

## **Case Report**

### **Prolonged gestation associated with fetal abnormality in a Holstein-Friesian crossbred cow**

**D Biswas, B Chakma, S Biswas and AK Paul\***

Department of Medicine, Surgery and Obstetrics, Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University, Barishal-8210, Bangladesh

#### **Summary**

A Holstein-Friesian cross-bred cow was presented due to gestation being prolonged to >365 days. The presence of a dead fetus was determined by examination per rectum. Induction of parturition was attempted using dexamethasone and a PGF<sub>2α</sub> analogue, but the cow did not respond. The fetus was therefore removed two days later by caesarian surgery. The fetus had gross abnormalities of the head, but the brain was at least partially intact. The cow recovered uneventfully after surgery. It was considered that the gross prolongation of gestation was due to a developmental perturbation of the hypothalamo-pituitary-adrenal axis that had prevented the initiation of parturition.

#### **Clinical Findings**

A first parity Holstein-Friesian crossbred cow was presented with prolonged gestation. It had been inseminated on July 8, 2021 and, after 4 months, pregnancy was confirmed and an expected date of delivery of April 8, 2022 was determined. The cow did not deliver on that date, and even after 356 days there were no signs of parturition. General clinical examination showed that the cow was healthy (weight: 350 kg, BCS: 2.5, rectal temperature: 101.4°F, respiration rate: 20/min, haemoglobin: 12 g/dL, mucous membranes: pink). Examination of the reproductive tract showed the presence of a fetus of relatively normal size for full term, but an absence of any fetal movements. It was determined that the fetus was dead. The cervix was closed.

#### **Clinical Management**

Induction of parturition was attempted using a standard PGF<sub>2α</sub>/corticosteroid induction regimen. The cow was therefore given 500 µg cloprostenol (Ovuprost<sup>®</sup>, Renata Ltd., Dhaka, Bangladesh) and dexamethasone (Dexa Vet<sup>®</sup>, Techno Drugs Ltd,

---

\*Corresponding author:- E-mail: ashitpaul@pstu.ac.bd

DOI: <https://doi.org/10.3329/bvet.v41i1.78675>

Received: 12 March 2023; Accepted: 8 December 2024; Published: 24 December 2024

Dhaka, Bangladesh, @ 7.5 mg/kg) intramuscularly. However, the cow had not delivered within 48 hours, so it was decided to remove the fetus by caesarean surgery. Surgery was performed as described by Cox (1987), under a left-sided paralumbar vertebral block (2% Lidocaine HCl: Jasocain<sup>®</sup>, Jayson Pharmaceuticals Ltd., Dhaka, Bangladesh). After opening of the abdominal wall of the left flank, the uterus was partially exteriorised and incised along the greater curvature of the pregnant horn. The fetus was removed and the fetal membranes were separated from the maternal caruncles. Part of uterine wall was devitalized and there were areas of adhesion to the caecum (Fig. 1). There was a hemorrhagic remnants of the corpus luteum (CL) in right ovary (Fig. 2). There was debate as to whether the condition of uterus was an indication for ovariectomy, but it was finally decided not to do so. Post-surgery, the peritoneal cavity was washed with normal saline and the abdominal wall closed in separate layers. Post-surgical analgesia was provided by meloxicam (0.5 mg/kg: Mel-Vet<sup>®</sup>, ACME Laboratories Ltd., Dhaka, Bangladesh) and pheniramine maleate (0.4 mg/kg), respectively: Antihista-Vet<sup>®</sup>, Square Pharmaceutical Ltd., Dhaka, Bangladesh). The cow was also given 20 mg/kg ceftriaxone sodium (Trizon vet<sup>®</sup>, ACME Laboratories Ltd, Dhaka, Bangladesh) intramuscularly for 7 consecutive days. The wound healed without any complication and, three months after the operation, the cow looked healthy and did not express any unfavorable behavioral signs.

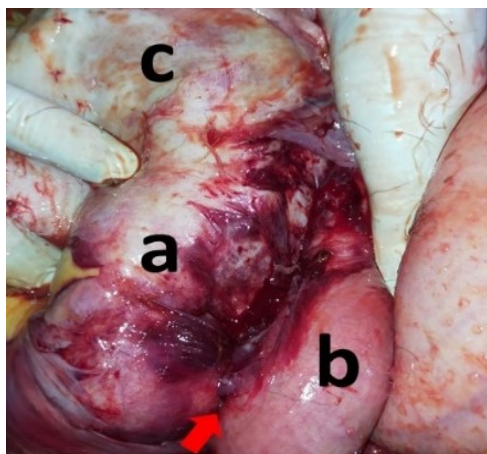


Fig. 1: Adhesions (red arrow) present between part of the caecum (b) and uterus (b), with areas of devitalisation of the uterus (c) also present.



Fig. 2: Hemorrhagic right ovary with remnants of corpus luteum.

### Fetal Abnormalities

The fetus (Fig. 3) weighed about 30 kg. Its torso and limbs appeared relatively normal, and there was no sign of limb ankylosis or deformity. The head was grossly abnormal, with relatively microcephaly and substantial underdevelopment of the lower jaw. The

orbits appear to have undergone relatively normal development, although the eyes were sunken and dehydrated. It was not possible to undertake a complete necropsy of the brain, pituitary gland and adrenals.



**Fig. 3:** The fetus, showing a relatively normal torso and an absence of ankylosis or mal-development of the limbs. The head showed gross mal-development of the lower jaw, non-development of the eyes within relatively normal orbits.

## Discussion

Prolonged gestation is said to occur when a cow does not give birth within a normal gestation period. Prolonged gestation is a rare condition, whose aetiology is usually associated with fetal death and/or perturbation of the fetal hypothalamo-pituitary-adrenal axis. Prolonged gestation often occurs in cases of fetal death and either maceration *in utero* or mummification (Aiello, 2016; Mahajan *et al.*, 2022), due to the inability of the fetus to initiate the endocrine cascade of the initiation of parturition. In both of these cases, the death of the placenta means that parturition cannot be initiated by exogenous corticosteroids. However, as these pregnancies are generally associated with the presence of the CL of pregnancy (Conrad and Baker, 2013), termination of the prolonged gestation can be achieved through exogenous  $\text{PGF}_{2\alpha}$ .

Prolonged gestation is also very characteristically associated with fetal abnormalities that affect the brain, hypothalamus, pituitary and/or adrenal gland to the extent that such abnormalities were pivotal to the discovery of the role of the fetal adrenal axis in the initiation of parturition (Buczinski *et al.*, 2007; Cornillie *et al.*, 2007; Ebru *et al.*, 2019; review from Sheng *et al.*, 2021). However, the fetus in such cases is often enlarged, sometimes massively so, particularly in the case of headless 'monsters' (Purohit *et al.*, 2012; Sharma *et al.*, 2013). In the present case, the fetus was not grossly enlarged as,

even though a calf weighing ~30 kg is large for a cow weighing only 350 kg, it was within normal limits for calf weight. The absence of widespread fetal limb abnormalities suggests that the motor areas of the brain, at least, were likely to have been functional at the time when limb development was taking place.

Also, in the present case, the placenta appeared to be viable, inasmuch as there were no signs of necrosis/decay, and there had to be manual separation of the maternal and fetal cotyledons. Likewise, the presence of a haemorrhagic CL would suggest that the CL of pregnancy had been present at the time of induction of parturition (i.e. it had been lysed by the exogenous PGF<sub>2α</sub>). It therefore seems probably that the prolonged gestation was due to a perturbation of the fetal mechanisms that induce the onset of parturition, rather than a failure of the maternal or placental endocrine mechanisms.

Other causes of prolonged gestation can include hormonal imbalance, fetal death, dystocia, gross uterine infection and cervical fibrosis (Buczinski *et al.*, 2007; Cornillie *et al.*, 2007). It may also be seen in calves developed through cloning, *in vitro* fertilization, and embryo transfer as part of the 'large newborn calf' syndrome (Norman *et al.*, 2007; Kornmatitsuk *et al.*, 2002). However, none of these appear to have pertained to the present case.

Induction of parturition is generally regarded as a reliable tool for clinical management of prolonged gestation and fetal oversize in cattle (Singha and Paul, 2019), such that dexamethasone alone or in combination with PGF<sub>2α</sub> analogue is widely used for emergency induction of parturition (Lewing *et al.*, 1995; Shukla *et al.*, 2008). In the present case, hormonal induction failed to initiate parturition, so caesarean surgery remained the only option to remove the fetus.

## References

- Buczinski S, Bélanger AM, Fecteau G, Roy JP 2007: Prolonged gestation in two Holstein cows: Transabdominal ultrasonographic findings in late pregnancy and pathologic findings in the fetuses. *Journal of Veterinary Medicine Series A* **54** 624-626.
- Conrad KP, Baker VL 2013: Corpus luteal contribution to maternal pregnancy physiology and outcomes in assisted reproductive technologies. *American journal of physiology. Regulatory, Integrative and Comparative Physiology* **304** R69-R72.
- Cornillie P, Van den Broeck W 2007: Prolonged gestation in two Belgian blue cows due to inherited adenohipophyseal hypoplasia in the fetuses. *Veterinary Record* **161** 388-391.
- Cox JE 1987: *Surgery of the reproductive tract in large animals*. 3<sup>rd</sup> revised edn. Liverpool University Press, Liverpool, L69 3BX, United Kingdom.
- Ebru K B, Ahmet A, Barış G, Gülnaz Y M, Ahmet G, Abdulkadir K 2019: Prolonged gestation in a Swedish Red cow due to fetal unilateral adrenal gland dysgenesis. *Turkish Journal of Veterinary and Animal Sciences* **43** 292-295.

- Kornmatitsuk B, Veronesi MC, Madej A, Dahl E, Ropstad E, Beckers JF, Forsberg M, Gustafsson H, Kindahl H 2002: Hormonal measurements in late pregnancy and parturition in dairy cows—possible tools to monitor foetal wellbeing. *Animal Reproduction Science* **72** 153-164.
- Lewing FJ, Proulx J, Mapletoft RJ 1985: Induction of parturition in the cow using cloprostenol and dexamethasone in combination. *Canadian Veterinary Journal* **26** 317-322.
- Mahajan M, Prasad S, Singh V, Tevatia GS, Vermam P 2022: Prolonged gestation due to mummified fetuses in conjunction with normal fetus in Barbari Doe. *Indian Journal of Veterinary Science and Biotechnology* **18** 149-150.
- Aiello SE 2016: *The Merck Veterinary Manual*, 11<sup>th</sup> edn. Merck and Co., Inc, Kenilworth, NJ, USA 1377-1380.
- Norman H, Wright J, Kuhn M, Hubbard S, Cole J, VanRaden P 2009: Genetic and environmental factors that affect gestation length in dairy cattle. *Journal of Dairy Science* **92** 2259-2269.
- Purohit GN, Kumar P, Solanki K, Shekher C, Yadav SP 2012: Perspectives of fetal dystocia in cattle and buffalo. *Veterinary Science Development* **2 (2e8)** 31-42.
- Sharma A, Kumar P, Singh M, Vasishta NK, Jaswal R 2013: Rare fetal monster in Holstein crossbred cow. *Open Veterinary Journal* **3** 8-10.
- Sheng JA, Bales NJ, Myers SA, Bautista AI, Roueinfar M, Hale TM and Handa RJ 2021: The hypothalamic-pituitary-adrenal axis: development, programming actions of hormones, and maternal-fetal interactions. *Frontiers in Behavioral Neuroscience* **14** 601939.
- Shukla SP, Pandey A, Nema SP 2008: Emergency induction of parturition in Buffalo. *Buffalo Bulletin* **27** 148-149.
- Singha S, Paul P 2019: Induction of parturition in cattle. *Agriallis* **5** 16-19.