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Clinical management of genital prolapse in Bovine

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Abstract
Genital prolapse is a descent of one or more of the pelvic structures (bladder, uterus and vagina) from the normal anatomical position toward or through the vaginal opening. Two distinct types of prolapse occur in the reproductive tract of cattle: uterine and vaginal. It is an emergency condition and should be managed before excessive edema, mucosal trauma, contamination and fatal haemorrhage lead to a grave prognosis. The clinically genital prolapse can be managed by reduction, repositioning and retention. The Button and Buhner's suture techniques are reported to be effective to retain the prolapse mass with minimum post-operative complications however the use of truss facilitates temporary retention of the prolapse. The mattress suture technique causes maximum post-operative complications like straining, oedema, tearing of vulvar lips with reoccurrence of prolapse in all the animals. However, the salvage hysterectomy on ethical and philanthropic ground is carried out to alleviate suffering and relieving pain.

Keywords: Genital prolapse, reduction reposition, retention, bovine

Introduction
The eversion and prolapse of the vagina is a problem frequently affecting in mature females during their last trimester of pregnancy. The cases of peripartum cervico vaginal prolapse (CVP) are mainly related to the cause of gravid uterus, dystocia and retained placenta (Roberts, 1971; Arthur *et al*., 2008) [12, 2]. It is the descent of one or more of the pelvic structures (bladder, uterus and vagina) from the normal anatomical position toward or through the vaginal opening. Two distinct types of prolapse occur in the reproductive tract of cattle: uterine and vaginal (Powell, 2007) [11]. The prolapsed genital organs become enlarged, which lead to the lesions of acute inflammatory changes, *viz*., oedema, congestion, and haemorrhage from the wounds and mucous discharge. Mishandling of the prolapse resulted in irreparable damage in reproductive organs leading to infertility. It is regarded as an emergency condition and should be managed before excessive edema, mucosal trauma, contamination and fatal haemorrhage lead to a grave prognosis (Miesner and Anderson, 2008) [7].

Clinical management of genital prolapse
Prolapse can be managed by three methods *viz*.: Reduction, Repositioning and retention.
Reduction in the size of prolapsed mass can be achieved by drainage of urine, reduction of edema of prolapse organs.
Due to prolapse of vagina a kink develops in the urethra that leads to retention of urine in the urinary bladder. This increases the size of the prolapsed mass. Thus, drainage of urine will often reduce the size of the prolapsed mass. Simply lifting the prolapsed mass upward straightens the kink in the urethra and releases the retained urine. Alternatively, it can be drained by using urinary catheter.
The prolapsed mass develops edema due to occluded blood supply, lifting the prolapsed mass above the level of ischial arch can reduce this edema. Cold water, ice packing or applying hypertonic sugar solution on the prolapsed part can further reduce it. The local administration of oxytocin in the uterine musculature in the uterine prolapse will also reduce the size of the prolapsed mass. Repositioning of the prolapsed mass whether the animal is straining or not, epidural anaesthesia using Lignocaine or bupivacaine alone or in combination with isopropyl alcohol which helps in reduction and retention of the prolapsed mass. Isopropyl alcohol prolongs the anaesthesia for more than 100 minutes but it may cause axonal degeneration of the nerve fibers and this effect may be irreversible.

The loss of tail tone and peri-vulvar skin sensation within 2 minutes and sedation for 4 hrs, the pelvic limb ataxia was observed up to 24 hrs and sternal recumbency. A caudal epidural block using lignocaine hydrochloride (2%) was effective in controlling straining and provided satisfactory regional analgesia. Low doses of xylazine can be added to prolong the duration of analgesia (Noakes *et al*., 2001) [9]. In order to prolong the effect of analgesia, use of either lignocaine hydrochloride with adrenaline or bupivacaine for achieving caudal block is comparatively safer.

The urinary tract infection are observed as a cause of tenesmus and associated with prolapse, so appropriate treatment of these infections must be done in addition to treatment of prolapse. The hindquarters of the animals should be raised by elevation of the ground by placing gunny bags filled with straw beneath the hind quarter. Some workers used a fore end loading tractor to raise the rear end of the cow to a height of about one meter. If the urinary bladder is full, it should be evacuated either by catheter or by puncturing with needle through the body of the uterus. For checking edema, prolapsed mass should be lifted and brought to the level of ischial arch which gives much relief to the animal. In these cases lifting of the uterus results in straightening the urethra enough to allow urination, improving cow comfort and reducing subsequent straining (Miesner and Anderson, 2008) [7]. Prolapsed mass must be thoroughly cleaned with cold mild antiseptic solution like candy's lotion or normal saline. Hygroscopic substance like cold alum solution should be used to reduce the size of the prolapsed mass.

The prolapsed mass should be put on a clean sheet and lubricated with non-irritant liquid or jelly. Although topical application of osmotic agents, such as sugar or salt, may reduce or prevent oedema by squeezing fluids out of the uterus (Miesner and Anderson, 2008) [7], these agents may also amplify endometrial trauma (Miesner and Anderson, 2008) [7]. An anesthetic jelly containing Xylocaine 2% with antibiotic cream like gentamicin or soframycin is ideal. The mass is then replaced back gently but firm pressure with closed fist. It is advisable to begin reduction at the area near to labia and with cranial portion.

The *repositioning* of prolapse mass is most important step which should be performed with utmost care as while straightening the reversed mass care is that it should be taken that no investigation be left as that will result in recurrence of eversion immediately. Manual massaging during repositioning of the mass after application of an ointment or a lubricant is an effective alternative technique. Putting 10-15 L of warm water or normal saline help in complete repositioning up to the tip of the horn. It also stimulates uterine contractions and helps to wash out uterine debris. The remaining fluid should be siphoned out. Pessaries like Furea may be kept in the reposed uterus.

Now days many veterinarians are prefer to use tocolytic drugs (Isoxsuprine, Clenbuterol etc.) before repositioning of prolapse mass. These drugs will provide temporary relaxation of the myometrial contractions which will help in easy repositioning of prolapse mass.

The *retention* of the prolapsed mass in normal anatomical position is most important after complete and hygienic reposition, it may be achieved as follows:

Conservative method

Rope truss: **(Robert, 1971 and Arthur *et al*., 2001) [12, 9]:** Take 30 feet long rope. Double it and make an 8-knot on the loop side at a distance of 2-3 feet. Adjust it around the neck of the animal. Put another 8-knot at the hump region. 3rd, 4th and 5th knots are put at the level of last rib, sacrum and on the base of tail, respectively. 6th and 7th knots are placed at the dorsal and ventral commissure of the vulva. The free ends of the rope are passed below the hind limbs on the sides of the udder and tied in front of the tuber coxae as a quick releasing knot. The knot below the ventral commissure of vulva is most important as it puts pressure on the part to retain it.

While making rope truss the most important precaution is to prevent the cutting of perineal parts by the rope. Cotton with proper padding either by leather straps or by bandages and proper place for defecation must be left. Care must be taken; if there is any difficulty in passing dung or urine that should be corrected. Thorough cleaning of the truss must be done daily and if any wounds are formed that must be dressed with non-irritant antiseptic lotion or creams.

Heroic technique: External suture

Mattress suture (Peter, 2015) [10]: The repositioned prolapsed mass was retained using Mattress suture technique. A triangular straight needle, non-absorbable suture material (cotton thread), and pieces of infusion set (drip) are used for application of the mattress suture.

The labia majora are prepared for aseptic surgery. The sutures are taken at the white line to avoid injuries to the vulvar lips. The straight needle threaded with cotton thread is passed from outside to inside from right vulvar lip and inside to outside from the left vulvar lip. The needle was then passed through the sterile infusion set tubing of about 5 cm length and passed again in the same way but from left to right vulvar lip then again passed through the infusion set tubing of about 5 cm length. Both the ends of the cotton thread are tied to place a knot.

Now a day different scientist modified this technique by using different material like latex tubing button to apply more tension to the suture site to avoid the tearing of vulvar lips.

Buhner`s method: Buhner technique of vulvar closure was reported by Buhner in 1958 as simple surgical treatment of uterine and vaginal prolapse.

In this technique first antiseptic washing of Prolapse mass is given then gently repositioning it into normal position. A Buhner needle, a sterile infusion set (drip) as suture material and BP blade was used for application of the Buhner's sutures.

First horizontal skin incision approximately 1 cm long is made midway between the anus and the dorsal commissure of the vulva. Another horizontal incision approximately 1.5 cm long is also made at the same level at the ventral commissure of the vulva (cranial to the normally projecting ventral commissure). An unthreaded sterilized Buhner's needle was introduced from ventral incision on one side of the vulvar lip, (2 to 3 cm away from the vulvar margin) in an upward direction, without piercing the vulvar surfaces. The tip of the needle emerged in the dorsal incision area between the anus and the dorsal commissure of vulva. Sterile infusion set tubing is threaded through the eye of the needle. The threaded needle is pulled out of the insertion point. After the needle is disengaged, it is reinserted in the same direction on the opposite side of the vulva keeping similar distances from the corresponding vulvar edge and its tip is pushed out through incision above the dorsal commissure. The needle is threaded with the free end of the infusion set hanging from the skin hole above the dorsal commissure. The needle is then pulled out and disengaged. Thus the free ends of the infusion set

tubing are brought out through one opening at lower aspect of the ventral vulvar commissure. Then following the surgical knot a slipping knot is applied at the ventral vulvar commissure in such a way that gap for urination remained.
Now a day modified Bühner's technique using infusion set tubing as suture before tying the knot in a crossbred HF cow. This type of suture material is beneficial by minimum suture tension, minimum tissue reaction without tearing of vulvar lips.

Lacing closure or Criss-cross method or Shoe lace method (Peter, 2015) [10]: In this technique three to four pairs of eyelets are made in the thick skin lateral to the labia. The stranded umbilical tape or bandage is laced through the eyelets. Three pairs of eyelets are made on each side of vulva and numbered 1, 2, 3 and a, b, and c. Suture should pass through the same numbers only i.e. one free end passes via No. 1, 2 and 3 while other free end passes via No. a, b and c. just like lacing your own shoe. Take one free end of suture and start lacing on right side from number 1, go to opposite and lace through eyelet number 2, come back to right side and lace through eyelet number 3. Take other free end of suture and start lacing from eyelet No. a (left side), go to opposite side and lace through eyelet No. b and come back to left side and lace eyelet No. c. This way two free ends of the suture emerges on the ventral side of the vulva the free ends are tied into a knot.

Flessa suture: These are specially designed sutures consisting of three metallic rods, two holed aluminium strips, six wooden beads and a Flessa needle. After fixing a wooden bead and passing through the aluminium sheet, the metallic needles are passed through the skin at the level of the base of the vulvar lips and through vestibule with the help of Flessa needle. These are secured with the aluminium strip and tightened with wooden beads on the other side. Since mucosa of vagina is damaged, infections can settle in. Many obstetricians prefer Flessa sutures to buhner's sutures.

Modified quill technique: (Peter, 2015) [10]: Widely placed matress sutures encircle vertically placed "quills" of rubber tubing or rope. This is one of the most secure external fixation patterns.

Internal suture

Minchev stay suture technique (Minchev, 1956) [8]: This method was 1st recommended by Minchev (1956) [8] and subsequently Bouckaert *et al*. (1956) [4] have modified the Minchev's technique by using hard rubber intravaginally for controlling prolapse of vagina by surgically fastening of the cranial portion of vaginal wall through the lesser sciatic foramen to the dorsolateral wall of the sacrosciatic ligament, muscles and skin of croup. They additionally placed the stay sutures cranial to the lesser sciatic foramen. They stated that in this technique firm attachment did not occur frequently so prolapse of vaginal may reoccur.

Modified Minchew's technique: This technique is similar except the stay sutures are placed anterior to the lesser sciatic foramen 5 cm lateral to the midline and just posterior to the shaft of the ilium, providing more cranial fixation of the vaginal wall. Care must be taken to avoid the sciatic nerve, pudendal artery, and rectum when placing the needle. These structures can be identified cranial and slightly dorsal to the lesser sciatic foramen. The needle is passed through the sacrosciatic ligament approximately 4–5 cm lateral to the sacrum and just posterior to the shaft of the ilium. There are advantages to this technique, including the fact that cows rarely show tenesmus when the vagina is replaced and the cow can calve unassisted. However, it is recommended that the sutures are removed in 2–4 weeks.

Surgical methods

Button fixation technique: This method is 1st recommended by Minchev (1956) [8]. In this technique after giving the epidural anaesthesia, the prolapsed mass is set and vaginal douch is given with mild antiseptic solution like liquid povidone iodine. In this technique, buttons having two/four holes are used. No.2 black braided silk thread having the two strands of equal length are threaded into the holes of the button and these four strands are threaded in to the straight needle. Before repositioning the prolapsed mass, a bite of the suture is to be placed in the fornix of vagina just caudal to cervix by entering the mucosa and sub mucosa. Two such sutures are to be placed on either side (left and right) of the vaginal wall. Now, the prolapsed mass is repositioned. Then the needle is introduced in the vagina under the covering of the palm near the posterior aspect of ilium. Needle is to be pierced in to vagina dorso-laterally through the vaginal wall. Button is to be held in a palm and hand acted as a bearing surface when forcing the needle through the gluteal muscle and skin. The needle is to be removed through the skin and No. #2 black braided silk is threaded into another button. Two equal strands of thread are tied on button so that the retroperitoneal surface of vagina and peritoneum of pelvic cavity comes in apposition to form adhesions. After tieing the knot on button further vaginal douche is to be given with antiseptic solution like Povidone iodine using 20 ml syringe. Sufficient care should be exercised to avoid bite in the rectal wall and also avoid iliac artery and vein.

Pervaginum Ovario-hysterectomy: (Mahida, 2008) [6]: Ovario-hysterectomy through per vaginum approach is to be performed under epidural anaesthesia and mild xylazine sedation in lateral recumbancy. Urination is to be facilitated by catheterization of urethra. Tourniquet is applied around the base of the prolapsed mass as near as possible to vulvar commissure to control the haemorrhage. A circumscribed incision between 9 O' clock to 3 O' clock position is made on the outer layer of the prolapsed mass and after that inner layer is incised. The adhesions is removed by blunt separation. By palpation through the incision, both the ovaries and uterus are to be located and dragged to the vaginal incision by constant firm tension. An utero-ovarian vessel is transfixed**.** The ovaries, uterus as well as prolapsed mass are to be excised out**.** Further, the blunt dissection allowed retraction of cervix attached with the uterus and the ovaries. The ventral wall of the vagina is cut taking care to retrieve the inner tube of vaginal wall. All bleeders are carefully ligated to ensure complete haemostasis. Care is to be taken to place this incision beyond urethral meatus. The inner and outer layer of the cut ends of vaginal wall are to be sutured using continuous lock stitch suture using catgut number 2, commencing at 9 O' clock position.

Vaginopexy: In this technique after achieving the desired level of analgesia, prolapsed mass is set and vaginal douch is given with antiseptic solution like Povidone iodine. After that per vaginal palpation is carried out to locate prepubic tendon. At the anterior side of the pubis in the lateral floor of vagina

at both the sides prepubic tendons are located. After that a half circled "U" shaped needle is threaded with Vicryl No.2 for the fixation of the prolapsed mass with the prepubic tendon. This "U" shaped needle is introduced with covering of the palm so that injury did not occur to any other part of vagina. The point of the needle is directed towards lateral wall of the vagina and the prepubic tendon is located and the bite is then taken which included the vagina and prepubic tendon. Later the needle is pulled back in to vagina. Further, the needle is removed from the vagina and with the help of forceps a knot is taken which fixed the vagina with prepubic tendon (Desai, 2012) [5].

Miscellaneous technique

Castor Oil and Indian Mallow: Complete recovery from pre-partum cervico vaginal prolapse in nine cows are observed with ad-libitum topical application of Ricinus Communis (Castor Oil) on prolapse mass and oral supplementation of leaves Abutilum Indicum (Indian Mallow) mildly fried in castor oil once daily (Umadevi and Umakanthan, 2011) [13].

Conclusions

The Button and Buhner's suture techniques are reported to be effective to retain the prolapse mass with minimum post-operative complications however the use of truss facilitates temporary retention of the prolapse. The mattress suture technique causes maximum post-operative complications like straining, oedema, tearing of vulvar lips with reoccurrence of prolapse in all the animals. However, the salvage hysterectomy on ethical and philanthropic ground is carried out to alleviate suffering and relieving pain.

In the future, the prolapse in animals should be exploited for hereditary predisposition, Scientific breeding in male and female of our animals is yet awaited looking to the anatomical variations in indigenous cattle.

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