

Dystocia Due to Single Pup Syndrome in a Spitz Bitch: A Case Report

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Abstract

The present study describes a unique instance of single pup syndrome in a seven-year-old spitz bitch. Abdominal palpation revealed presence of swelling structure in abdominal area. Radiographic examination revealed presence of one number of fully oversized foetus in posterior presentation, dorso public position with flexed limbs in uterus. Ultrasonographic examination revealed absence of heartbeat, fetal movement indicating a dead foetus. Induction for whelping was performed with oxytocin, calcium gluconate, calcium lactobionate, DNS on marked greenish black discharge from genitalia but failed. Finally, C-section was performed to remove one dead oversized fetus and post-operative care was taken leading to uneventful recovery.

Keywords: Bitch, radiography, ultrasonography, single pup syndrome, Cesarean section

INTRODUCTION

Bitches being polytocous animals with litter sizes normally ranging between three to seven but rarely get pregnant with a single offspring in a gestation period, a condition known as “single pup syndrome” [1]. This is regarded as a high-risk pregnancy for the female. Single pup syndrome has several etiological causes, such as breeding geriatric females, early embryonic death, and reabsorption of embryos before calcification [2]. Single pup syndrome is characterized by the endometrium not releasing enough cortisol from the foetus to trigger release of PGF₂ α , leading to whelping and Corpus Luteum regression [3]. Pregnancy is regarded as grave due to varied conditions. In addition to infectious factors (bacterial, viral, and other) they include previous failure of pregnancy, brachycephalic breed, toy breed and singleton litters [4].

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Adrenocorticotrophic hormone (ACTH) and cortisol production in a single puppy at the end of gestation is thought to be insufficient to cause whelping [5]. Puppy dies in-utero since it has surpassed its placental supply of nutrition and oxygen for which a lifesaving hysterotomy can be the only option [6]. Single pup syndrome cases are uncommon in the literature [7, 8].

CASE STUDY AND OBSERVATIONS

A seven year old female Spitz (body wt. 10 kg) was presented to Veterinary Clinical Complex, CVSc & AH, OUAT, Bhubaneswar with the history of onetime breeding approximately 71 days ago and failure to deliver the pup including anorexia since last 3 days. Clinical examination revealed restlessness, rectal temperature of 102.6°F and per vaginal examination revealed greenish black discharge from the vagina with no protrusion of

fetal parts, there were no palpable foetal membranes too. Engorged mammary glands were observed during the examination.

Trans-abdominal palpation was done to ascertain the pregnancy status, but no reliable conclusion was made. The haematology parameters were also found to be normal. A right lateral abdominal radiograph revealed a single fully grown foetus with ventro-transverse presentation. A radiopaque bony skeletal structure was visible on survey of lateral (Figure 1) and ventro-dorsal (Figure 2) radiographs of the abdomen, which is confirmed to be a single-pup pregnancy.

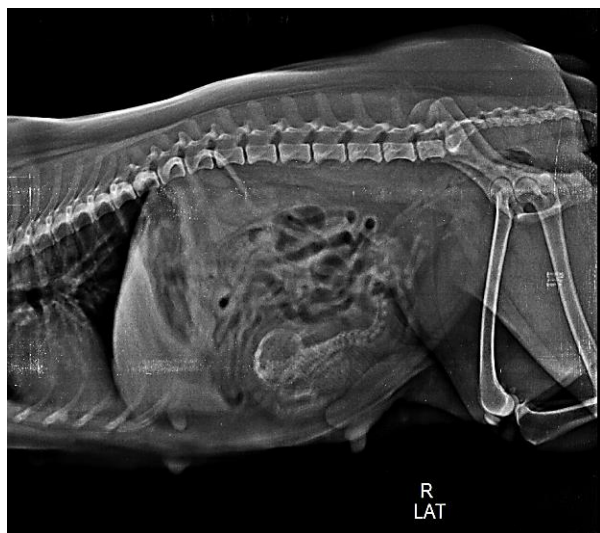


Figure 1. Right lateral radiograph of abdomen showing S-shaped radiopaque mass (foetus).

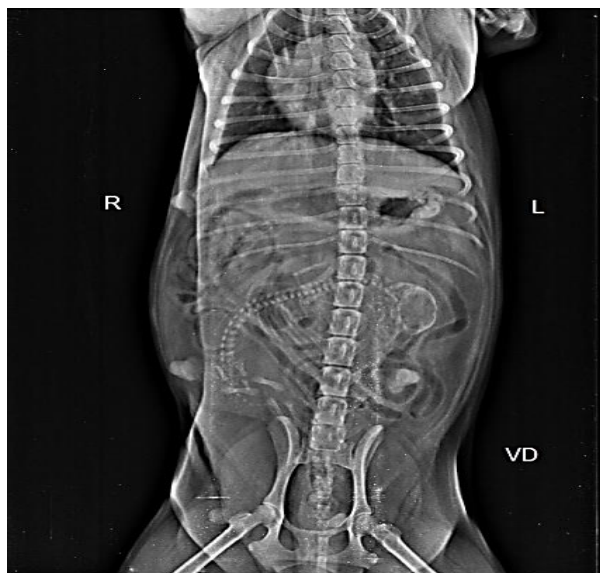


Figure 2. Ventro-dorsal view of bony skeletal structure of single pup in transverse presentation.

An abdominal B mode ultrasonography test was conducted with real-time ultrasound equipment equipped with a 3.5 MHz curved array transducer. The skin was shaved, and the abdomen was inspected following the application of acoustic gel to the transducer. Ultra-sonographic examination of the uterus revealed a hypoechoic region (the gestational sac) inside the border of uterine wall in the transverse plane and confirmed the absence of heartbeat in single fully-grown foetus. The case was diagnosed as dystocia and classified under foetal cause of dystocia, i.e., small litter size resulting oversize foetus in comparison to dam's birth canal leading to failure of whelping.

TREATMENT AND MANAGEMENT

The bitch was treated with whelping induction therapy as a medical management for dystocia brought on by single pup syndrome due to presence of a single dead foetus. Inj. Calcium Sandoz (10%) 10 ml iv containing calcium gluconate (10% solution, 9.3 mg/ml) was administered at doses ranging from 0.5 to 1.5 ml/kg. This is in response to the long-held belief that subclinical hypocalcaemia is the common cause of uterine inertia. After a waiting period of 30 min, Inj. Evatocin (oxytocin) was administered at a dose rate of 5 IU iv along with Inj. DNS 200 ml. Nonetheless, the bitch failed to react to the composite therapy within 24 hrs and, hence, a caesarean section (C.S.) was performed to preserve the life of dam. According to protocol, a ventral midline celiotomy was used to deliver a single deceased foetus (Figure 3) [9, 10]. The uterus was incised on grater curvature over a less vascular area. The dead oversize foetus along with attached placenta was removed carefully with due precautions. The uterus was irrigated with normal saline and metrogyl liquid [11]. The uterus was sutured with absorbable suture Catgut No. 2.0. The peritoneum and muscle layers were sutured with absorbable suture vicryl. The skin was sutured with non-absorbable suture trulon. The bitch received parenteral fluid (Inj. DNS and metrogyl), antibiotic (Inj. Ceftriaxone), pain killer (Inj. Meloxicam) therapy for 5 days [12]. The skin sutured was removed after 14 days on complete healing of the incision and the bitch recovered uneventually.

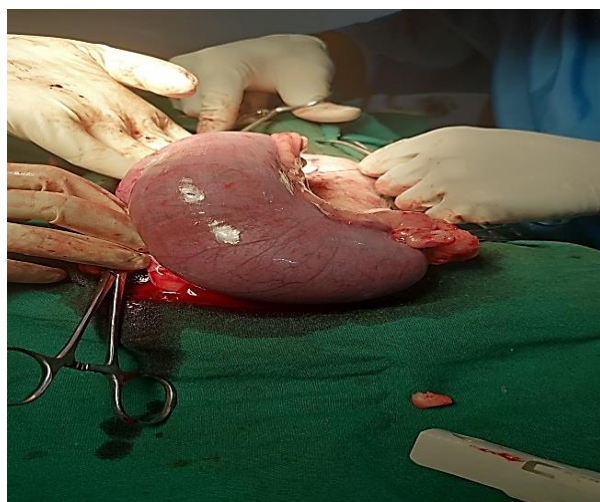


Figure 3. Intraoperative image of gravid uterine horn carrying single dead foetus.

DISCUSSION

The bitch is having zonary type of placenta during gestation to provide nutrition, oxygen, etc., to the developing fetus. Due to this zonary nature of the canine placenta, gestation after exceeding 48 hrs of the normal due date of whelping, there would be less nutritional and oxygen support to the fully developed, matured foetus, which results in intrauterine foetal death [13, 14]. Hence, it is highly necessary to confirm the length of gestation and ensure that foetus has attained the due date of parturition but not exceeded its maximal gestational age prior to parturition [15]. An inability of single oversized dead foetus inside the uterus to trigger or initiate parturition mechanism either before or after the approximate gestational age due to a lower cortisol secretion which is the cause of extending second stage of parturition (expulsion of foetus) ultimately leading to dystocia. The physiological prostaglandin-glucocorticoid route is not sufficient to start luteolysis mechanism in the ovary containing the corpus luteum [16, 17]. Prostaglandin mainly $\text{PGF}_2\alpha$ were released from placental tissue of uterine endometrial lining in response to cortisol originating from the foetal source. The foetal cortisol was mediated through foetal hypothalamic-pituitary-adrenal axis, which is activated by certain stress, like hypoxia, hypercapnea, etc., to the foetus and this stress is caused by reduction in nutritional and oxygen support from the placental source [18]. In single pup syndrome, failure of whelping may be caused by either incomplete dilatation of cervix of dam (ICD) or over size of foetus (may be live or mostly dead) or sometimes combinedly contribute to this condition that enhance the chance of complications in whelping.

According to another hypothesis, Hypoluteodism appears to be the preliminary cause for this single pup syndrome. This is characterized by lack of volume and function of luteal tissue in the ovary resulting in an insufficient release of pregnancy maintaining progesterone hormone causing death of embryo/foetus in utero and absorption of dead embryo during any stage of gestation. Progesterone is the main hormone responsible for the maintenance of pregnancy in animals which is secreted from corpus luteum present in ovary [19]. Many reasons of progesterone insufficiency can be cured by various managerial practices like proper feeding and housing facilities or medicinal therapies suggested by veterinarians. Time of breeding and age of bitch also contribute significantly to the occurrence of this single pup syndrome. Determination of actual time of breeding is very crucial for conception with maximum numbers of healthy growing and developing foetus inside the uterus. Also mating above 7 years of age in bitch, increases the chance of having lesser number of puppies or sometimes may even result in single puppy/litter [20, 21].

Bitches with presence of single foetus consequently had very large size predisposing to dystocia due to primary uterine inertia [22]. Jayakumar et al. (2017) [5] also stated that managing high risk pregnancies in canines with single pup inside uterus are to optimize maternal, foetal and perinatal health, maintain lactation along with maximize the survival of the pup. Management of these types of cases that help in safe birth of puppies and reduce risk to the dam should be taken up immediately where the foetus is already declared as dead [23, 24].

CONCLUSIONS

Single pup syndrome is always a unique type of cases where detected oversize fetus in radiography if found live in ultrasonography should be approached with immediate caesarean section to save both the dam and puppy.

Conflict of Interest

None.

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