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Srivati Venkatesh

Post Graduate Scholar,
Department of Veterinary
Gynaecology and Obstetrics,
Rajiv Gandhi Institute of
Veterinary Education and
Research, Kurumbapet,
Puducherry, India

G Shalini

Ph.D. Scholar, Department of
Veterinary Gynaecology and
Obstetrics, College of Veterinary
and Animal Sciences, Mannuthy,
Thrissur, Kerala, India

K Murugavel

Professor, Department of
Veterinary Gynaecology and
Obstetrics, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Kurumbapet, Puducherry, India

H Hemalatha

Assistant Professor (C),
Department of Veterinary
Gynaecology and Obstetrics,
Rajiv Gandhi Institute of
Veterinary Education and
Research, Kurumbapet,
Puducherry, India

S Kantharaj

Associate Professor and Head of
the Department, Department of
Veterinary Gynaecology and
Obstetrics, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Kurumbapet, Puducherry, India

Corresponding Author:

S Kantharaj

Associate Professor and Head of
the Department, Department of
Veterinary Gynaecology and
Obstetrics, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Kurumbapet, Puducherry, India

Management of single puppy syndrome in a Mudhol hound dog following Artificial insemination: A case report

Srivati Venkatesh, G Shalini, K Murugavel, H Hemalatha and S Kantharaj

Abstract

A 6.5-year-old female Mudhol hound bitch with a history of vaginal bleeding was brought for breeding advice. Exfoliative vaginal cytology revealed more than 90% of superficial nucleated and a nucleated keratinized cells. However, the bitch was reluctant to show sexual interest in the male dog. Semen was collected from the male dog on alternative days for two days and after evaluation of semen, it is used to inseminate the bitch. At full term, vaginal examination revealed a closed cervix with no impending signs of whelping. Ultrasonography indicated the presence of a single fetus with a feeble heartbeat. An emergency cesarean section was performed and a live female fetus was removed. The dam and puppy recovered uneventfully.

Keywords: Artificial insemination, cesarean section, mudhol hound, single puppy syndrome

1. Introduction

India has the privilege of having excellent dog breeds like the Mudhol Hound, which was the first Indian breed to join the Indian Army [1]. It was originally a hunting dog but is now used for companion purposes and is reared mainly in the Bagalkot and Bijapur districts of north Karnataka by villagers [2]. Canines are polytocous species, with a typical litter size ranging from three to seven [3]. But occasionally there may be the presence of a solitary fetus, which is referred to as single pup syndrome [4] and it is regarded as a high-risk pregnancy in dogs due to prolonged gestation, dystocia from relative fetal oversize and primary uterine inertia caused by inadequate cortisol release from a single fetus [5] to initiate prostaglandin synthesis in the endometrium, which leads to luteolysis and initiates parturition [6]. The maturation of the fetal hypothalamic-pituitary-adrenal axis facilitates the release of cortisol due to fetal stress [7]. Due to the zonary nature of the canine placenta, once a fetus exceeds its due date by more than two days, it will demand more nutritional support than the placenta can provide, resulting in intrauterine fetal death. Hence, it is important to ensure that the fetus has attained, but not exceeded, its maximum gestational age before delivery. The objectives of overseeing high-risk single puppy syndrome pregnancies are to optimize maternal, fetal, and perinatal health and maximize the pup's survival [5]. Artificial insemination (AI) is the process of depositing semen into the female reproductive tract [8]. Behavioural problems in both sexes necessitate the adoption of AI techniques [9]. Artificially inseminated dams produce small litter sizes than those impregnated naturally. This is likely due to more sperm dying during the process of collection and insemination [10]. According to American Kennel Club (AKC) records, natural service produces larger litter than AI [11]. Hypoluteoidism, where the effective functioning of the luteal tissue is compromised, appears to be one of the causes of single-puppy syndrome [12].

2. Case History and Observation

A 6.5-year-old mudhol hound nulliparous bitch maintained at Livestock Farm Complex (LFC), RIVER, was referred to the small animal unit of VGO, Veterinary Clinical Complex, River for breeding advice. It was reported that the animal was showing procedural bleeding for the past 8 days. History revealed that the bitch was reluctant to show interest in the male dog during previous breeding seasons.

The last proestrus bleeding was six months ago. As the female was not showing sexual interest in the male and was unwilling to copulate naturally, it was decided to adopt the assisted reproductive technique, i.e., AI. Based on Exfoliative vaginal cytology done on the 9th day of proestrus bleeding, it was predicted that the bitch was in oestrus. Fresh semen was collected (Fig. 1) from the mudhol hound dog by digital manipulation technique in the presence of estrus bitch on day 10. The pre-sperm, sperm-rich and post-sperm fractions were pooled and used for the semen evaluation (Table. 1) before insemination. AI (Fig 2) was performed on days 10 and 12 of the proestrus bleeding with freshly collected semen. Four weeks later, the female dog was subjected to ultrasonography and confirmed as pregnant. A second re-examination later revealed the presence of a single fetus with a gestational average of 54 days. Even after the completion of the gestation period of 63 days, the female has not shown any signs of impending whelping. Ultrasonography revealed sluggish fetal movement with a feeble heartbeat. Hence, it was decided to perform a C-Section.

Table 1: Evaluation of Semen

Parameters	Method	Result
Volume	Graduated Test Tube	7 ml
Colour	Visual technique	Opalescent
Progressive Forward Motility	Phase Contrast Microscope	80%
Sperm Concentration	Haemocytometer	170 million/ml
Live Spermatozoa	Eosin-Nigrosin	87%
Total Sperm Abnormality	Eosin-Nigrosin	6%

3. C-Section

Pre Anaesthetics Glycopyrrolate@0.02 mg/kg b.wt S/C & Diazepam@0.5 mg/kg b.wt I/V was given. Under general Anaesthesia plain propofol@4 to 6 mg/kg b.wt I/V for both Induction and Maintenance was given. C-Sections was performed through a mid-ventral incision as per standard techniques. A single live Female pup was removed (Fig.4). The post-operative care was given for five days with antibiotic Taxim and supportive therapy. Under careful observation, both the dam and the pup recovered uneventfully (Fig. 5).



Fig 1: Semen Collection



Fig 2: Artificial Insemination



Fig 3: Cesarean section



Fig 4: A single live female pup with its dam



Fig 5: Uneventfully recovery of pup and dam

4. Conclusion

From the above case report, it was concluded that AI may be one of the reasons for single-puppy syndrome in bitches. Single puppy syndrome can easily be managed by performing a C-section at the right time.

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