CLINICAL REPORT

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Case report of surgical correction of acquired preputial stenosis in a calf

Relato de caso de correção cirúrgica de estenose prepucial adquirida em bezerro

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ABSTRACT: Diseases involving the reproductive tract of male ruminants, especially bulls, are a significant cause of economic and genetic loss to beef and dairy cattle industry worldwide. In calves, congenital hypospadia is the most commonly reported condition affecting genital organs. In the reviewed literature, there are no reports of surgical correction of acquired phimosis in calves. Therefore, the present paper aimed to report the surgical correction by circumcision of a traumatic-induced phimosis in a calf. A 6-months-old crossbred calf was submitted to surgical correction of acquired preputial stenosis by the Lazzeri circumcision approach. Surgery was uneventful and post-operatory complication was restricted to partial wound dehiscence, that did not compromise complete secondary intention healing. Long-term follow-up (30-months after surgery) was conducted by telephone call, revealing that the calf is now a bull with 3-years-old and still is the herd's breeder. To the best of our knowledge, this is the first report of surgical correction by circumcision of a traumatic-induced phimosis in a calf using the Lazzeri technique. In this calf post-operatory complications were considered minor and long-term follow-up confirmed that the procedure was successful, and the animal obtained its reproductive capacity maintained.

KEYWORDS: Cattle, genital organs, internal preputial lamina, prepuce, urogenital surgery.

RESUMO: Doenças que acometem o trato reprodutivo de ruminantes machos, especialmente touros, são causa significativa de perdas econômicas e genéticas para a indústria pecuária de corte e leite em todo o mundo. Em bezerros, a hipospadia congênita é a condição mais comumente relatada que afeta os órgãos genitais. Na literatura revisada não há relatos de correção cirúrgica de fimose adquirida em bezerros. Portanto, o presente trabalho teve como objetivo relatar a correção cirúrgica por circuncisão de uma fimose induzida por trauma em um bezerro. Um bezerro mestiço de 6 meses de idade foi submetido à correção cirúrgica de estenose prepucial adquirida pela abordagem de circuncisão de Lazzeri. A cirurgia ocorreu sem intercorrências e a complicação pós-operatória restringiu-se à deiscência parcial da ferida, que não comprometeu a cicatrização completa por segunda intenção. O acompanhamento a longo prazo (30 meses após a cirurgia) foi realizado por contato telefônico, revelando que atualmente o bezerro se tornou um touro com 3 anos de idade e ainda é o reprodutor do rebanho. Até onde sabemos, este é o primeiro relato de correção cirúrgica por circuncisão de fimose induzida por trauma em bezerro pela técnica de Lazzeri. Neste bezerro as complicações pós-operatórias foram consideradas mínimas e o acompanhamento a longo prazo confirmou que o procedimento foi bem-sucedido e que o animal obteve sua capacidade reprodutiva preservada.

PALAVRAS-CHAVE: Bovinos, orgãos genitais, lâmina prepucial interna, prepúcio, cirurgia urogenital.

INTRODUCTION

Diseases involving the reproductive tract of male ruminants, especially bulls, are a significant cause of economic and genetic loss to the beef and dairy industry worldwide (Anderson, 2008; Prado *et al.*, 2016; Queiroz *et al.*, 2021; Lopes & Papa, 2023). In a survey of diseases affecting the external genital organs of bulls from Goiás, Midwestern Brazil, acroposthitis-phimosis was the more frequent accounting for 80.5% of the diseases affecting the prepuce (Rabelo *et al.*, 2015). In calves, congenital hypospadia is the most commonly reported condition affecting genital organs (Misk *et al.*, 2013). Nevertheless, calves are also prone to preputial traumatic injuries, especially in breeds with pendulous sheath or larger preputial orifices (Hopper, 2016). These traumas may act as predisposing factors to phimosis (Hopper, 2016), defined as the inability to protrude the penis from the prepuce (Akhtardanesh *et al.*, 2022; Lopes & Papa, 2023). Phimosis may be a result of a preputial opening that is too small or absent impairing penile exposition, and may

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be developmental or a result of trauma and preputial stenosis. Additionally, phimosis may also occur secondary to penile, preputial neoplasia or cellulitis (Hajinasrollah *et al.*, 2019).

In the reviewed literature, there are no reports of surgical correction of acquired phimosis in calves. Therefore, the present paper aims to report the surgical correction by circumcision of a traumatic-induced phimosis in a calf. Additionally, epidemiological, clinical, laboratory features and long-term follow-up information are determined.

CASE REPORT

A 6-months-old and 130-kg crossbred calf was referred for hospital care. The owners reported that the calf was acquired 1-month earlier with the purpose of becoming the herd's breeder, but already presented a pendulous navel and prepuce. After this, the calf presented difficulty urinating and preputial urinary retention occurred. Frequent puncture of the preputial foreskin to relieve urinary retention and treatment with dexamethasone (13mL intramuscularly, once a day for three days) was also reported. The previous owner stated that the calf has had a preputial injury with myiasis, and also reported not disinfecting the navel after birth. On the new farm, the calf was raised semi-extensively on *Urochloa decumbens* pastures and supplemented with 1.5-kg of grounded corn daily and had free access to mineral mixture.

On physical examination the calf presented a regular body condition score (5/10 score) and a pendulous navel with urine retention on the preputial cavity (Figure 1). During preputial manipulation, urine dripping occurred through the diminished (about 6mm) preputial opening. The surrounding tissue presented a whitish coloration and hardened consistency, suggesting fibrosis (Figure 1). The other parameters (rectal temperature, ruminal motility, heart and respiratory rate) were within normal values for calves (Dirksen *et al.*, 1993).

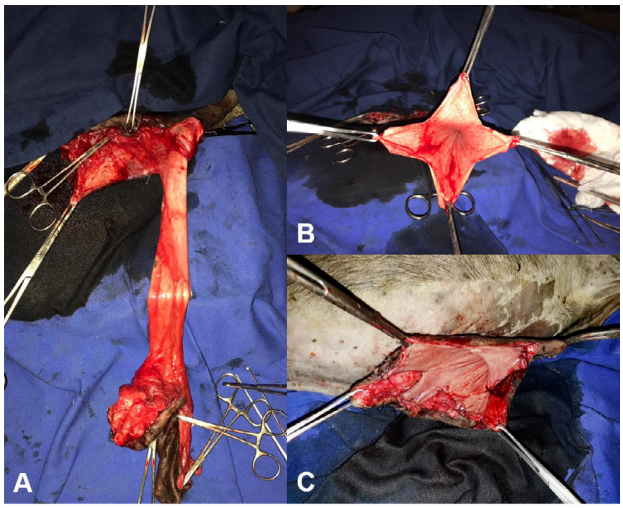
Source: author's collection.

Figure 1. A six-months-old crossbred calf presenting preputial urinary retention. Note the urine splatter marks on the floor. Closer view: diminished preputial orifice presenting whitish coloration and hardened consistency, suggesting fibrosis.

Blood samples were collected through jugular venipuncture for hematology (complete blood count and fibrinogen determination) and serum biochemistry (aspartate aminotransferase and gamma-glutamyl transferase activities, albumin, total protein, urea and creatinine levels). Laboratory abnormalities were restricted to hypoproteinemia (6.3 g/dL; reference range: 6.7-7.4 g/dL) by hypoalbuminemia (2.8 g/dL; reference range: 3.03-3.55 g/dL) (Kaneko *et al.*, 2008).

In view of the owner's intention to use the calf as a breeder, surgical correction by circumcision was chosen. After 12-h fasting, pre-medication with 2% xylazine hydrochloride (0.2 mg/kg, intramuscularly [IM]) was performed, followed by dissociative anesthesia with triple drip solution (xylazine: 0.2 mg/kg; ketamin: 1 mg/kg; and 5% EGG, intravenously [IV]) (Seddighi & Doherty, 2016). The calf was positioned on right lateral recumbency, and the preputial foreskin was shaved. Local anesthesia was accomplished by thoracic lateral nerve and ring infiltrative block on the prepuce foreskin with lidocaine (6 mg/kg) and bupivacaine (0.5 mg/kg). Pre-operatory care also included an intravenous dose of hydrocortisone (4 mg/kg). After aseptically routine pre-surgical preparation, the circumcision by the Lazzeri technique was performed (Rabelo *et al.*, 2017a) (Figure 2).

Postoperatively, the calf was submitted to broad spectrum antibiotics (oxitetracycline: 20 mg/kg, IM, every 48-h, three doses), anti-inflammatory (flunixin meglumine: 2.2 mg/kg, IV, once a day, three days) and analgesic (dipyrone: 25 mg/kg, IM, two times a day, five days) therapies. Surgical wound was dressed twice daily with preputial immersion on 1% chlorhexidine solution for 5 minutes, followed by drying



Source: author's collection.

Figure 2. Surgical approach. (A) Complete release of the stenotic preputial ostium and internal preputial lamina (IPL). (B) A longitudinal incision was made in the IPL between each Allis clamp, in order to improve diameter compatibility and allow a tension-free suture. (C) Suture of each "petal" of the preputial mucosa to the external preputial lamina with Wolf pattern sutures using size-0 polyglactin.

and topical antibiotic spray. After surgery, the calf was maintained on a clean stall with controlled access to a paddock (two hours twice daily), aiming to prevent preputial edema. On the 6th day after surgery, there was necrotic debris on the surgical wound with dehiscence of one petal, but did not compromise complete secondary intention healing within two weeks (Figure 3), and the calf receive hospital discharge on the 22nd day post-surgery.

At the time of manuscript preparation, long-term follow-up (30-months after surgery) was conducted by telephone call. The owners reported that the calf is now a bull with 3-years-old and still is the herd's breeder. No further complication after hospital discharge was reported.

DISCUSSION

Phimosis is consequence of acroposthitis, which is a well document disease in the bull, especially from Zebu breeds and their crossings (Rabelo *et al.*, 2015; Queiroz *et al.*, 2021; Lopes & Papa, 2023). A significant relationship seems to exist between a pendulous sheath and the tendency of habitual eversion of the prepuce (Prado *et al.*, 2016). Also a larger preputial orifice may predispose to prolapse (Hopper, 2016). Injury and infection lead to fibrosis, and later to phimosis or preputial stenosis (Prado *et al.*, 2016). Additionally, inability to expose the penis causes preputial irritation and infection secondary to urine pooling within the prepuce (Hajinasrollah *et al.*, 2019). The aforementioned pathophysiology may also serve to explain this case report. Absence of navel disinfection, pendulous sheath and a previous history of preputial myasis are also important risk factors that may have contributed to the trauma-acquired phimosis in the calf herein.

In the present report, detailed clinical evaluation combined with epidemiological data were enough to achieve a reliable definitive diagnosis, as previously reported in bulls (Anderson, 2008; Prado *et al.*, 2016; Hopper, 2016; Lopes & Papa, 2023). Nevertheless, the impossibility of evaluation of the preputial internal layer was a concern, since there must be at least one third of healthy tissue for surgery (Queiroz *et al.*, 2021). Recently, ultrasonography was presented as a useful ancillary test to evaluate the preputial internal layer and free part of the penis, helping to establish surgical feasibility and prognosis (Silva *et al.*, 2019). Chronic cases of phimosis with severe fibrosis may cause circulatory disturbances and ischemic injuries, especially to the free part of the penis (Rabelo *et al.*, 2016). Additionally, urinary infection and acroposthitis are considered common complications of phimosis (Akhtardanesh *et al.*, 2022).

Source: author's collection.

Figure 3. Preputial appearance on the 20th post-surgery day (two days prior to hospital discharge). Note that there is still a gap between the preputial foreskin and the petal that presented dehiscence (arrow).

Hypoproteinemia by hypoalbuminemia detected in the calf possibly occurred because albumin being a negative acute-phase protein, decreases in concentration following acute phase response and malnutrition (Kaneko *et al.*, 2008). No abnormalities in serum creatinine and urea were observed, since there was no complete urinary outflow obstruction and the calf could still urinate by dribbling through the stenotic preputial orifice.

Surgical options in cases of acroposthitis-phimosis includes the circumcision by the Marques; Lazzeri or Rabelo & Silva techniques (Rabelo *et al.*, 2017a). Additionally, there is a simpler approach consisting of a "V" shaped incision on the caudal aspect of the preputial orifice providing diameter increase (Rabelo *et al.*, 2017b). Recently, a postoplasty technique performed in a standing position has been reported, which has advantages in relation to animal welfare by preventing injuries due to prolonged recumbence, especially in heavy bulls (Lopes & Papa, 2023). Herein, the owner's intention of using the calf as the herd breeder associated to the clinical presentation (pendulous sheath and preputial stenosis) played an important role on the surgical approach choice. Therefore, the Lazzeri technique seemed the best approach, as preputial shortening and stenosis correction were required.

Correct post-operatory management is also extremely important to achieve a good result, and all techniques may present post-operatory complications, such as edema, surgical site infection, dehiscence and stenosis relapse (Hopper *et al.*, 2016; Prado *et al.*, 2016; Rabelo *et al.*, 2017a,b; Queiroz *et al.*, 2021). Some authors advocate that severe preputial edema is one of the most important risk factor to partial or total surgical wound dehiscence. Therefore, therapies to prevent post-operatory edema, such as anti-inflammatory therapy, cold-water showering and a preputial suspender, are considered beneficial to achieve primary intention healing (Rabelo *et al.*, 2017a; Queiroz *et al.*, 2021; Lopes & Papa, 2023). The calf herein was submitted to controlled exercise, wound dressing and anti-inflammatory therapy; and post-operatory preputial edema was considered moderate. Nevertheless, the calf presented a partial wound dehiscence, that did not compromise complete secondary intention healing. Long-term follow-up

confirmed that the calf was used as the herd breeder and no stenosis recurrence or other complication was reported.

To the best of our knowledge, this is the first report of surgical correction by circumcision of a traumatic-induced phimosis in a calf using the Lazzeri technique. In this calf post-operatory complications were considered minor and long-term follow-up confirmed that the procedure was successful, and the animal obtained its reproductive capacity maintained.

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