CASE REPORT

Sokoto Journal of Veterinary Sciences

(P-ISSN 1595-093X: E-ISSN 2315-6201)

http://dx.doi.org/10.4314/sokjvs.v22i4.12

Ahmad *et al.*/*Sokoto Journal of Veterinary Sciences*, **22**(4): 312 - 317.

Surgical management of grade 2 vaginal prolapse in a six-year-old gravid Sokoto Gudali cow

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Publication History:
Received: 07-07-2024
Revised: 04-11-2024
Accepted: 06-11-2024

Abstract

A 6-year-old gravid multiparous Sokoto Gudali cow, weighing approximately 250 kg, was presented at the Veterinary Teaching Hospital of Usmanu Danfodiyo University Sokoto with the major complaint of straining and protrusion of an abnormal mass around the vulvo-vaginal area. The client revealed that the cow was fed Soya bean bran and table remnants mixed with water few days prior to development of the protrusion and subsequent presentation at the clinic. The cow was reported to be in her last trimester, had received ivermectin injection 4 weeks prior to presentation for the treatment of external parasites and had not received any previous vaccination. There was no history of previous vaginal prolapse during or after previous pregnancies. Management of the condition included reduction of the protruding mass and the replacement to its normal anatomical position. Stay sutures were placed using size 2 nylon thread (Ethilon®) along with supportive treatment. The cow delivered successfully 2 months post-treatment. This case presentation revealed that pre-partum vaginal prolapse can occur at the last trimester in cow without the risk of premature termination of pregnancy if immediate intervention is instituted.

Keywords: Grade 2, Sokoto Gudali cow, Surgical management, Third trimester, Vaginal prolapse

Introduction

Post-parturient eversion or protrusion of the vaginal mucosa is a relatively common occurrence, particularly in cattle compared with other species affecting the dairy industry worldwide and has been reported by numerous researchers (Balamurugan *et al*., 2018). lHowever, the occurrence of the pre-partum vaginal prolapse is not commonly reported. Vaginal prolapse is a reproductive problem affecting the females of several animal species, including cows, buffaloes, sheep, goats, horses, donkeys, and camels (Miesner & Anderson, 2008)

In cattle and sheep, eversion or prolapse of the vagina, with or without prolapse of the cervix, occurs most commonly in mature females during the last trimester of pregnancy. It rarely occurs in primiparous animal (Aiello *et al*., 2016). Extreme relaxation of the pelvic structures, flaccid uterus, and hyperestrogenism have been reported as predisposing factors (Jackson *et al*., 2014). This condition has also been reported in non-pregnant ewes and heifers (Aiello *et al*., 2016).

The main causes of vaginal prolapse remain unknown; however, genetic, nutritional, and hormonal factors have been linked to this problem (Miesner & Anderson, 2008; Aiello *et al*., 2016). Other factors capable of increasing intra-abdominal pressure, such as intra-abdominal fat accumulation, rumen distention, large foetuses, multiple foetuses, and occasionally hilly terrain, also contribute to the occurrence of vaginal prolapse as reported by Miesner & Anderson (2008). Several factors are involved in the course of parturition in a synergistic mechanism to deliver the foetus. Any deviation or alteration in any factor leads to abnormal conditions, such as dystocia or prolapse in the peri-parturient period (Balamurugan *et al*., 2018). Early diagnosis and immediate replacement of the prolapsed mass are keys to successful management of vaginal prolapse. There is a dearth of information on vaginal prolapse in the Sokoto Gudali breed of cattle. However, post-parturient uterine prolapse has been reported in the breed by Umaru *et al*. (2013).

Case Presentation

Case history

A 6-year-old multigravid Sokoto Gudali cow weighing approximately 250 kg was presented at the Veterinary Teaching Hospital of Usmanu Danfodiyo University Sokoto with complaints of straining and the emergence of a mass around the vulvo-vaginal area (Plate I). The cow was kept under semi-intensive management along with others and fed wheat bran and bean husks. Further history revealed that the cow was fed soya bean bran and table remnants diluted in water a day prior to the development of the protrusion and subsequent presentation at the clinic. The cow was reported to have received an ivermectin injection 4 weeks prior to presentation for treatment against external parasites and had not been vaccinated against any disease previously. Upon close physical examination, the cow was found to be in advanced pregnancy (third trimester), but not at term. The patient was alert, with a normal ocular mucous membrane, and the capillary refill time was less than two seconds. Further examination revealed that the cow was straining and there was the presence of a pink to reddish protruding mass (estimated measurement: 15x10 cm^2) around the vulva opening that was slightly soiled (Plate II). The evaginated mucosal layer lining of the vulva was hyperemic and warm to the touch. The protruded mass was carefully

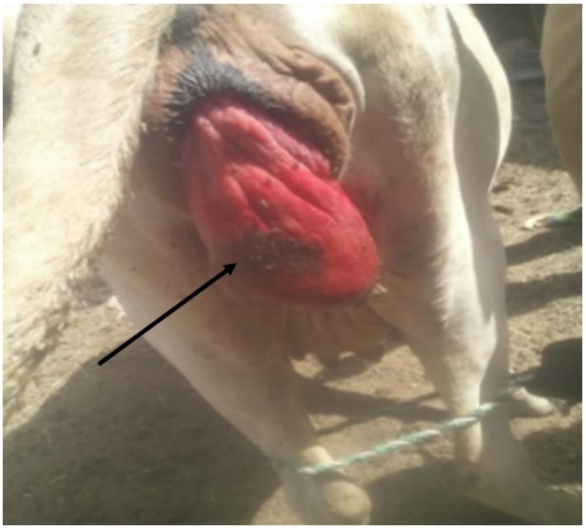

Plate I: The Sokoto Gudali cow on presentation with the vaginal prolapsed mass hanging over the vulva opening and contaminated with soil (arrow)

Plate II: Vaginal prolapse showing the dimension of the mass

examined for viability of the tissue and the presence of lacerations. It was observed that the mass was viable and there was no evidence of trauma or frank blood oozing out from it. The temperature, pulse, and respiratory rates of the cow were 38.2^{o}C, 73 beats per minute, and 25 cycles per minute, respectively and were within the normal range. The foetus, along with an intact placenta, was observed on rectal examination. The patient was diagnosed with vaginal prolapse, and blood and faecal samples were collected for routine haematological and parasitological examinations.

Plate III: Careful washing with normal saline and removal of physical dirt and contaminants from the prolapsed vagina before reduction of edema

Case management

The cow was restrained in a standing position in a chute and sacro-coccygeal caudal epidural anaesthesia was administered using 2% lignocaine (Troy Laboratories, NZ PTY Limited) at a dosage of 7 mg/kg. The prolapsed mass was gently cleaned with warm water to remove soil and debris sticking to the mass (Plate III). To reduce oedema and facilitate reduction, the mass was then washed with hypertonic glucose D solution, rinsed with normal saline, and manually manipulated and returned to its original anatomical position *in situ*, with purse-string suture (Buhner Stitch) applied around the vulva opening to keep the mass in place, using size 2 nylon suture material (Ethilon®) (Plate IV). Post-operatively, four boli of Vetcotrim® (sulfadiazine 200 mg/kg and trimethoprim 40 mg) were administered intravaginally. Penstrep® (procaine penicillin and dihydrostreptomycin sulfate) at a dose rate of 20,000 IU/kg and 10 mg/kg respectively, was administered for five consecutive days. Multivitamin Inj. (containing; Vit. A 2000I.U, Vit. D 2000 I.U, Vit. E acetate, 4 mg; riboflavin phosphate sodium, 1 mg; niacinamide, 10 mg; Thiamine Hcl, 10 mg; Pyridoxine HCl, 5 mg; D-panthenol, 1 mg; vit. B12 (10 mg), calcium glycerophosphate (10 mg), and phenol (0.5% w/v) 20 mL was administered for five consecutive days. The sutures were removed 7 days post-surgery, and the cow calved successfully a singleton 2 months post-surgery without any difficulties (Plate V). Parasitological examination revealed the absence of parasites while haematology revealed neutrophilia (Table 1).

Plate IV: Returning the reduced prolapsed vaginal mass into the pelvic cavity **(A)** and placement of stay suture to retain the mass in situ **(B)**

Plate V: The vulva of Sokoto Gudali cow after removal of the stay suture before calving **(A)** the cow with its calf after successful calving without recurrence of the vaginal prolapse **(B)**

Table 1: Haematological parameters of the Sokoto Gudali cow diagnosed with grade 2 prepartum vaginal prolapse

Parameters	Obtained values	Absolute values	Reference values Gyang (1999)
PCV (%)	40	-	27.00-45.00
RBC ($x10^6/mm^3$)	10.53	-	5.00-10.00
WBC ($x10^6/mm^3$)	7.20	-	4.00-12.00
Neutrophils	-	**4.82***	0.70-3.20
Lymphocytes	-	3.60	2.60-7.20
Basophils	-	0.00	0.00-0.20
Eosinophils	-	0.00	0.00-0.10
Monocytes	-	0.00	0.00-0.10

Key: * Abnormal values

Discussion

Vaginal eversions are classified into four grades according to the severity of eversion, the extent of injury, and the exposure of the cervix in such eversions. Grade 1 eversion is a small protrusion of the vaginal mucosa through the vulval lips, often causing dehydration and trauma. Grade 2 eversion involves continuous protrusion, with the possibility of the urinary bladder getting trapped in the everted organ. Grade 3 eversion involves the entire vaginal mucosa and cervix protruding continuously, leading to bacterial contamination, placentitis, and fetal death. Grade 4 eversion results in necrotic and fibrosed vaginal mucosa, potentially involving the urinary bladder and potentially leading to peritonitis (Peter & King, 2021).

Vaginal prolapse is a recurrent reproductive disease affecting virtually all species of farm animals (Umaru *et al*., 2013). The likelihood of vaginal prolapse occurring again during calving is very high in cows that have had pre-partum prolapses managed previously. It was reported that, the offspring of a cow with this condition are likely to develop vaginal prolapse at some point in their life because it can be a genetic feature. Based on this, cattle that had vaginal prolapse should thus be culled and their progeny should not be utilized for breeding operations because of the possibilities of genetic inheritance of the genes responsible for this condition. This also applies to bull calves, as they have the potential of spreading the condition throughout the herd by passing on undesirable genetic features to their female progeny (Aiello *et al*., 2016).

Most vaginal and cervical eversions occur postpartum after calving. However, few cases were reported to have occurred in the last few weeks to delivery (Umaru *et al*., 2013), similar to what was reported in this case. There have been some reported cases where the condition occurred several months before

calving; in such cases, the chances of recurrence during delivery are very high, as reported by Peter & King (2021). The objective of treating vaginal prolapse in pregnant farm animals is to replace and retain the vagina and cervix in situ within the pelvic canal so that foetus can be delivered without any complication (Abubakar *et al*., 2013).

Several management and treatment options have been described for vaginal and cervical eversions (Miesner & Anderson, 2008). However, the severity of eversion, the time to expected delivery, the veterinarian's preference, and the owner's ability or willingness to manage the patient after treatment dictate the treatment option to be considered (Peter & King, 2021). This case was successfully managed by adhering to the 10 "R" principles which included removal of debris, rinsing the protruded mass, relieving the bladder, restraining the animal, reducing edema, repositioning the prolapse organs, retention techniques to avoid recurrence, restricting feed and water, reducing roughage, and suture removal (Thangamani et al., 2018).

In previously reported cases, there were no specific changes in haematology and clinical chemistry associated with vaginal prolapse. However, anaemia can occur following haemorrhage. When there are complications due to laceration of the prolapsed mass, there could be leukocytosis which may indicate systemic infection due to secondary bacterial invasion from the exposed vaginal mass (Aiello *et al*., 2016). In animals, neutrophils are the initial leukocytes recruited in response to inflammation. Therefore, neutrophilia observed in this case is a common finding in most of the cases of vaginal prolapse reported in farm animals (Upadhyay *et al*., 2021). The neutrophilia observed, in this case, could be associated with two reasons; possible bacterial contamination due to observed soiling of the vaginal mass, or it could also be due to increased levels of cortisol secretion caused by stress similar to what was observed by Upadhyah *et al*. (2021).

According to Miesner & Anderson (2008), nutrition may contribute to the occurrence of vaginal prolapse in ruminants. Feeding animals with fast-fermenting carbohydrates can cause ruminal enlargement, which is exacerbated by fermentation-related gas buildup. Acidotic ruminal distention has also been linked to the development of increased intra-abdominal pressure, which promotes vaginal prolapse. From the case report, feeding the cow soybean husks and table scraps might have contributed to the vaginal prolapse by causing ruminal distention and elevating intra-abdominal pressure, both of which are known to promote vaginal prolapse. Consequently, the case in question may be connected to the ingestion of soybean byproducts. It is worth noting that the cow's usual diet consisted of wheat bran and bean husks; however, when fed soybean meal, vaginal prolapse was observed.

In conclusion, vaginal prolapse occurs frequently and is usually observed in ruminants, particularly cattle and sheep. Although this condition is not commonly reported in the Sokoto Gudali breed of cow, this case report indicated that this breed of cattle is also at the risk of having this condition. The condition requires immediate intervention by veterinarians to protect the prolapsed mass from possible injuries, bleeding, and sepsis and to further prevent economic loss due to maternal and fetal death. Farmers should also avoid self-medication and feeding pregnant animals with rapidly fermentable feed, such as soybean husks and table remnants.

Conflict of Interest

The authors declare that there is no conflict of interest.

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