

Case Report

Caesarean Operation in Cow due to Prolonged Pregnancy

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ABSTRACT

Prolonged pregnancy is defined as a pregnancy that lasts for more than 294-days compared with term gestation which is between 260 and 293-days. This case report was prepared with the aim of describing and documenting the surgical procedures, techniques of cesarean section and its outcome on eight-years-old crossbred cow that was referred to the veterinary hospital, Mekelle University from a field; Edaga Hamus Veterinary Clinic. According to the owner's history, the cow was presented to the clinic with an extended gestational period over 345-days than anticipated according to their own record. Thus, based on the history and clinical findings, the case was diagnosed as prolonged pregnancy. After aseptic preparation of the surgical site, stabilizing the animal and locally desensitizing the incision area; a vertical skin incision with a distance of approximately (~40 cm wide) on the left flank region approximately (~10 cm) below the lumbar transverse process. After the incision of the abdominal muscles and uterus, the non-viable and abnormally oversized calf was taken out with the help of an assistant. Moreover, the uterus was filled with excess and abnormal dark brown colored blood and was properly drained, washed with sterile isotonic saline solution. The uterus was closed using a double layer of Utrecht suturing pattern whereas the peritoneum and abdominal muscles were separately closed with a continuous lockstitch pattern and simple interrupted pattern using 2-0 size sterile absorbable polyglycolic acid, respectively. After that, the skin was closed using silk 2-0 size in a horizontal interrupted mattress. Lastly, with proper antibiotic follow-up, dressing and cleaning of the surgical site, the cow was successfully recovered after two months.

Keywords

Dairy cow; Caesarean section; Prolonged pregnancy.

INTRODUCTION

In cattle, the duration of pregnancy is affected by factors like the breed of the cow and bull, calf sex, single or multiple birth, the parity of the cow, the fetal genotype and environmental factors (nutrition, ambient temperature, and the season of the year). Among these factors, the breed of cattle has the greatest impact on gestation length. As compared to the *Bos taurus* species where mean gestation length varies between 279-days in *Holstein-Friesian* to 287-days in *Charolais*, the gestation length is slightly longer in breeds of the *Bos indicus* species (*Zebu* cattle have a mean gestation length of 296-days). Within breeds, individual bulls may sire calves with longer gestation length than normal, leading to a higher incidence of dystocia.¹⁻³

Furthermore, prolonged gestation in an animal can be diagnosed due to poor record, misdiagnose of pregnancy, and miscalculation of the prospective calving date.⁴ True prolonged gesta-

tion is relatively uncommon; the common denominator is a defective hypothalamic-pituitary-adrenal axis. Suspected cases should be investigated and examined with care. Accordingly, in some cases, the dead or severely deformed fetus is often of little economic value. The life of the dam may be at risk of prolonged gestation is allowed to continue, and termination of the abnormal pregnancy is recommended.^{4,6}

Prolonged pregnancy in dairy cattle has been described previously as an unfrequented event in pregnancy. It commonly results from fetal anomalies and requires differentiation from fetal loss or fetal mummification because in both scenarios affected cattle fail to show signs of impending parturition at their due date. Mostly, the cause of prolonged gestation cases involves the abnormalities in the fetal pituitary gland and the fetal pituitary-adrenal axis.^{4,7,8}

According to different studies, the condition was report-

ed in *Holsteins* and *Brown Swiss* cattle that is thought to represent a recessive trait. During prolonged gestation, most dams appear normal without showing signs of udder edema or pelvic laxity at the predicted calving date. Gestation may be prolonged 1 to 3 months or more. Rectal palpation of the cow reveals a large fetus. Besides, errors in breeding dates or records must be ruled out before confirming the condition. Spontaneous parturition seldom occurs in true prolonged gestation unless the fetus dies in utero. If the fetus is born alive, it will be non-viable and most calves with this condition die shortly before, during, or within 48-hours of birth.^{5,9,10}

In addition, prolonged gestation in dairy cattle can occur due to fetal anomalies and should be differentially diagnosed from dead or mummified fetus since it fails to show signs of parturition at their prospected calving date. Besides adrenal abnormalities, calves produced by cloning, *in vitro* fertilization, and embryo transfer as part of the “large newborn calf” syndrome are also the cause of prolonged gestation. It also is possible that adeno-hypophyseal and pituitary abnormalities coexist or contribute to adrenal insufficiency in such fetuses.^{3,6,11}

Caesarian section, also called laparohysterotomy, means the extraction of the fetus or foeti from the mother animal, through a surgical opening in the abdominal wall and the uterus. It is commonly indicated in cases of dystocia when a calf cannot be delivered by normal parturition cascade. There are different available surgical approaches for bovine caesarean section: the standing left paralumbar celiotomy, standing right paralumbar celiotomy, recumbent left paralumbar celiotomy, recumbent right paralumbar celiotomy, recumbent ventral midline celiotomy, recumbent ventral paramedian celiotomy, and the standing left oblique celiotomy. Each has its own advantages and disadvantages. The selection of an appropriate approach depends on the type of dystocia, the health status of the cow, the environmental conditions, the availability of assistance, and the surgeon's preference. The indications for performing a caesarean section include maternal and fetal factors. Maternal indicators include immature heifers, pelvic deformities, failure of cervical dilation, uncorrectable uterine torsion, uterine tear, hydrops, a long gestation period, and prepartum paralysis.^{12,13} The current case report is prepared with the aim of describing the surgical management of caesarean section in dairy cow due to prolonged pregnancy with no sign of parturition is described.

FIELD CASE REPORT

Case History and Clinical Examination

Eight-years-old healthy *Holstein Friesian* cross-bred dairy cow with a good body condition was presented to the Edaga Hamus Veterinary Clinic before a week and the case was referred to the Veterinary Hospital, College of Veterinary Science (CVS), Mekelle University (MU), Ethiopia. In the former veterinary clinic, the cow was diagnosed for prolonged pregnancy that takes about 321-days and there was also no sign of labor and parturition. The owner also told as a proper record at the time of insemination and proposed dated of parturition was taken and recorded. Besides, the cow has a history of three parity and any abnormal as well as disease con-

dition was recorded during the gestational period. Then, the veterinarian referred the case immediately to the Veterinary Hospital, CVS, MU. A detailed clinical examination was performed by taking all the necessary parameters. Further close examination of vital organ parameters such as heart rate, respiratory rate, pulse rate, and mucous membrane was made and found within the physiological limits. In addition, upon rectal examination, most organs and structures of the fetus were palpated, but there was no response from the fetus. Accordingly, based on the history and clinical observation, the case was diagnosed as prolonged pregnancy and the team decided to be managed the case surgically by caesarean section.

Pre-operative Preparation of Surgical Site of the Cow

The cow was restrained adequately and the skin surface on the left paralumbar fossa was prepared aseptically by washing with water, soap and Salvon® (Cetrimide 3% and Chlorhexidine gluconate 0.5% solution). Then the hair was first clipped with sharp scissor and shaved with a razor blade and cleaned thoroughly with a standard solution of Salvon®. Finally, the area was scrubbed three times with tincture iodine 2% solution to decrease the microbial load in the area and left dried till readying for caesarean section.

Animal Handling and Anesthetic Protocol

The cow was properly restrained with the combination of physical and chemical methods. Upon the physical restraining technique, the cow was handled with rope-assisted by personnel and fixed at one place against a well-built wood to adequately restrain the cow in standing position (Figure 1A). In the chemical restraining technique, the cow was first sedated with Domidine® (Detomidine hydrochloride, manufactured by Dechra Veterinary Products Ltd., United Kingdom) with a dose of 20 µg/kg intravenously. In addition, regional anesthesia of the left flank area was done using two percent lidocaine (Lidocaine hydrochloride 2%, Vedco Inc. Saint Joseph Missouri, USA) to desensitize the abdominal muscle and alleviate pain during surgical procedure (Figure 1B). This was done by loading the lidocaine in a syringe with 18 gauge, 10 cm needle, 5 ml per each paravertebral space. The needle was inserted halfway between the intervertebral transverse process and the needle is slightly angled to reach and deposit the lidocaine in the sub-arachnoid space. Finally, two linear infiltrations were made in the pattern of inverted ‘T’ using local anesthetic lidocaine (60 ml) to desensitize and put in sufficient analgesia enclosing the site of incision and waited for 10-minutes (Figure 1C).

Surgical Correction and Treatment

Following proper physical and chemical restraining and aseptic preparation of the surgical site (left flank), the cow was kept on appropriate direction for the next surgical procedure. A sharp vertical skin incision with a distance of approximately (~40 cm long) was made on the left flank region approximately (~10 cm) below the lumbar transverse process (Figure 1D). After blunt dissection of the skin from the subcutaneous tissue, the incision was continued through the external and internal abdominal oblique, transverse abdominal muscle and peritoneum. Then all muscular layers to-

gether with skin were grasped with handheld retractor to get sufficient surgical field and exposure to the uterus. Upon insertion of a finger, slight adhesion of uterus with the lower abdominal wall was found and it was gently detached and the uterus was retracted from its right position to the left one.

forceps and topical infiltration of epinephrine on bleeding site depending on the site and condition.

Later, uterus was closed using a double layer of Utrecht suturing pattern with 1-0 size sterile absorbable polyglycolic acid (Shandong Sinorgmed Int'l Co., Ltd, China). The uterus and surrounding area were rinsed copiously with sterile isotonic saline solution and replaced in the abdomen to its normal position. Some fluid that leaks to the peritoneum was also sucked with sterile sponge and gauze. After proper abdominal lavage, the peritoneal incision was closed with a continuous lockstitch pattern using 2-0 size sterile absorbable polyglycolic acid (Figure 1E). Besides, all three abdominal muscular layer were separately closed with simple interrupted pattern using 2-0 size sterile absorbable polyglycolic acid. Later, the skin was closed using silk 2-0 size in a horizontal interrupted mattress. Lastly, the area was properly cleaned and dressed with a 2% tincture iodine solution and admitted home (Figure 1G).

Post-Operative Follow-Up and Result

Intermittent bleeding was noticed following skin suture but it is normal and helps to clean the wound unless continued for a long period. The dressing of the wound was done at second and third days post-operative up to 14-days until it completely healed. Besides, Ceftriaxone (Dose-500 mg/kg) Parkinson Pharma, India) was also administered Intravenously (IV) for five days post-operation at the farmers' farm. Tetracycline wound spray was also applied around the wound.

The owner was also advised to closely monitor the cow and avoid leaving the cow on the grass but advised to allow some exercise and supplied with good nutrition to facilitate wound healing. After 20-day post-operation, the wound was healed completely and after two months of follow-up, the cow was under good health status.

DISCUSSION AND CONCLUSION

Prolonged pregnancy in cattle is frequently associated with various congenital anomalies which classically include hypophyseal aplasia. Adenohypophyseal aplasia has been reported in various dairy breeds as a cause of prolonged gestation. The genetic component of the defect has been confirmed in Jersey and Guernsey breeds but not in Holstein. Definitive diagnosis of prolonged pregnancy is difficult since possible error of insemination date is almost impossible to eliminate. Pre-mature fetal death with fluid resorption by the dam is also another possible misdiagnosis. Therefore, assessment of the fetus and its annexes is valuable to determine fetal health and macroscopic anomalies.^{7,14,15} This is in agreement with the current case report regarding the assessment of the case.

Most surgeons use a standing left paramedian celiotomy to perform caesarean sections in the cow. In most cases, the left oblique approach is preferable because of less peritoneal cavity contamination and with less interference of intestinal content during the exteriorization of the uterus. Alternative approaches are



After the position and condition of the calf was determined, gently incision approximately (~40 cm) was made on the uterus. Then, the calf was taken out with the help of an assistant after proper stabilization of the uterus. However, the calf was non-viable and abnormally oversized (approximately 85 kgs) than anticipated under normal gestational conditions (Figure 1F). Additionally, the uterus was filled with excess and abnormal dark brown colored blood and was properly drained and removed together with the placenta from the uterus. Then, the uterus was washed and cleaned with sterile isotonic saline solution before suturing. In addition, bleeding during the procedure was managed by applying sterile gauze, using different straight and curved hemostatic

available that will further limit the potential for contamination. Practitioners are encouraged to consider alternative approaches for certain conditions.^{13,16} This is in agreement with the surgical approach used in this case report.

The main goals of the caesarean section are preservation of the cow and calf and the future reproductive efficiency of the cow. A number of variables may affect the successful outcome of this procedure; case selection is the most important and often overlooked variable. In addition, patient and surgeon preparation, surgical technique, calf viability at the time of surgery, and exteriorizing the uterus can affect outcomes. Moreover, a good surgical technique such as gentle tissue handling, selection of appropriate suture materials and patterns, and adequate in-folding of the uterine incision to prevent leakage, combined with antibiotics and anti-inflammatory medication when indicated, can help to minimize detrimental adhesions that may adversely affect the future reproductive efficiency of the cow.^{12,16} This agrees with the current case management in terms of surgical management.

According to different research outputs, 14.8% of cows becoming recumbent intra-operatively during caesarean section. It is believed that cows are more likely to become recumbent during attempts to exteriorize the uterus, because of the pain that arises from traction on the broad ligament during difficult uterine manipulations. Cows that remain standing during the procedure have a better chance of survival, with reports of 91-94% cow survival rate and a 95-100% calf survival rate. In the author's experience, cows that fall down intra-operatively were more likely to develop peritonitis and experienced greater post-operative mortality compared with cows that remained standing during the surgery.^{13,17,18} This report agrees with the current case report in terms of the occurrence of intra-operative recumbency and post-surgical survival rate.

Furthermore, antibiotics are indicated post-operatively when the calf is dead when there is a prolonged dystocia when there is a compromised uterus, when extensive obstetric manipulations occurred pre-operatively, and when abdominal contamination has occurred. Besides, the use, type, and frequency of antibiotics vary depending on the case. The most commonly used antibiotics are penicillin G procaine 22,000 IU/kg intramuscularly every 24-hours for 3-5 days), oxytetracycline (19.8 mg/kg intravenously, intramuscularly, every 1-3-days), ceftiofur (1 mg/kg intravenously, intramuscularly, every 12-24-hours for 3-5-days), and florfenicol (20 mg/kg intramuscularly every 48-hours or 40 mg/kg subcutaneously every 96-hours) has been used. In addition, the appropriate milk and meat withdrawals need to be followed.^{12,13} This statement agrees with the current post-operative case management.

According to different research findings, post-operative complications associated with paralumbar incisional infections are between 1.3% and 8.2% and dehiscence 3.8%. The occurrence of subcutaneous emphysema has been reported between 0% and 41%. Thus, differences in surgical site preparation, local anesthetic technique, incision length, difficulty in removing the calf through the incision, time of surgery, and the use, type, and duration of

post-operative antibiotics are among some of the common predisposing factor for post-surgical complication.^{12,19,20} This report is in contrast to this case report since there was no post-operative complication was reported.

In conclusion, the caesarean section using standing flank incisions requires little post-operative care and attention compared with other approaches especially ventral approaches. Cows with flank incisions often do not require stall rest that provides restricted activity and can be rebred using a bull without undue concern regarding abdominal wall herniation. In contrast, ventral approaches require strict stall rest for 6-weeks. Although these cows may be rebred using artificial insemination at 6 weeks, they should not be mounted by either their herd mates or the bull until 8-weeks after surgery, the time required to allow the ventral incisions to reach maximal holding strength.^{12,16} In this particular case report, the caesarean section using left flank celiotomy was performed under aseptic condition and alleviation of pain was done through paravertebral nerve block of T₁₃, L₁ and L₂ nerves and topical infiltration on the lidocaine on the incision site. Finally, after removing the calf, the incision site and the wound was regularly dressed and recovered after a few months. Accordingly, for early recovery and positive outcomes of the surgical procedure, the wound should always be managed and regularly monitored for the fast healing process.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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