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CESAREAN SECTION IN BOVINES

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ABSTRACT

Cesarean section ("C-section"), an incision through the abdominal wall and then into the uterus to deliver a calf potentially indicated in cases of dystocia when a calf cannot be delivered by fetal mutation and extraction or when vaginal delivery could endanger her life or the life of her calf. A prompt decision to perform a caesarean operation is important for optimum success. A successful prognosis depends on several factors, such as the skill and speed of the surgeon, duration of dystocia, physical condition of the dam, surgical environment, concurrent disease, and presence of a live calf. The following article discusses about the procedure of Cesarean section and the outcomes.

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INTRODUCTION

Cesarean section ("C-section"), an incision through the abdominal wall and then into the uterus to deliver a calf is one of the more challenging surgical procedures performed under field conditions. Cesarean section is potentially indicated in cases of dystocia when a calf cannot be delivered by fetal mutation and extraction or when vaginal delivery could endanger her life or the life of her calf (Loren *et al.*, 2008). C-section is preferred when 1) the dam has been straining for more than 30 minutes and no progress has been made or 2) after a long period of progress the cow has stopped trying to give birth or when a live calf cannot be delivered after 15-20 minutes of manipulation or 3) the water sac is visible for two hours and the cow is no longer trying to give birth or 4) the cow is experiencing severe rectal bleeding and/or fatigue and/or 5) the calf is showing stress signs such as fatigue or a swollen tongue (Newman, 2008). Newman (2008) and Vermunt (2008) opined that the following six major indications account cumulatively for 90% of all caesarean operations: fetomaternal or fetopelvic disproportion (either relative or absolute fetal oversize), incomplete dilatation or induration of the cervix, abnormalities of the cow's uterus or vagina and uterine torsion that cannot be corrected otherwise, fetal monsters (congenital defects), faulty fetal disposition (presentation, position or posture) and fetal emphysema.

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The three main goals of the caesarean operation in cattle are: survival of the cow; survival of the calf; and maintenance of post-operative productivity, which implies not only the maintenance of body condition and an acceptable level of lactation, but also the ability to conceive again and sustain a developing fetus to term (Kolkman, 2007). A prompt decision to perform a caesarean operation is important for optimum success. A successful prognosis depends on several factors, such as the skill and speed of the surgeon, duration of dystocia, physical condition of the dam, surgical environment, concurrent disease, and presence of a live calf (Newman and Anderson, 2005; Newman, 2008). The veterinarian often has far less control over the patient, availability of assistance, and environmental contaminants. The bovines presented for Caesarean section with a history of futile attempts to relieve dystocia, due to reasons, such as torsion, dead fetus, emphysematous fetus, narrow pelvic cavity, monsters, incomplete cervical dilatation, etc should be thoroughly examined including for the physiological parameters, mentation and physical status of the animal. Severely dehydrated animals should be administered with appropriate and adequate i/v fluids prior to and during the surgery depending on their clinical status in order to stabilize the animal. Pre-operatively broad spectrum antibiotics and anti-inflammatory drugs should be administered as per the standard recommended dose. Administration of isoxsuprinelactate (tocolytic agent) @ 220-250 mg i/m facilitates easy manipulation and exteriorisation of the uterus during the surgery.

A good bedding made up of 20-30 cm-thick base of sand, or with clean straw covered with a large plastic/Rexene sheet, provides an ideal surface for conducting the surgery. The animals should be placed in right lateral or semi-sternal recumbency with the body slightly tilted to the right and the limbs should be tied to a wooden pole for proper restraint. A wide surgical field should be prepared for left low flank oblique incisional laparotomy (Young's approach). Regional analgesia may be achieved using 15 ml of epidural anesthetic technique and a line block should be achieved using 2% lignocaine hydrochloride along the length of the proposed incision. A 15 to 18 inches long incision should be made through the skin into the abdominal cavity. The omentum which will be seen as a thin semi-transparent membrane should be methodically pushed cranially and dorsally to expose the uterus. The hard body of the calf through the uterine wall should then be identified and the uterus as much possible be carefully and methodically exteriorized to the outside. The incised edges of the abdominal cavity should be draped and packed with sterilized cloth all along the exteriorized sides of the uterus in order to aid in limiting the peritoneal cavity contamination with uterine fluids. A stab incision should be made in the uterine wall to rupture the amniotic sac in order to drain all the amniotic fluid and the incision should then be carefully extended long enough to allow removal of the fetus without further tearing of the uterus. The gaping ends of the uterine incision should be secured properly with fingers at both the ends to avoid further haphazard tearing of the incisional ends. The calf should be secured, held and slowly exteriorized from the uterus. The placenta should then be slowly and completely removed by separating the attachment between chorions and cotyledons. The uterine cavity should be thoroughly lavaged with luke-warm normal saline and broad spectrum antibiotic boluses should be inserted in the uterus prior to its closure to prevent post-operative uterine infection.

The uterine incision should be sutured using swaged on 1-0 chromic catgut in a single or double layered continuous inverting pattern. When single layer (Utrecht pattern) suturing is done, the suturing should be started at the cervical end of the uterine incision, to facilitate the ease of suturing when the uterus starts to involute and the cervix retracts into the abdomen before the ovarian end does so. When double layer suturing (Cushing followed by Lambert pattern) is done, the suturing should be started at the ovarian end and ended at ovarian end. Once the uterine incision is repaired, the uterus should be checked for leakages or tears and the surface should be cleaned with sterile gauze while flushing with normal saline solution to remove blood clots and other debris. Inj. oxytocin (20-40 IU) should be administered in the uterine musculature at various points in order to hasten uterine involution and expulsion of the placental remnants. The gauze or cloth drape surrounding the uterus should then be removed and the uterus repositioned to its location within the abdomen, ensuring that there is no torsion of the genital tract. The abdominal cavity should be inspected and blood/fibrin clots if any should be removed. Sterile fluids should then be infused into the abdomen to replace some of the fluid lost during the operation and also to significantly reduce the chances of post-operative adhesion formation. Inj. metronidazole and a water-soluble antibiotic injection should then be infused into the abdominal cavity before closure of the laparotomy wound. The abdominal lower flank incision should be sutured with chromic catgut No 2, using simple interrupted sutures in two layers; the

peritoneum and transverse abdominal muscle in the first, and the internal and the external abdominal oblique muscles in the second layer. To reduce dead space between the suture layers, deeper bites with the suture should be made periodically into the deeper muscle layer, thus intermittently anchoring the suture into the underlying tissue. Broad-spectrum antibiotics may be infused between the suture layers. The skin incision may be closed in a standard manner using monofilament nylon No 2. Application of moderate tension to the sutures to bring the wound edges into complete apposition ensures a good seal and promotes first-intention healing. Post-operatively the animals should be encouraged to drink 20-25 liters of water mixed with jiggery, soda-bicarbonate and salt. Inj. dextrose normal saline and Inj. calcium borogluconate are administered to prevent hypocalcaemia and facilitate uterine involution. A course of broad spectrum antibiotics and non-steroidal anti-inflammatory drug (NSAID) should be administered parentally for five days post-operatively as per the recommended dose and schedule. Intra uterine therapy may be followed for three days. The wound should be surgically dressed until healing and suture removal.

Prognosis for recovery after C-section is generally good. Timely presentation of the cases for C-section is very important in early recovery and high survival rates of the animals. The left lateral oblique approach allows better manipulation and exteriorization of the uterus, limiting peritoneal cavity contamination. Similar observations were made by Loren *et al.*, (2008) and Vermunt (2008). Maternal survival rates following caesarean operation are high; most surveys report 90-98% dam survival. It has a high maternal and fetal survival rates, and often is less exhausting, speedier and safer than fetotomy (Vermunt, 2008). Bouchard *et al.*, (1994) reported that risk of cow dying was 24% following surgery. If the cow had emphysematous, dead or live calf, the chances of dying were 63%, 21% and 14% respectively. The high death rate in calves was due to excess handling during relieving dystocia, prolonged duration of dystocia, torsion, incomplete cervical dilation or emphysematous fetus. Post-operative complications associated with a caesarean operation are often due to difficulties encountered during rotation of the uterus, exteriorisation of the pregnant horn, making the uterine incision, removal of the calf; and suturing of the uterine incision. Subcutaneous emphysema due to leakage of air from the abdominal cavity into the subcutaneous tissues and muscle layers may occur following surgery if the peritoneum is not closely apposed. Care should be taken to oppose the peritoneum and transverse abdominal muscle to avoid leakage of air from the abdominal cavity into the muscle layers following surgery. Air leakage is less likely following surgery on a recumbent animal, because less air is sucked into the abdomen during surgery. The amount of air within the abdomen can be reduced by an assistant compressing the ventral abdomen and flank immediately before closure of the dorsal aspect of the peritoneal incision (Mijten, 1998; Vermunt, 2008). Retention of the placenta occurs in 6-10% of cases of caesarean operation. Reduced fertility may occur as a consequence of increased incidence of retained fetal membranes and endometritis, uterine adhesions that hinder involution, adhesions that affect the ovary or uterine tube, and reduced endometrial tissue competence. In addition, there is an increased risk of abortion during subsequent pregnancy, possibly as a result of scar tissue formation within the uterine wall, limiting expansion of the uterus and/or nutrition of the fetus Vermunt (2008).

Inadequate repair of the uterine incision, particularly in the presence of metritis, is the principal cause of post-operative peritonitis. The incidence is increased in the case of a dead or emphysematous fetus, after severe dystocia, rupture of the uterus or presence of a fetal monster, and after spillage of infected uterine fluids into the abdomen during surgery. Diarrhoea, pyrexia, inappetence and abdominal pain are the common presenting signs of peritonitis following a caesarean operation (Vermunt, 2008). As many as 24 % of animals may have complications related to dehiscence, abscess or seroma formation around the abdominal incision. Predisposing factors for wound dehiscence include inadequate asepsis, low abdominal incisions, trauma to tissues during surgery, environmental contamination, tenesmus, and a poor temperament of the animal after surgery (Kolkman, 2007).

Cows that are recumbent during surgery have the risk of temporary or permanent peroneal nerve injury. Animals that have been in lateral recumbency on a hard surface may suffer from radial paralysis. In addition, a number of cows may have sustained trauma to the obturator nerve during dystocia prior to caesarean operation. More often, though, femoral paralysis is encountered as a stretch injury in large calves, mainly of beef breeds following hip or stifle lock during parturition (Vermunt, 2008). Catgut has advantages over synthetic suture materials, particularly when the uterus is friable because the latter have a cheese wire effect (Loren *et al.*, 2008). However, catgut causes greater tissue reaction, and thus is more likely to produce adhesions between the incision site and surrounding. Complete closure of the hysterotomy incision is critical to preserve future fertility of the dam. A single layer is sufficient if the uterine wall is healthy and the uterine contents are not septic. Double layer suturing pattern is particularly efficient if the uterine wall is flaccid during repair of the wound. Infusion of sterile fluids into the abdomen to replace some of the fluid lost during the operation, also significantly reduces the chance of post operative adhesions formation (Vermunt, 2008). Sedation should be avoided as it would be detrimental to fetal survival, causes rumen tympany, has an ecobolic effect making exteriorization of the uterus and suture placement more difficult and problematic and increasing the likelihood of uterine tears during closure. (Jansen *et al.*, 1984; Sakamoto *et al.*, 1996; Hoeben *et al.*, 1997., Loren *et al.*, 2008 and Vermunt, 2008).

Cesarean section is a routinely needed surgery under field condition and the need for performing an emergency cesarean is growing day by day. Numerous variables may affect the successful outcome of this procedure. Case selection is the most important thing. Following of the principles of aseptic surgery have a profound effect on the outcome of the results. In addition, good surgical technique, including gentle tissue handling, calf viability at the time of surgery, exteriorizing the uterus, selection of appropriate suture materials and patterns, and adequate in folding of the uterine incision to prevent leakage, combined with antibiotics and anti-inflammatory when indicated can help minimize detrimental adhesions that may affect adversely the future reproductive efficiency of the dam and can affect outcome.

Minimizing excessive adhesion formation is equally important because it may affect reproductive efficiency. Intensive medical management is crucial determining factor of cow survival. The percentage of cows that subsequently conceived post operatively ranged from 48-80%.

Shivaprakash *et al.*, (2008) opined that only a correct surgical technique, asepsis, speed, judicious use of fluid therapy and antibiotic therapy gives high success rate following caesarean section.

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