

Repair of Perineal Lacerations in the Cow

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Introduction

The incidence of pneumovagina resulting in infertility in beef cows apparently is increasing. Heritable influences are not easily delineated. However, many cases can be attributed to alteration in the functional structure of the vulva or vagina following calving injuries. These injuries occur during imprudent assistance at calving and rarely are sustained during unassisted birth (6).

Vaginal lacerations in the area of the constrictor vestibuli muscle (3,5), malocclusion of the vulvar lips and third degree perineal lacerations may result in ballooning of the vagina by air. Frequent sequellae include anterior vaginitis, cervicitis and metritis (10). Occasionally, severe pneumovagina is followed by pooling of urine in the anterior portion of the vagina. The condition occurs especially if the cow is simultaneously high at the ischium and low at the lumbar region (Fig. 1). This posture involves ventral tipping of the pelvic brim which allows urine to gravitate inward. While tipped pelvis or "weak loin" occurs as an innate



Figure 1: Charolais cow with bilateral sacroiliac luxation; injury sustained during forced fetal extraction. Acquired conformation predisposes to pooling of urine in anterior vagina. Note tipping of pelvis.

conformational defect (10), it is also seen following luxation or subluxation of the sacroiliac

articulations following excessive traction on a fetus and occasionally after violent struggling by an animal that has been cast (7).

Perineal lacerations have been classified according to the location and degree of tissue damage. First degree lacerations are superficial wounds of the mucosa of the vagina or vestibule. Second degree lacerations involve the entire wall of the vagina or vulva, or both. This class includes laceration of the vulvar lips with disruption of the integrity of the constrictor vulvae muscle which normally serves to close the vulvar cleft (3,5). The most extensive type of defect is the third degree laceration in which the walls of both rectum and vagina are torn, as well as the anus, perineal body and vulva (1,4,8).

It must be emphasized that severe injury may occur in some instances without resulting in infertility. However, reconstructive surgery is indicated and warranted in certain cases in order to restore reproductive function.

Vaginal Lacerations

Simple tearing of the vaginal mucosa seldom interferes with subsequent fertility unless severe inflammation is followed by adhesion of opposing surfaces of the vagina. These adhesions effect stenosis or blockage of the vaginal lumen. The adhesions usually can be broken down manually and treated with frequent applications of oily medicants to reduce recurrence. The prognosis is guarded in cases where complete occlusion has occurred.

Second degree lacerations involving the entire vaginal wall frequently accompany forced delivery in undersized or overfat beef heifers (6). With proper aftercare, including topical and systemic antibacterial medication, these lesions rarely cause infertility. Suturing these wounds is usually contraindicated. Perivaginal fat which characteristically protrudes into the vagina through the defect should be removed by blunt dissection.

Occasionally, when the fat is allowed to remain in the wound, the laceration heals around the mass of fat which becomes covered by a smooth layer of connective tissue. The mass may cause tenesmus and may protrude through the vulva. The appearance of the pedunculated mass may be mistaken for a neoplasm.

Extensive vaginal lacerations in the area of the constrictor vestibuli muscle may disrupt the function of the muscle. Thus the protective barrier to external contamination of the vagina proper is lost. In most instances the function is restored by unassisted healing. Occasionally the condition results in chronic vaginitis and pneumovagina. Reconstruction of the sphincter-like barrier between the vestibule and vagina can be accomplished by insertion of a deeply placed pursestring suture at the level of the constrictor vestibuli muscle. There is some danger of excessive scar formation and stenosis which might later interfere with normal birth. A more conservative approach is to employ the Caslick method of closure of the dorsal portion of the vulvar cleft (2,6).

Severe disfigurement of the vulva should be avoided when possible by judicious application of episiotomy. An episiotomy incision is much more easily repaired than an irregular tear. When a fetus is being delivered by traction, the decision for episiotomy can be made as the head of the fetus approaches and stretches the vulva. Ample time should be given for physiological dilation. If episiotomy is indicated, incise the stretched vulva dorsolaterally at one side of the upper portion of the vulvar cleft. If greater dilation is required, the opposite side may also be incised. The dorsal commissure should be avoided. Following delivery the incision should be closed with deeply placed vertical mattress sutures.

When healed vulvar lacerations cause malocclusion of the vulvar lips, the cow is predisposed to pneumovagina. Reconstruction consists of excision of scar tissue and realignment of the cleft. If sufficient tissue is lacking to provide normal apposition, the dorsal portion of the cleft should be closed with interrupted vertical mattress sutures after further excision of tissue at the mucocutaneous junction (2). Occasionally, wounds at the dorsal commissure heal with an infolding of perineal skin so that the "ceiling" of the vestibule is covered with this skin. In effect, the vulva is propped open and pneumovagina ensues. The

infolded skin must be freed from its inner attachment and restored to its normal vertical position after deep supporting sutures of absorbable suture are placed in the underlying connective tissue.

Third Degree Perineal Lacerations

Rectovaginal or rectovulvar lacerations in cows have not received the consideration of importance which has been accorded similar wounds in mares. However, the condition in cows is seen with increasing frequency and often in otherwise valuable individuals. The technique which has been most satisfactory for the author is a slight modification of procedures which have been described elsewhere (4,7,8,9). Repair at the time of injury is contraindicated due to imminent failure of healing of the devitalized and contaminated tissue. Failures at this time are conducive to excessive scarring and more difficult repair later. Six weeks is usually required to allow for sufficient healing and clearing of infection and inflammation.

There is seldom any necessity for providing a special diet for the bovine patient as long as the manure is soft enough to stack. If diarrhea or very firm feces are present, either condition should be corrected prior to surgery. Fasting in order to reduce fecal volume will complicate surgical preparation by making the feces too firm.

Surgery is done with the cow standing in a chute or stock. Low epidural anesthesia is used. The rectum is evacuated manually. At this time, if it has not been done beforehand, a thorough rectal manual examination of the internal genitalia is indicated. The most common pathologic finding is metritis.

The caudal portion of the rectum, vaginal vault and perineal region are washed and flushed repeatedly with a dilute chlorhexidine^a solution, using a stomach tube and pump. If there is metritis and if the cervix is negotiable it is well to insert an intrauterine infuser^b at this point. Thus the uterus can be medicated regularly during convalescence.

Special longhandled instruments have been suggested for similar surgery in the mare (8,9). These have not been found necessary or useful in most cases of the condition in cows.

A tampon of 5 cm. (2 in.) stockinett[®] stuffed loosely with cotton and tied with a length of

a. Nolvasan, Fort Dodge Laboratories, Fort Dodge, Iowa

b. IUI, Fort Dodge Laboratories, Fort Dodge, Iowa

umbilical tape is placed in the rectum cranial to the rectovaginal defect. The loose end of the tape is secured to one side of the perineal region outside the operative area, to be used after surgery for removing the tampon. The cow's tail is drawn to one side via a rope looped around the neck.

The operative area is exposed by placing gut sutures in the perineal skin near the mucocutaneous margin on each side of the disrupted dorsal commissure of the vulva and at the torn edges of the anus. These four sutures are anchored laterally near the tubera ischii. The defect is thus revealed as a "shelf" uniting the rectum and vestibule with a seam on either side of the common cavity extending to the perineal skin and marking the healed junction of rectal and vestibular mucosae (Fig. 2). The free edge of the shelf is

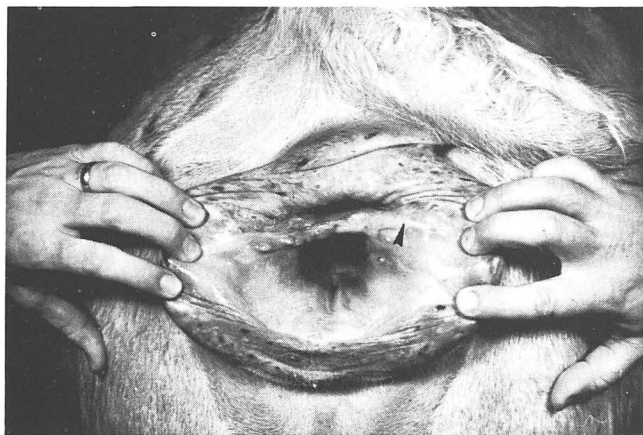


Figure 2: Third degree perineal laceration in a cow. Note common opening of rectum and vestibule. Arrow marks healed junction of rectal and vestibular mucosae.

incised, dividing it into a thick rectal floor and thin vestibular roof. The incision is deepened cranially by blunt dissection for about 4 cm. (1.5 in.) and then extended laterally and caudally on each side along the junctions of healed vestibular and rectal mucosae (Fig. 3). The dissection thus forms flaps of tissue sufficient to provide for reconstruction of the rectal floor and vestibular roof. Sometimes, especially following unsuccessful attempts at repair, there will be a considerable amount of scar tissue along the lines of dissection. This scar tissue is cautiously removed during dissection to insure resilience of the tissues to be included under suture. Excessive tissue removal is contraindicated for two reasons: (1) undue hemorrhage should be avoided; and (2) as much tissue as possible must be preserved to bridge the defect.

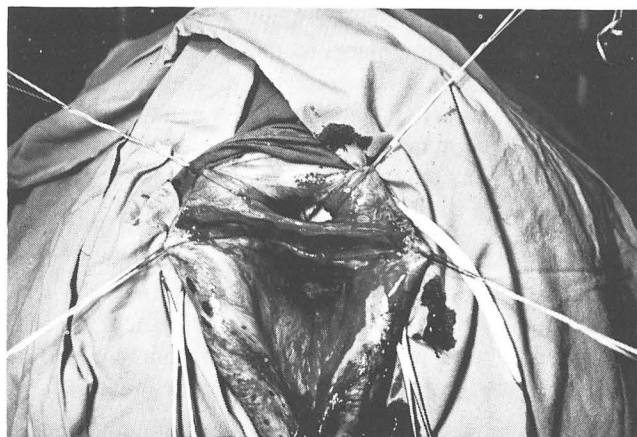


Figure 3: Dissection along margins of rectum and vestibule forming flaps for reconstruction of rectal floor and vestibular roof.

Synthetic nonabsorbable 0.4 mm. suture^c and a No. 2 or 3, half circle cutting edge needle (fistula needle) are used in the pattern illustrated in Figure 4. A surgeon's knot is tied snugly. The two tag

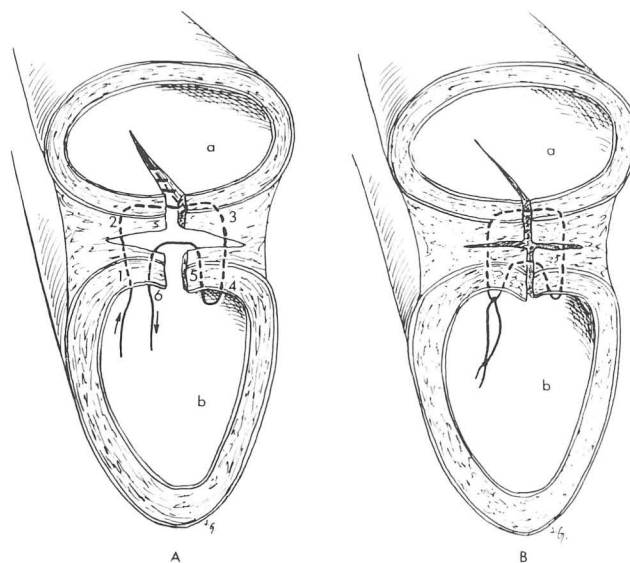


Figure 4: A. Pattern for closure of perineal laceration: (1) deep thrust through left vestibular flap; (2) thrust through left perirectal tissue and rectal submucosa; (3) thrust through right rectal submucosa and perirectal tissue; (4) deep thrust through right vestibular flap into vestibular lumen; (5) superficial thrust through right vestibular flap; (6) superficial thrust from deep side of left vestibular flap to vestibular lumen. B. Closure of perineal laceration. Suture must not penetrate rectal mucosa.

ends of each stitch are left long (8 cm.) and tied together at their ends to aid in identification of each knot during removal. If the tension on the sutured tissues is great enough that the tissues tend to separate, it is likely that there has been insufficient dissection. It is important that the suture pattern effects abutment closure of the

edges of rectal mucosa. The suture must not penetrate the rectal mucosa. While the edges of vestibular mucosa are everted, excessive flap formation serves no useful purpose.

The first one or two sutures are placed in the shelf cranial to its free edge in order to establish eversion of the vestibular roof. Sutures are placed at about 1.5 cm. (0.5 in.) intervals until the rectum and vestibule are reconstructed. There appears to be no advantage in suturing the disrupted anal sphincter. After vertical dissection, the perineum is closed with vertical mattress sutures of nonabsorbable material. If there is an indication of malocclusion of the vulvar lips, the dorsal portions of mucocutaneous junctions on each lip are trimmed and sutured with vertical mattress sutures (Fig. 5). The rectal tampon is gently removed.

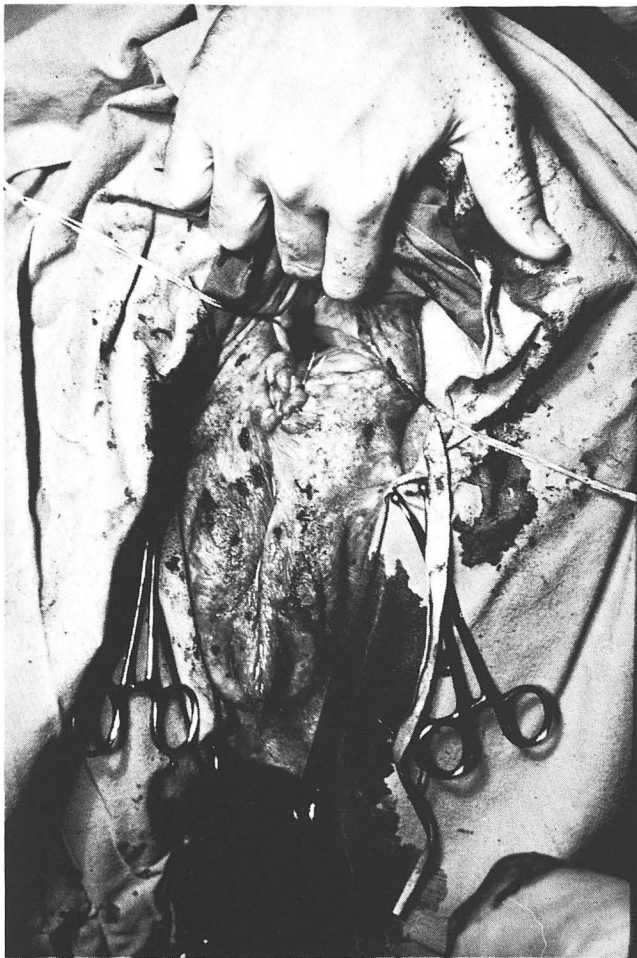


Figure 5: Closed perineal skin; vertical mattress sutures. Temporary guy sutures are holding anus open for visualization.

Systemic antibiotics are administered daily for four or five days. Daily topical application of zinc oxide ointment to all wound edges is considered beneficial. When healing is secure, usually in about

10 days, the sutures are removed with long scissors following digital palpation of the individual knots in the vestibular mucosa.

Rectovaginal fistulae in the cow apparently are rare. In the cow, laceration results from cranial extension of a tear which begins at the dorsal commissure of the vulva rather than vaginorectal penetration by a foot of the fetus as commonly occurs in the mare. Most fistulae in cows encountered by the author have resulted from partial failure of third degree perineal laceration repair. The method of repair has been conversion to a third degree perineal laceration by incision, and repair as described above.

Pneumovagina with Pooling of Urine

In some cases of pneumovagina the anterior portion of the vagina becomes sacculated and droops into the abdominal cavity. The vaginal fornix is thus obliterated and the cervix is continually bathed in vaginal and cervical debris (9). If this condition is complicated by cranio-ventral tipping of the pelvic brim so that the external urinary meatus is higher than the anterior pelvic floor, urine flows cranially and collects in the anterior vagina. The added weight of urine increases the sacculization. As much as 3.5 L. (one gal.) of urine has been found in the pool in some patients.

In order to avoid procreation of genetic defects the veterinarian should try to determine whether the abnormal pelvic structure is due to heritable conformation or trauma. Because urine frequently penetrates the cervix and fills the uterine cavity, a thorough examination should be made.

The corrective procedure is carried out in two steps. First, a transverse dam composed of a fold of vaginal wall is established cranial to the external urinary meatus in order to prevent cranial flow of urine (Fig. 6). Second, the dorsal two-third of the vulvar cleft is sutured to obviate pneumovagina. This second step may include correction of any of the previously described causes of pneumovagina.

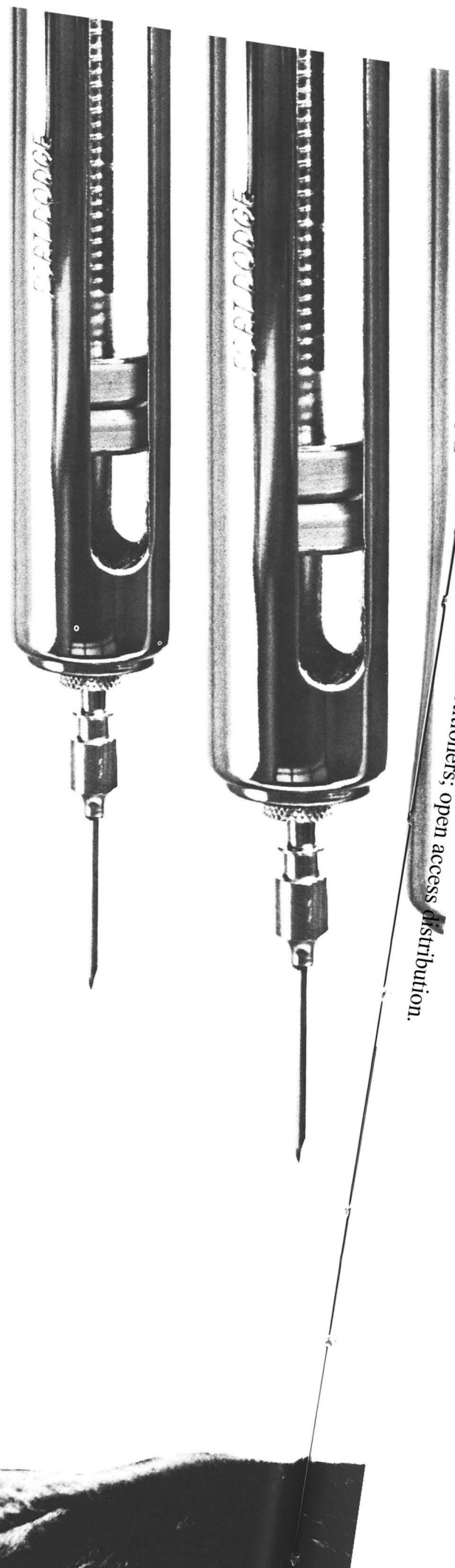
Surgery is done under low epidural anesthesia with the cow in the standing position. Urine and debris are scooped and raked from the vagina with the hand. The perineal region and vaginal vault are thoroughly and repeatedly flushed with a mild antiseptic. In order to gain as much relaxation of the vaginal floor as possible, the cranial wall of the ballooned vagina is depressed, grasped with one hand and retracted while the other hand spreads one vulvar lip, thus forcing escape of a portion of

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the air. While deflation is only transitory, it is helpful in rolling a transverse fold of vaginal floor at the level of the constrictor vestibuli muscle. The fold includes the ventral 120° of the circumference of the vagina. This is accomplished, somewhat laboriously, by use of a half-curved, 12 cm. (5 in.) cutting edge needle and No. 4 chromic catgut in a continuous mattress pattern across the base of the rolled wall. At the beginning of the pattern the suture is anchored at about the four o'clock position on the right lateral vaginal wall. The

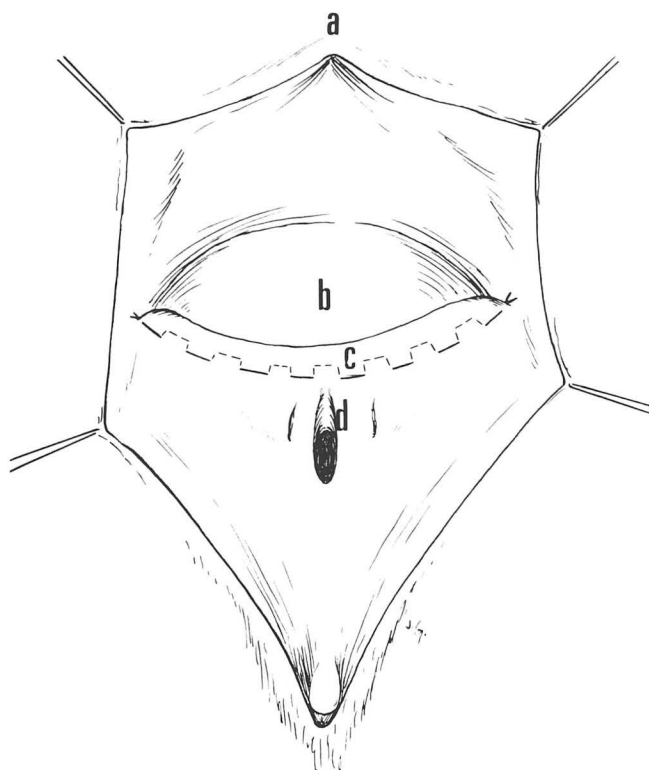


Figure 6: Surgical management of urine pooling in anterior vagina. Posterior view of open vulva showing technique of construction of transverse fold of vaginal floor. (a) Dorsal commissure. (b) Vaginal lumen. (c) Transverse fold of vagina constructed by placement of continuous mattress suture through base of fold. (d) Suburethral diverticulum.

needle is passed longitudinally under and through approximately 7.5 cm. (3 in.) of vaginal floor, directing the needle alternately cranially and caudally to form the mattress pattern. If the size of the pelvis permits, the use of both hands is extremely helpful. As the pattern is carried across the midline, the urethra should be avoided. The pattern is terminated at about the eight o'clock position on the left lateral vaginal wall by pulling the suture material tightly and tying. The result should be a semilunar dam about 5 cm. (2 in.) high. The apparently inconsistent addition in height is a result of the drawstring action of the taught suture. The intent is to cause adhesion

between the two portions of vaginal wall forming the base of the dam.

Fortunately, the free edge of the dam tends to lean cranially, a safety factor for both cow and bull during subsequent coitus, should natural service be possible. Followup examinations of the surgical site in several cases indicate that resolution of scar tissue is probably sufficient to allow for normal expansion during parturition. To date this observation is actually supported by only a few cases of known uneventful parturition.

The second stage of the repair is the classical Caslick's closure of the upper portion of the vulvar cleft (2) and whatever specific reconstruction of the perineum is indicated. When the vagina is no longer being ballooned by air and distended by urine, the lumen regresses to a nearly normal size. If metritis is present, frequent medication through an intrauterine infuser is indicated. If the required closure of the vulvar cleft is extensive, the cow may be restricted to artificial insemination.

Summary

The increasing incidence of pneumovagina in beef cows may include heritable implications but many cases can be traced to injuries occurring during parturition. Simple vaginal lacerations are treated conservatively. Severe vulvar wounds and rectovulvar lacerations are successfully repaired by methods originally designed for use in mares. Pneumovagina complicated by extensive pooling of urine in the vagina is corrected by establishment of a transverse fold of vaginal floor cranial to the external urinary meatus.

Acknowledgments

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REFERENCES

1. Aanes, W. A. Surgical Repair of Third Degree Perineal Laceration and Rectovaginal Fistula in the Mare. *J.A.V.M.A.*, 144, (1964): 485-491.
2. Caslick, E. A. The Vulva and Vulvovaginal Orifice and its Relation to Genital Health in the Thoroughbred Mare. *Cornell Vet.*, 27, (1937): 178.
3. Habel, R. E. The Topographic Anatomy of the Muscles, Nerves and Arteries of the Bovine Female Perineum. *Am. J. Anat.*, 119, (1966): 79-96.
4. Heinze, C. D. Repair of 3rd Degree Perineal Laceration. In *Bovine Medicine and Surgery*. Edited by W. J. Gibbons, E. J. Catcott, and J. F. Smithcors. American Veterinary Publications, Wheaton, Ill. (1970): 818-822.
5. McLeod, W. M. *Bovine Anatomy*. Burgess Publishing Co., Minneapolis, Minn. (1958): 197-199.
6. Roberts, S. J. *Veterinary Obstetrics and Genital Disease*. 2nd ed. Published by Author, Ithaca, N.Y. (1971): 303-306.
7. Rosenberger, G. *Krankheiten Des Rindes*. Paul Parey, Berlin, German. (1970): 331-334.
8. Straub, O. C. and Fowler, M. E. Repair of Perineal Laceration in the Mare and Cow. *J.A.V.M.A.*, 138, (1961): 659-664.
9. Vaughan, J. T. Personal Communication, 1967.
10. Wempe, W. W. Observations and Opinions on Breeding and Obstetrical Problems in the Cow. *Vet. Med./Sm. An. Clin.*, 63, (Dec. 1968): 1151-1153.