciprofloxacin in the treatment of mixed bacterial infections involving *Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Enterococcus faecalis* and *Clostridium spp* which was adapted in the therapeutic management of the current case. The treatment regimen employed in handling this case of foetal maceration gave satisfactory results.

CONCLUSION

Regular monitoring of pregnant dams is necessary for the detection of preparturient disorders which may affect maternal health and future fertility. Observation of abnormal conditions no matter how trivial, even if the dog does not show any overt clinical sign, should be reported to the veterinarian for early diagnosis and prompt intervention.

CONFLICT OF INTEREST: There is no conflict of interests in the handling and reporting of this case.

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