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# Single puppy syndrome and its management in two cases

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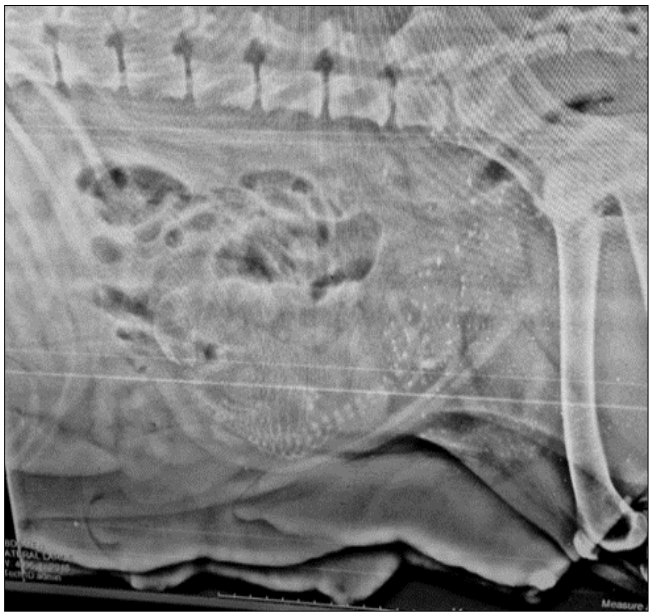
**Abstract**
Two dogs, a five year old female Doberman and a 2 year old nulliparous female Beagle were presented with a history of mating prior to 67 and 68 days respectively. In both the cases on vaginal examination revealed greenish discharges with incomplete cervical dilatation with no foetal parts felt in the birth canal. Abdominal radiography and ultrasonography in both the bitches indicated completely developed dead single puppies. Medical treatment with Inj Calcium Sandoz 10%, Inj Oxytocin and fluid therapy were used to effectively manage both the cases to hasten whelping. The present paper reports successful delivery of dead fetus following medical therapy in two cases.

**Keywords:** Dystocia, oxytocin, calcium, single puppy syndrome

## 1. Introduction
Dogs are polytocous animals, with litter sizes normally ranging between three to seven. However, there are rare cases of single fetal pregnancy in bitches, known as single pup syndrome, which is regarded as a high-risk pregnancy. In cases with single pup syndrome, the foetus may not release enough cortisol for the action of endometrial PGF2α, cause regression of CL and whelping (Vineeth Kumar, 2016) [4]. Dystocia can be caused by uterine inertia which is exerted due to presence of single pup with considerable increase in body size.
Pregnancy is regarded as high risk due to varied conditions. In addition to infectious factors (bacterial, viral, and other) they include advanced age of the male and female used for breeding, previous pregnancy failure, brachycephalic dogs and singleton litters (Shekher, 2020) [7].
Single puppy syndrome has multiple etiological causes, such as breeding older animals, death of embryos during early gestation, and embryos being reabsorbed before calcification (Pitroda, 2019) [6].

## 2. Materials and Methods
**Case 1:** A five year old Doberman bitch was presented to Veterinary Clinical Complex, NTR College of Veterinary Science, Gannavaram with a history of breeding approximately 67 days previously but not progressive for whelping.

**Case 2:** A two years old nulliparous Beagle bitch presented with history of mating prior to 68 days with greenish discharges and straining since 12 hrs of presentation.
Upon clinical examination, two bitches were restless and slight drop in temperature, there were no palpable fetal membranes or parts in the birth canal, along with mild greenish discharges in both cases. Engorged mammary glands were observed during the examination in both the bitches. Radiographic and ultrasound examination of bitches demonstrated fully grown dead single pup in both the cases. Based on clinical findings and diagnostic imaging techniques both case were categorized under dystocia due to single puppy syndrome.

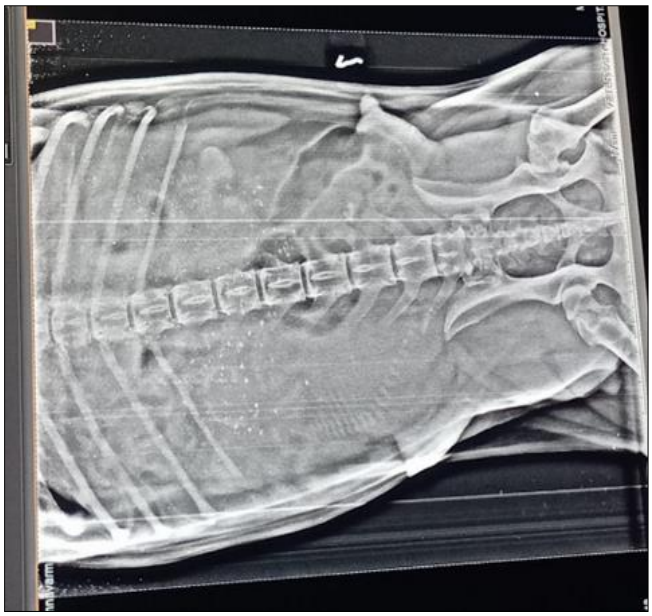


**Case 1:** Lateral radiograph showing single pup


**Case 2:** Lateral radiograph showing single pup

**Case 1:** Bitch with dead single pup

**Case 2:** Bitch with dead single pup



**Case 1:** Ventro Dorsal view with single pup

### 3. Treatment and Discussion

Both cases were treated with Inj Dextrose 20% IV, Inj Calcium Sandoz 10% IV and Inj Oxytocin to induce whelping. A lapse of after 30 minutes the bitches were examined per-vaginally and no fetal parts were palpable. The owner was advised to wait for four hours to assess the progress. The bitches whelped a fully developed dead fetus after a lapse of 4 hours. The bitches were administered with antibiotic therapy (Inj Cefotaxime @ 20 mg/kg bwt) for five days and a mild analgesic for three days (Inj Melonex @0.2 mg /kg bwt) intramuscularly.

### 3.1 Discussion

Due to Zonary nature of the canine placenta, once a foetus exceeds its due date by more than 2 days, there would be more for nutritional support than the placenta could provide, which resulted in intrauterine foetal death (Abhay Kumar Meena, 2021) [1].

Prostaglandin were released from placental tissue in response to foetal cortisol. The foetal cortisol was mediated through fetal hypothalamic-pituitary-adrenal axis which was activated

by stress of the fetus possibly in response to a reduction in nutritional support from the placenta (McLean, 2012) [5]. The failure of a single fetus to induce parturition mechanism after or before the expected date of gestation was due to reduced production of cortisol by the foetus.

It was hypothesized that effective luteolysis could not be initiated via prostaglandin glucocorticoid pathway (Ganesan, 2017) [2]. Also bitches with singleton foetus consequently had very large puppies predisposing to dystocia due to primary uterine inertia (Jaykumar, 2017) [3]. The goals of managing high risk pregnancies from single pup are to optimize maternal, fetal and perinatal health, maintain lactation and maximize the survival of the pup (Jaykumar, 2017) [3].

Medical management upon completion of term could successfully manage such cases. Therefore, the current study concluded that uterine inertia caused by a single puppy could be diagnosed with diagnostic techniques, such as radiography and ultrasound, and successfully treated with fluid therapy and oxytocin.

## 4. Conclusion

Single pup syndrome, is regarded as a high-risk pregnancy as the single fetus is insufficient to initiate luteolysis after or before the expected date of gestation owing to its reduced concentration of cortisol. Early diagnosis by using radiography and ultrasonography is helpful. Medical management can be successfully carried out with intravenous Injections of 20% Dextrose, 10% Calcium and Oxytocin to induce whelping.

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