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CASE REPORT
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Videodiagnosis of External Urinary Meatus Obstruction and Persistent Urachus in Heifer

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ABSTRACT

***Background*:** Persistent urachus conditions in calves are related to umbilical pathologies and might lead to uroperitoneum abnormalities, especially persistent urachus itself and bladder rupture. Videosurgery could be an interesting option for diagnoses of the genitourinary tract, given the relevance of genitourinary affections in calves. The aim of this report is to describe videosurgery resolution and performance in a case of external urinary meatus obstruction and persistent urachus in a heifer.
***Case*:** An eight-month-old Girolando heifer was admitted in the UNIFRAN Veterinary Hospital with the suspicion of persistent urachus. The owner reported that the animal was not urinating, and after a few days, it was noticed the presence of urine leaking from the umbilical site. It was also informed that another veterinarian had previously performed pure iodine infusion in probable urachus area for 5 days in a row in an attempt to obliterate the canal. Significant higher levels of urea, creatinine and fibrinogen were noticed in the exams executed, also leukocytosis and signs of pain when performed abdominal palpation. When urethral sounding was implemented, it showed difficulties and resistance in the introduction of the sound. In the vaginourethrocystoscopy, it was noticed a thin membrane in the external urinary meatus causing complete obstruction, which was easily perforated by the cystoscope sheath, allowing the attainment of urethra and part of cranial bladder inspection. In order to evaluate the flow of the urine, it was applied methylene blue by the cystoscope working channel in the interior of the urethra and the bladder, which was collected by sounding the urachus, confirming presence of persistent urachus. When realized a contrasted x-ray of the bladder, it was noticed extravasation of the contrast into the peritoneum, indicating that a surgical approach should be performed; however the owner did not authorize the realization of any surgical intervention. Antibiotic therapy with cefitiofur (1 mg/kg) and anti-inflammatory therapy with flunixim meglumine (1.1 mg/kg) were initiated, however the patient died after 24 h of therapy. Persistent urachus was confirmed at necropsy, showing malodorous brownish secretion in the umbilicus area. Also, it was observed 2 L of turbid purulent liquid in abdominal cavity, which was filled with fibrin; petechiae in the intestinal serosa; focus of necrosis and bladder rupture concluding that the cause of death was given by rupture of the urinary bladder followed by peritonitis.
***Discussion*:** The diagnosis through vaginourethrocystoscopy was important to verify the urethral obstruction. However it was not able to visualize the necrosis area in cranial portion of the bladder due to the size of cystoscope, which was too short and rigid. Video diagnosis was an efficient method for urethral abnormalities and, if necessary a complete bladder evaluation, flexible cystoscope should be used. Urethrocystography is a good option for diagnosis of uroabdomen in heifer and should be performed as a supplementary technique of video diagnosis when injury or rupture of cranial bladder is suspected. Caustic products such as iodinated compounds must not be used if urethra is obstructed, because it can cause extensive necrosis in cranial bladder, uroperitoneum and sepsis, which may lead the patient to death.

Keywords: genitourinary tract, bovine, urethra, *Bos taurus*, umbilical pathologies, videodiagnosis.

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INTRODUCTION

One of the most important diseases in calves is the persistence of the urachus, usually related to umbilical abnormalities [8]. Under normal physiology, among anatomical and physiological occurred since the rupture of the umbilical cord of newborn ruminants, it takes into consideration the closure of the urachus because the urine becomes excreted through the urethra instead of the urachus and this structure then becomes the median umbilical ligament [7].

Flaws in urachus closure can result in the occurrence of malformation of the bladder, sometimes there may be partial obstructions in the flow of urine or normal pressure contractions, resulting in urinary stasis, persistent inflammation, and even formation of calculi [3]. It is usually 1% povidone iodine in the urachus of newborn calves to promote its closure, but if there is already malformation of the genitourinary tract, such as urethra obstruction, the solution may lead to necrosis, extravasation, peritonitis and even death of the animal [5].

As a result of these alterations, the animal may present uroperitoneum, which is the urine accumulation in the peritoneum because of its flow from the kidneys, ureters, bladder or urethra or by a rupture in the persistent urachus or bladder [1].

Videosurgery procedure is an interesting option for diagnosis in the genitourinary tract, including urethrocystoscopy, however is still poorly applied in clinical practice in large animals [3].

Due to the magnitude of genitourinary disorders in calves, mainly related to umbilical pathologies, the aim of this report is to describe a case of external urinary meatus obstruction and persistent urachus in a heifer.

CASE

An eight-month-old, Girolando heifer was admitted in the UNIFRAN Veterinary Hospital with the suspicion of persistent urachus. The owner reported that the animal was not urinating and after a few days it was noticed the presence of urine leaking from the umbilical site. It was also informed that another veterinarian had performed pure iodine infusion in urachus perforation during 5 days in an attempt to obliterate the canal.

Complementary laboratory exams were requested in which it was observed significant increases in the levels of urea, creatinine and fibrinogen and signs of pain when performed abdominal palpation. The patient was admitted and presented heart rate of 140 beats per minute and rectal temperature of 39.5º C, showing signs of pain when performed abdominal palpation, thick vaginal secretion and mild hematuria. It was observed resistance in urethral catheterization and bladder access.

Given this, the patient was submitted to vaginourethrocistoscopy, which diagnosed a thin membrane in the external urinary meatus causing an obstruction. The membrane was easily perforated by the cystoscope sheath, allowing the inspection of the urethra and bladder. In order to evaluate the urinary flow, it was applied methylene blue through the cystoscope working channel in the interior of the bladder to confirm urethral normal flow and persistent urachus.

In laboratory monitoring it was found that there was leukocytosis (36,700 cel/µL) by neutrophilia (17,616 cel/µL) and regenerative shift left. Discrete lymphocytosis (9,906 cel/µL), monocytosis (8,808 cel/µL) was observed. Moderate azotemia (creatinine XX mg/dL and urea 134.5 mg/dL) and increased fibrinogen (1,400 mg/dL) was the most important alteration in biochemical profile.

Figure 1. A- Patient submitted to vaginourethrocistoscopy. B- Application of methylene blue through the cystoscope in the interior of the urethra and bladder.

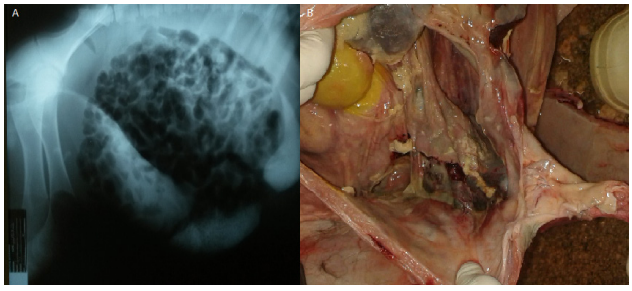

Figure 2. A- Contrasted X-ray of the bladder with extravasation into the peritoneum. B- Necropsy examination confirming bladder rupture and peritonitis.

The patient was submitted to a contrasted X-ray of the bladder, in which it was confirmed bladder rupture by contrast extravasation into the peritoneum. However the owner did not authorize the realization of any surgical intervention. Anti-inflammatory and antibiotic therapies were started with ceftiofur 1 mg/kg and flunixin 1.1 mg/kg, both through intramuscular route. The patient died within 24 h.

The necropsy examination revealed the persistent urachus and also showed malodorous brownish secretion in the navel area, two liters of turbid purulent fluid in the abdominal cavity filled with fibrin. Cranial portion of bladder was completely necrotic and petechiae was present in bladder extending until the navel and on intestinal serous. The umbilical artery was presented with a different insertion in the liver and there was still resistance to urethral catheterization. The conclusion of the cause of death was given by rupture of the urinary bladder followed by peritonitis.

DISCUSSION

In cattle with uroperitoneum the described symptomatology is hyporexia, rumen stasis and abdominal distension, presenting high levels of urea and creatinine, which corroborates with the data found in this case. Regarding the anatomical defect, it may occur persistent urachus communicating with the bladder, but closed towards the navel or presenting ruptured diverticulum in the cranial pole of the bladder [1].

The contrasted X-ray is an important tool in the diagnosis of bladder rupture and uroperitoneum. Iodine-based contrast is the most common contrast used. This substance is considered to be nonabrasive and when correctly managed with the proper technique, it doesn't usually present complications, being relatively safe, inexpensive and easy to perform [2]. However this technique is rarely used in cattle, for its difficulty to surpass the whole genitourinary tract due to its length [2]. In calves, due to their smaller tract, this technique was effective.

The current case report is important because it allowed to perform a technique that is not common used in cattle, for its difficulty to surpass the whole genitourinary tract due to its length. However, it demonstrated to be effective in calves due to their smaller and more accessible tract. The vaginourethroscystoscopy diagnosis was important in the case characterization, once it was able to verify the form of the obstruction. The urethral sounding is the most usual method of diagnosing obstructions in this portion; however it is not possible to precisely diagnose the obstruction. Therefore the video diagnosis was an efficient method and if the patient had been brought to the Veterinary Hospital earlier, the likelihood of a favorable diagnosis would have been greater [6]. In studies with heifers, the cystoscopy proved to be essential in the diagnosis of changes in the genitourinary tract allowing direct visualization of injured mucosa and enabling the capability of a more accurate prognosis [3].

Rigid cystostopy is not much used in cattle but it demonstrated to be a helpful technique. It is an interesting option to explore the urethra, providing a good visualization of the organ, but it's not a good method to evaluate the cranial portion of the bladder. Nevertheless, a flexible cystoscope proved to be an excellent alternative, once the cranio-ventral bladder need to be evaluated [1]. The pure iodine infusion performed previously may have caused the necrosis of the bladder, due to the highly abrasive solution, especially when the urethra is obstructed, because the solution may overflow and becomes abrasive to the mucous membranes of the organs.

Although not performed by lack of authorization of the owner, the surgical treatment is the most indicated procedure when uroperitoneum is confirmed. \in case studies of uroperitoneum and cystic dilatation of the urachus in bulls, the exploratory laparotomy was the choice of recommended treatment, proving to be extremely effective, presenting mortality in only 1 of the 5 bulls in this study [4].

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