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# Complete bladder eversion in periparturient Nellore cow – case report

*[Eversão completa de bexiga no pré-parto em vaca Nelore – relato de caso]*

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## ABSTRACT

Partial or complete bladder eversion is a rare condition of poor prognosis in cows, commonly associated with intense tenesmus observed in the peripartum period. A 14-year-old obese Nellore cow at 280 days of gestation was referred with 24-hour bladder prolapse. The bladder was complete eversion through the vulvar vestibule showing a thick congested wall and small residual urine volume. After clinical examination, the cow received scopolamine butylbromide and intercoccygeal epidural anesthesia, and the externalized bladder segment was partially reduced, remaining only 10 cm externalized. The cow was maintained with an intravesical human gastric tube number 16 and constant monitoring. The eversion was fully reduced after 12 hours of local treatment, and as the cow presented subclinical ketosis, hypocalcemia and cystitis, antibiotic, glucose, calcium and propylene glycol therapy were performed. We opted for induction of parturition, and after 24 hours, a healthy 52kg calf was born and the placenta was delivered 16 hours after calving. The cow and calf were discharged on the sixth day of hospitalization, with no recurrences or secondary complications after treatment.

Keywords: everted bladder, cattle, pregnant cow, cystitis

## RESUMO

*A eversão vesical parcial ou completa é uma condição rara de mau prognóstico em vacas, comumente associada a tenesmo intenso observado no período periparto. Uma vaca Nelore obesa de 14 anos de idade, com 280 dias de gestação, foi encaminhada com prolapso de bexiga de 24 horas. A bexiga apresentava eversão completa por meio do vestíbulo vulvar apresentando parede espessa e congestionada e pequeno volume residual de urina. Após exame clínico, a vaca recebeu butilbrometo de escopolamina e anestesia peridural intercoccígea, e o segmento vesical exteriorizado foi parcialmente reduzido, permanecendo apenas 10cm exteriorizado. A vaca foi mantida com sonda gástrica humana número 16 por via intravesical e monitorada constantemente. A eversão foi totalmente reduzida após 12 horas de tratamento local, e, como a vaca apresentava cetose subclínica, hipocalcemia e cistite, foi realizada antibioticoterapia, glicose, cálcio e propilenoglicol. Optou-se pela indução do parto. Após 24 horas, nasceu um bezerro saudável de 52kg e a placenta foi expelida 16 horas após o parto. A vaca e o bezerro receberam alta no sexto dia de internação, sem recidivas ou complicações secundárias após o tratamento.*

*Palavras-chave: bexiga evertida, bovinos, vaca gestante, cistite*

## INTRODUCTION

The bladder eversion through the urethra is a rare condition in cows (Ribelin, 1948; Frazer, 1988; Peter *et al.*, 1989; Friesen *et al*., 1995), probably due to their long and narrow urethra (Fubini and Ducharme, 2004). Although its causes are not fully understood, the condition is strongly associated with the excessive abdominal forces observed during the labor (Hooper e Taylor, 1995; Hallowell and Potter, 2016) or shortly after parturition (Friesen *et al.*, 1995). However, there is a bladder eversion report in a non-pregnant mare due to chronic bacterial cystitis (Kumas and Maden, 2014). It is believed that increased intra-abdominal pressure and hypocalcemia are predisposing factors for this condition (Friesen *et al.*, 1995).

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Clinical signs will depend on the evolution of the condition, involvement of other structures, and the everted organ's commitment. The eversion development time varies from hours to days, and it is commonly reported that the animal was apparently healthy, presenting only a history of previous intense tenesmus (Frazer, 1988). As in most cases, if the cow is healthy, there is a delay in referring the animal to a referral center, allowing the development of secondary complications such as renal failure (Ribelin, 1948; Friesen *et al.*, 1995), incarceration/herniation of intestinal loops, uterine torsion (Frazer, 1988; Peter *et al.*, 1989), cystitis and peritonitis, making the prognosis poor (Hallowell and Potter, 2016).

As the condition is suspected when a prominent mass is detected on the vaginal floor, it must be differentiated from other disturbances that present a similar appearance, such as bladder prolapse, vaginal prolapse, and vaginal hematoma or tumor (Ribelin, 1948; Frazer, 1988). The treatment consists of replacing the bladder; however, this procedure is challenging to perform since the already narrow cow's urethra becomes narrower due to the bladder's subsequent congestion and swelling. Furthermore, even after successful replacement, there is a risk of subsequent bladder rupture due to tissue necrosis (Hallowell e Potter, 2016).

As, as far as we know, there are only few reports of successful reduction of bladder eversion in cows (Brunsdon, 1961; Hentschl and Walton, 1966; Jones, 1984; Frazer, 1988), the aim of this paper is describe a conservative method of bladder replacement through the urethral orifice in a multiparous cow.

## CASUISTRY

A 14-year-old, 1000kg, Nellore cow at 280 days of pregnancy with a body condition score of 5 (1 to 5 point scale) was referred to the Veterinary Hospital of the School of Veterinary Medicine and Animal Science - UNESP, Brazil with a 24-hour bladder prolapse. At the farm of origin, the farm's veterinarian drained approximately 400mL of liquid with a urine aspect, by an insemination pipette inserted through the urethra. However, there was no improvement in the clinical condition on the farm. Moreover, after hospital admission, the animal was apathetic, with tenesmus and dripping of liquid through the vulva. In the clinical evaluation, the female presented intense tenesmus and bladder's complete exteriorization (22cm) through the vulvar vestibule (Fig.1), which presented its thick wall. The cow's rectal temperature and pulse rate were within normal limits, but respiratory rate was elevated (52 breaths/min) and ruminal motility reduced (2 incomplete contractions/3 min). The first approach was the administration of scopolamine butylbromide 0.16mg/kg IV (Buscofin Composto®, hyoscine and dipirone, Agener União, Brazil) and an intercoccygeal epidural block (C1-C2) with 2% lidocaine hydrochloride with vasoconstrictor (6mL) and 8mL morphine (8mL). Then, using tap water and chlorhexidine digluconate 2%, local cleaning and 20 min of cryotherapy, applying ice bags, were performed in the exteriorized bladder segment; this procedure resulted in a 50% reduction of the volume everted.

Figure 1**.** Everted bladder with congestion and thickening of the bladder wall, and small residual urine volume in Nellore cow.

After its lubrication with chlorhexidine ointment, the everted segment was partially reduced after 40 minutes of manual attempts, remaining only ~10 cm exteriorized. Subsequently, five liters of carboxymethylcellulose were administered into the bladder through the urethra to create a gravitational force to reduce bladder eversion.

A intravesical human gastric tube n.16 was inserted. The cow and fetus were continuously monitored, and frequent antisepsis of the

bladder exteriorized segment with potassium permanganate solution (100mg in 5 liters of warm water) was also performed. The total eversion reduction was observed after 12 h, and clinical laboratory analysis revealed only the increase of blood urea concentrations (31mg/dL). A therapeutic protocol with oxytetracycline (20mg/kg, IM, SID), scopolamine butylbromide, and flunixin meglumine (1.1mg/kg, IV) was instituted.

Twenty-four hours after the eversion reduction, secondary ketosis (β-hydroxybutyric acid: 1.2mmol/L) and subclinical hypocalcemia (total calcium: 5.8mg/dL) were detected, and therapy with glucose, calcium and propylene glycol solution was initiated.

As a new vaginal evaluation revealed mild fibrinous vaginitis with multifocal fibrin deposits adjacent to the external urethral ostium, consistent with cystitis and, only hyperfibrinogenemia (1000mg/dL) was observed in laboratory analysis at 72h after admission, therapy with ciprofloxacin (5mg/kg, IM, SID) and meloxicam (0.5mg/kg, IV SID, three days) was started due to the improvement of ketosis (β-hydroxybutyric acid: 0.5mmol/L), and to monitor the labor.

Parturition was induced with dexamethasone (20mg, IM) and 24h later, a healthy 52kg calf was delivered and the placenta expelled 16h after calving. The cow and calf were discharged on the sixth day of hospitalization, but the antibiotic therapy was kept for 15 days of treatment after discharge. The cow presented no relapses or secondary complications.

## DISCUSSION

In cows, differently from uterus and vagina prolapse that are common, especially in Brahman and Nellore breeds (Prestes *et al.*, 2008), bladder prolapse and eversion are extremely rare (Fubini and Ducharme, 2004), without apparent racial predisposition, being most often associated with degree II and III vaginal prolapse (Azawi *et al.*, 2012). This condition is an emergency and should be solved before developing intense swelling, vascular impairment, necrosis, and possible hemorrhage worsen the prognosis (Miesner and Anderson, 2008).

Partial or complete bladder eversion, although rare, commonly occurs in parturient cows (Fubini and Ducharme, 2004). Nonetheless, it can occur at any moment during pregnancy since any increase in intra-abdominal pressure can initiate this disorder, like in this case (Hallowell and Potter, 2016). It is believed that some factors predispose the bladder eversion development, especially after parturition, when the cow is in negative energy balance and commonly has metabolic disorders, such as hypocalcemia (Friesen *et al.*, 1995). In this case, the cow developed ketosis before delivery, as well as hypocalcemia also observed, this seemed to reduce bladder and vagina wall tone, predisposing for bladder eversion (Friesen *et al.*, 1995).

The bladder eversion in a periparturient cow is a rare condition. In spite of this, it is not possible to determine the triggering cause of eversion in the present case, hypocalcemia, even in the observed subclinical form, cannot be ruled out; there are descriptions that this deficiency is capable of reducing the tone of smooth muscle, especially in overweight animals (Risco *et al.*, 1984; Seifi e Kia, 2017).

In cows, bladder eversion should be differentiated from other disorders that present a prominent mass in the vagina, such as uterine eversion, vaginal prolapse, vaginal abscess, and vaginal neoplasia (Frazer, 1988). Although bladder prolapse is relatively easy to be diagnosed during a detailed clinical examination, some cases were misdiagnosed as a vaginal tumor (Ribelin, 1948); so a detailed anamnesis and evaluation of the "mass" are essential.

The differentiation between prolapse and bladder eversion is not only to make a more accurate diagnosis, but also to elect the best management to perform the replacement. Bladder prolapse occurs usually through a tear in the vaginal wall, majority associated with delivery, while a bladder eversion occurs through the urethral orifice. Therefore, in cases of prolapse, the surface of the bladder serosa protrudes through the vulvar lips, while in eversion, is the bladder mucosa, as evidenced in the admission evaluation that detected the everted portion as the bladder mucosa (Fubini and Ducharme, 2004; Hallowell and Potter, 2016). However, it is not always possible to distinguish which surface

of the bladder is protruding. Thus, some signs should be considered when evaluating the genital system, such as the absence of lacerations in the floor of the vagina (Peter *et al.*, 1989) as observed in the present case, it is suggestive that the condition is an eversion, and not a prolapse.

Another sign for realizing this differentiation refers to whether the bladder may contain urine or not (Bloomberg, 1963). It is known that the protrusion of the organ occurs through the urethral orifice, the passage of urine to the bladder is compromised, making it impossible for the everted bladder to become full, and there is a report of hydronephrosis secondary to this condition (Friesen *et al.*, 1995). However, as observed in the present case and in other reports (Frazer, 1988; Peter *et al.*, 1989), the cow had residual fluid similar to urine in the everted bladder, which in reality consists in serous exudate of acute inflammation (Frazer, 1988; Peter *et al.*, 1989). It is important to emphasize that in cases of partial eversion, the presence of urine can normally be observed, but in a smaller amount. Furthermore, sometimes the difference between exudate and urine is only possible to detect with cytology.

The treatment consists of replacement of the bladder through the urethral ostium under epidural block, and in some cases, amputation of the bladder apex is necessary (Fubini and Ducharme, 2004). Unlike the few successful cases described in the literature, in which surgical treatment was performed as laparotomy and cystotomy (Frazer, 1988), the clinical management instituted in the present case was efficient in correcting the disorder. Probably the need for surgical procedures (Friesen *et al.*, 1995) euthanasia and early slaughter (Peter *et al.*, 1989) is due to the delay in the animal's referring, which most often is performed late, when the necrotic process is very extensive (Ribelin, 1948) and with the presence of serious complications (Peter *et al.*, 1989).

## CONCLUSIONS

The treatment of the present case of bladder eversion obtained success, with absence of relapses and secondary complications, considering the animal's distance accompaniment, probably due to the rapid diagnosis and treatment instituted.

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