Estrus detector males

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Introduction

Estrus detection plays a vital role in the success of any artificial insemination program. There are multiple methods of heat detection employed on beef and dairy operations. The intact bull that has been rendered sterile is often described a teaser bull. These animals are useful aids for detection of estrus in females that do not display strong external cues that they are ready for breeding. This article reviews the most common techniques employed by practitioners to render a male sterile and still maintain libido. The options to avoid penetration of the genital tract of the female are desirable to limit infectious disease transmission. The vast number of techniques described in the literature are evidence that there is no perfect procedure. This article discusses several common, effective and currently recommended surgical techniques for preparing teaser bulls. The bull selected for these procedures should be young, healthy and have a strong libido. It is also recommended that the candidate for procedures should be easy to handle because of frequent human interactions.

Pre-anesthetic preparation

The bull should be fasted for 24-36 hours prior to deep sedation or general anesthesia to prevent bloat and the possibility of regurgitation with subsequent aspiration of ruminal contents. Pre-operative antimicrobials are recommended if the procedure is not performed in a sterile environment. The author prefers to utilize beta lactam antibiotics because of the spectrum of activity and common pathogens discovered in the urogenital tract of the bull. These antimicrobials should be administered 90 to 120 minutes prior to surgery for optimal efficacy.

For procedures that require extended time in lateral recumbency, the bull must have adequate padding to prevent the development of peripheral neuropathies. We utilize innertubes of different sizes to pad the shoulder and protect the radial nerve.

Surgical procedures

Epididymectomy

The bilateral caudal epididymectomy is a preferred procedure in to cause sterility in the bull. This procedure has the advantage of being performed in the standing position. The distal 1/3 of scrotum is aseptically prepped and a local block in administered. The most prominent area of the cauda epididymis is incised. The incision is extended through the scrotal fascia and tunica vaginalis. The cauda epididymis will protrude through the skin incision when the adequate depth has been achieved. Apply towel clamps and gentle traction to further exteriorize the epididymal tissue. Hemostatic forceps are applied following exteriorization of the entire cauda epididymis. The tissue is excised using a scalpel blade. The surgeon should be careful not to incise the tunica albuginea to avoid significant hemorrhage. The tissue is left to heal by second intention and the same procedure is performed on the contralateral testicle. The owner should wait 30 days to utilize this animal for estrus detection. This procedure does not prevent the bull from achieving intromission and other procedures are warranted to prevent the possible transmission of infectious pathogens.

Vasectomy

The surgical approach to the ductus deferens is on the caudal aspect of the scrotal neck. The bull is placed in lateral recumbency under light sedation. The area should be clipped and aseptically prepped. Local anesthetic is administered in the scrotal skin and extending into the spermatic cord proximal to the incision. Make a 2 to 3 cm longitudinal incision through the skin and underlying tunica dartos muscle to expose the spermatic cord. A blunt instrument like a Kelly forcep is placed under the spermatic cord. The vaginal tunic is sharply incised and the surgeon should avoid the cremaster muscle to prevent excessive hemorrhage. The fibrous, cord like ductus deferens are carefully isolated from the testicular artery and vein. Ligatures are placed proximally and distally 5 cm apart using absorbable suture. The tissue is transected and the tunica vaginalis is closed primarily. The scrotal skin and dartos muscle are then closed in a routine fashion. This procedure also does not render the bull unable to achieve intromission. The producer is advised to wait 30 days prior to utilizing this bull as described above. This procedure is more commonly used in small ruminants to render the male sterile.

Penile translocation (Sidewinder technique)

This technique repositions the prepuce in a lateral orientation to prevent intromission with the female during estrus. The author prefers to relocate the prepuce in the fold of the flank and this is the procedure of choice because of maintenance of libido in this population of bulls following the procedure. The drawback to the procedure is that it requires the bull to be in lateral recumbency under general anesthesia or deep sedation. The bull must not be utilized for 30 days following this procedure. Clip and prepare the ventral abdomen from the preputial orifice to the neck of the scrotum. The prepared area should extend two hand widths proximal to the fold of the flank. The preputial hairs remain intact to provide urine egress and avoid urine scald.

Make a seven-centimeter circular incision in the skin and extending through the cutaneous trunci muscle in the fold of the flank. Achieve adequate hemostasis and place a moistened 4x4 sponge over the area.

Marker suture is then placed on the dorsum of the external preputial orifice to give the surgeon orientation after translocation to the flank. Make a circumferential incision through the skin five-centimeters proximal to the external preputial orifice. Next, make a longitudinal incision that connects with the circumferential incision cranially and extends 40-50 cm caudally along the sheath. Blunt and sharp dissection is utilized to free the penis and prepuce away from the abdominal wall. It should be stressed to remain close to abdominal wall with the dissection to avoid large vessels in the elastic tissues. The dissection is complete when the penis and prepuce are free from the abdominal wall for the length of the longitudinal skin incision.

Blunt dissection to form a tunnel for transposition of the penis and prepuce is accomplished utilizing long cervical forceps. The author prefers to start the blunt dissection from the circular incision in the flank and extend distally. Sterile obstetrical sleeves are utilized to prevent contamination of the undermined tissue. Warm saline is applied to the lumen of the sterile sleeve after it is pulled through the incision for ease of movement the penis and prepuce. The sleeve is removed after transposition of the penis.

The marker suture previously placed allows the surgeon to position the external preputial orifice in the proper orientation in the flank. The subcutaneous tissue of the prepuce is sutured in quadrants to the cutaneous trunci muscle. Interrupted sutures using #1 absorbable suture is placed in each quadrant to secure subcutaneous tissue to the cutaneous trunci muscle. The skin is closed primarily using #3 monofilament non-absorbable sutures in an interrupted pattern. Prophylactic antibiotics should be administered for five days post-operatively. Non-steroidal anti-inflammatory drugs should be administered for 10 days to prevent excessive swelling and discomfort associated with the surgery.

Induced corpus cavernosal thrombosis

The goal of this procedure is to prevent straitening of the sigmoid flexure by inciting a thrombus in the corpus cavernosum proximal to the sigmoid flexure. Malleable dental acrylic is often utilized for this procedure. This type of acrylic sets up slow (12-24 hours) and does not cause a high temperature exothermic reaction. This procedure has the advantage of being performed in a standing position. The bull is restrained and a caudal epidural with 2% lidocaine is applied for regional analgesia. The area between the rectum and the scrotal neck are prepared aseptically. Make a midline incision of 15-20 cm in length that ends approximately 6-8 cm proximal to base of scrotum. The underlying thick fascia is dissected sharply, followed by blunt dissection of the elastic layers surrounding the penis. A loop of penis is exteriorized and the distal sigmoid flexure is identified as the site of attachment of the retractor penis muscles. Identify the ventral groove of the urethra as a landmark to avoid when placing the needle. Insert a 14 gauge by 1.5-inch needle in the dorsal aspect of the corpus cavernosum penis and inject 10-20 mL of saline to ensure proper positioning. The saline can be palpated as it is injected adjacent to the needle if in the proper position. It is a sign of improper placement of the needle if the solution is difficult to inject. The next step is to mix the dental acrylic and injecting 6-8 mL through the needle that remained in the cavernous space. Number 3 non-absorbable sutures are placed from the tunica albuginea on the lateral aspects of the penis at the distal sigmoid flexure to the subcutaneous fascia. This will prevent penile prolapse when the bull is stimulated and relaxes the retractor penile muscles. The skin is closed with non-absorbable suture in routine fashion. The bull should be observed following the procedure to ensure that he can urinate. Remove skin sutures in 10-14 days and put the bull to use at the time of suture removal.

Penis tie-down technique

The goal of this surgery is to create a permanent adhesion between the tunica albuginea of the penis and the ventral body wall. The bull is placed in right lateral recumbency following heavy sedation and the lateral aspect of the sheath is aseptically prepared. Local anesthetic is injected half way between the preputial orifice and the base of the scrotum on the lateral aspect of the sheath. A 15 cm skin incision is made midway between the preputial orifice and the scrotum, approximately 2 cm lateral to the midline. The incision is continued through the subcutaneous tissue, followed by bluntly dissect the ventral abdominal wall and the tunica albuginea with gauze sponges. Multiple interrupted sutures are placed to appose the tunica albuginea to the ventral body wall. It is recommended to utilize an absorbable suture that maintains its strength for extended periods compared to others. It is recommended by the author to close the superficial and deep subcutaneous tissues to avoid excessive dead space. Close the skin in a routine manner with non-absorbable suture material. The bull should be isolated away from cycling females in for 45 days to allow for adhesions to form. The bull should be observed by the owner for success or failure of the procedure prior to use for estrus detection.

References

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