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Atypical uterine torsion in criollo mare: A case report

Torção uterina atípica em égua crioula: Relato de caso

Torsión uterina atípica en yegua criolla: Reporte de un caso

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Abstract
Uterine torsion (UT) constitutes an obstetric emergency that predominantly impacts advanced pregnancies and, although rare, accounts for 5 to 10% of all mare-related obstetric emergencies. The condition is characterized by a rotation of the uterine body along the longitudinal axis, which may affect the uterine horns, and its etiopathogenesis remains undefined. The degree of torsion can range from 180 to 720 degrees and is positively correlated with reserved prognosis. This article aims to report the case of a mare in late pregnancy diagnosed with uterine torsion. A 13-year-old Criollo mare in late pregnancy presented to Hospital de Clínicas Veterinárias – UFRGS with a 5-day history of abdominal discomfort. Rectal palpation, ultrasonography, and gynecological examination revealed the presence of uterine torsion. A flank laparotomy was performed during which the manual repositioning of the uterus into its anatomical position was unsuccessful, leading to the decision to euthanize the animal. The body was submitted for necropsy at Serviço de Patologia Veterinária – UFRGS. A 360-degree counterclockwise torsion of the right uterine horn through the broad uterine ligament and around the left uterine horn was observed, as well as a 360-degree torsion of the uterine body around its axis in the same direction. The fetus was already in advanced autolysis. Histologically, endometrial necrosis was present, along with pronounced hemorrhage, fibrin deposition, and inflammatory infiltrate in the uterus. The severe uterine torsion, elevated heart rate, advanced pregnancy and delayed hospital referral were the main factors responsible for the worse prognosis, leading to mare and fetal death.
Keywords: Obstetric emergency; Equine; Laparotomy; Right flank approach.

Resumo

Torção uterina (TU) constitui uma emergência obstétrica que impacta predominantemente prenhezes avançadas e, embora rara, é responsável por 5 a 10% das emergências obstétricas relacionadas à égua. A condição caracteriza-se por rotação do corpo uterino em seu eixo longitudinal, podendo afetar cornos uterinos, de etiopatogenia ainda indefinida. O grau de torção pode variar de 180 a 720 graus e possui correlação positiva com prognóstico reservado. O objetivo deste artigo é relatar o caso de uma égua diagnosticada com torção uterina. Uma égua crioula de 13 anos em prenhez avançada foi atendida no Hospital de Clínicas Veterinárias – UFRGS com histórico de cinco dias de desconforto abdominal. Palpação retal, ultrassonografia e exame ginecológico revelaram a presença de torção uterina. Foi realizada uma laparotomia pelo flanco, durante a qual o reposicionamento do útero à sua posição anatômica não obteve sucesso, levando à decisão de realização de eutanásia do animal. O corpo foi submetido à necropsia no Serviço de Patologia Veterinária – UFRGS. Foi observada uma torção do corno uterino direito de 360º no sentido anti-horário atravessando o ligamento largo uterino esquerdo e envolvendo o corno contralateral, bem como uma torção de 360º do corpo uterino em seu próprio eixo no mesmo sentido. O feto encontrava-se em autólise avançada. À histologia, verificou-se necrose no endométrio, além de pronunciada hemorragia, deposição de fibrina e infiltrado inflamatório no útero. Grau severo de torção, frquência cardíaca elevada, prenhez avançada e demora no encaminhamento hospitalar foram os principais fatores responsáveis pelo pior prognóstico, levando à morte fetal e materna.
Palavras-chave: Emergência obstétrica; Equino; Laparotomia; Abordagem pelo flanco direito.

Resumen

Torsión uterina (UT) constituye una emergencia obstétrica que afecta predominantemente a gestaciones avanzadas y es responsable del 5 al 10% de las emergencias obstétricas relacionadas con yeguas. La condición es una rotación del cuerpo uterino en su eje longitudinal, pudiendo afectar los cuernos, con una etiopatogenia aún no definida. El grado de torsión puede variar de 180 a 720 grados y está correlacionado con un peor pronóstico. El objetivo de este artículo es reportar el caso de una yegua criolla de 13 años en avanzado estado de gestación atendida en el Hospital de Clínicas Veterinárias – UFRGS con un historial de cinco días de dolor abdominal. La palpación rectal, ultrasonografía y examen ginecológico revelaron la torsión uterina. Se realizó una laparotomía por el flanco, pero el reposicionamiento del útero a su posición anatómica no tuvo éxito. El animal fue eutanasiado. El cuerpo fue sometido a necropsia en el Servicio de Patología Veterinaria - UFRGS. Se observó una torsión del cuerno uterino derecho de 360º en sentido antihorario atravesando el ligamento ancho izquierdo e involucrando el cuerno contralateral y una torsión del cuerpo uterino en su propio eje de 360º en el mismo sentido. El feto estaba en autólisis avanzada. En la histología, se encontraron necrosis en el endometrio, hemorragia, depósitos de fibrina y infiltrado inflamatorio en el útero. Grado severo de torsión, frecuencia cardíaca elevada, embarazo avanzado y demora en la remisión al hospital fueron los principales factores responsables del peor pronóstico, lo que llevó a la muerte fetal y materna.
Palabras clave: Emergencia obstétrica; Equino; Laparotomía; Abordaje por el flanco derecho.

1. Introduction

The national industry around horses and other equids moves billions of reais annually, allowing countless business possibilities and generating employment. A great contribution to this industry is the Criollo horses, with a nationally registered herd of more than 460 thousand animals (ABCCC, n.d.). Reproductive care is of great importance for the species' development. That said, Uterine Torsion (UT) accounts for 5 to 10% of all obstetric emergencies in the mare (Vandeplassche et al., 1972). This condition, without a defined etiopathogenesis, is characterized by a rotation of the uterine body on its longitudinal axis, possibly affecting the uterine horns as well. It occurs mainly in the advanced stages of the pregnancy and the torsion degree may vary from 180 up to 720 degrees (Chaney et al., 2007; Satoh et al., 2017; Shaw, 2023). This article aims to report a case of UT to the right encompassing the uterine body and horns, in a 10-month pregnant Criollo mare.

2. Methodology

The present study is a descriptive case report of qualitative nature (Pereira et al., 2018; Toassi & Petry, 2021) supported by a secondary literature review with relevant data regarding the pathology's characteristics, etiology, and possible treatments. The present case is of a 13-year-old Criollo mare presented with chronic uterine torsion treated at the Hospital de Clínicas Veterinárias (HCV) of Universidade Federal do Rio Grande do Sul (UFRGS). The patient’s owner was informed of the risks, possible outcomes, and prognosis of all treatments implemented and signed an informed consent form.

3. Case Report

A 13-year-old Criollo mare weighing 400 kg, approximately 10 months pregnant, was referred to Clínica de Grandes Animais (CGA) of HCV at UFRGS. The mare was maintained at the Stud farm in an extensive production system of native grass without nutritional supplementation. During anamnesis, it was reported that the animal had been presenting with abdominal discomfort for approximately five days and was not responsive to analgesic treatment. Afterward, a veterinarian, through at-site rectal palpation, suspected uterine torsion and referred the patient to CGA, due to the severity of the condition. At clinical examination, the patient presented with congested mucous membranes, increased respiratory and heart rates, 20 movements per minute and 64 beats per minute respectively, positive digital pulse on the medial and lateral palmar digital arteries of the right thoracic limb, and the presence of Parascaris equorum on feces. The remaining parameters were unaltered.

A rectal palpation with ultrasound examination (Sonoscape® S8V, rectal probe) and a gynecological exam were performed to confirm the diagnosis. The left broad uterine ligament presented abnormally distended, hindering the palpation of the contralateral ligament. Therefore, we sought to evaluate the vagina and cervix by manual inspection and vaginoscopy. The exams revealed a severe dislocation of the cervix dorsolateral to the right. Torsion of the vagina was not verified.

Taking into account the patient's clinical condition and palpation, ultrasound, and gynecologic exam findings, as aforementioned, the mare was submitted to standing right flank exploratory laparotomy. The presurgical therapy was established through the intravenous (IV) administration of 0,5mg/Kg of dipyrone monohydrate at 500mg/mL (Febrax®) and 1,1mg/Kg of flunixin meglumine at 8,3mg/mL (Flumax®) for anti-inflammatory effect and pain relief, followed by a pre-anesthetic protocol comprised of 12µg/Kg IV of detomidine chloride at 1% (Detomidin®) and 0,05mg/Kg IV of methadone at 10mg/mL (MYTedom®). The anesthesia maintenance was accomplished through continuous intravenous infusion of 10µg/kg/h of detomidine at 1% (Detomidin®) and 0,05mg/kg/h of methadone at 10mg/mL (MYTedom®). To access the abdominal cavity through the flank, peridural anesthesia was applied with 5mL of bupivacaine at 5mg/mL (Neocaína®), as well as local anesthesia in inverted L with 28mL of lidocaine chloride at 20mg/mL (Lidovet®) and 28mL of ropivacaine chloride at 7,5mg/mL (Ropi®). Furthermore, intravenous fluid reposition therapy with ringer lactate was carried out for the duration of the surgical procedure.

The access to the abdominal cavity was accomplished through a 30cm longitudinal incision on the right flank, trespassing skin, and abdominal muscles. The uterine repositioning was attempted through uterine traction inside the abdominal cavity with occasional assistance through rectal palpation, nevertheless without success. During the repositioning attempt, a 360º torsion was observed at the basis of the uterus, which presented severe edema and was positioned cranioventral on the abdominal cavity. No fetal movements were perceived at any time during the surgery. Hence the pregnant horn was partially externalized and incised for an attempt at fetal removal, at which fetal death and decomposition were confirmed, with the presence of rancid and green-like color allantoic fluid and visualization of the placenta with macroscopic evidence of autolysis, with dark green to brown color. Regardless of the extension of the incision, both the fetal removal as well as the rotation and exteriorization of the uterus for hysterectomy were unsuccessful. Taking into account the inability to reposition or remove the uterus and the surgical recovery risks, euthanasia was considered the approach of choice. The mare was referred to Serviço de Patologia Veterinária - UFRGS for necropsy.

The necropsy's (Figure 1) main macroscopic findings are comprised of a 360º counterclockwise torsion of the right uterine horn through the left broad uterine ligament and around the left uterine horn, along with a 360° torsion of the uterine body on its axis to the same direction. At uterine dissection, the fetus presented with a high degree of autolysis, and the fetal membranes, as well as the fluids within, were opaque, brown, and with a foul smell. There were, also, extensive reddish areas on the uterine mucosa. Various organs were sampled during necropsy, preserved in 10% formalin, routinely processed for histologic examination, and stained with the Hematoxilin-Eosin (HE) technique. The histopathologic findings consisted of

areas of significant necrosis in the endometrial epithelium, mainly on the right uterine horn, associated with marked fibrin deposition and hemorrhagic areas. An infiltrate of whole and degenerated neutrophils, lymphocytes, plasm cells, and macrophages were present.

Figure 1 - Necropsy main macroscopic findings.

The right uterine horn trespassing the left broad uterine ligament (left). The uterine horn torsion and fetal autolysis (right) are evidenced. Source: the authors.

3. Discussion

The UT does not have a defined etiology, although the anatomic conformation of the mare, accidents, and fetal movements are associated with the pathology (Barber, 1995; Derbala et al., 2024a; Frazer et al., 2002; Vandeplassche et al., 1972). One hypothesis is that intense fetal movements at the end of pregnancy are significant factors that could cause a torsion. According to Frazer et al. (1997), 80% of fetuses were in dorsosacral position at the time of UT correction, thus being, possibly, related to the fetal positioning reflexes. At the beginning of pregnancy, the fetus can move freely inside the uterus, having its movement restricted later on as it grows, especially at the last third of pregnancy (Ginther, 1998).

Reported cases of UT encompass torsions both clockwise and counterclockwise, with an average of 180 to 720 degrees, associated, in some cases, with vaginal involvement (Barber, 1995; Chaney et al., 2007; Dabas et al., 2014; Doyle et al., 2002; Saini et al., 2013; Satoh et al., 2017). Nevertheless, to the authors' knowledge, there are no reports of torsions similar to the present case. That atypical degree of rotation and involvement of both the horn and the body of the uterus seems to be pretty uncommon.

The signalments of the present patient were consistent with the clinical signs described in the literature. The classical signs of UT are abdominal discomfort similar to colic syndrome, although the mare can present no clinical signs for weeks, as reported in UT of 84 to 235 days' pregnancies (Barber, 1995; López & Carmona, 2010). Furthermore, gastrointestinal involvement, such as colon displacement, can worsen the clinical condition of the patients (Spoormakers et al., 2016). This condition must be considered a differential diagnosis to dystocia and labor distress in general, especially when the repositioning techniques are proving difficult to accomplish. Mares with less than 320 days of gestation have a more favorable

prognosis than late-term pregnancies, with 97% and 72% survival chance for the mare and foal, respectively. Adversely, mares that present with heart rates superior to 59bpm and are referred to a clinical center 20 hours or more after the onset of clinical signs are reported to have worsened clinical conditions and, thus, a less favorable prognosis (Chaney et al., 2007). Therefore, prompt hospital referral is essential to a good prognosis as timely diagnosis and treatment are crucial to prevent the worsening of the clinical condition and ensure better chances of survival for the mare and foal.

Rectal palpation greatly assists the diagnosis of UT, as it allows a faster and easier assessment of the reproductive tract. It is not usual for the vagina to be involved in the pathologic process of UT, nevertheless, the gynecological exam is essential to evaluate the cervix's positioning (Frazer et al., 2002). Ultrasonography allows for the evaluation of fetal viability through visualization of liquids, fetal membranes, thickening of uterine walls, and fetal heartbeat (Freeman, 2010). As stated by Masko et al. (2020), any prolonged alterations in the fetal heartbeat are indicators of foal suffering. For instance, intense fetal movements accompanied by low foal heart rate are suggestive of foal perinatal asphyxia syndrome. Biochemical markers can furthermore aid in the evaluation of case severity, as per LeBlanc (2010) the sudden rise in blood concentration of progestogens and lowering of total estrogens below 500ng/ml in mares is related to abortions and stillborns. The inability of the fetoplacental unit to maintain the progestogens' production will compromise foal development due to a lack of oxygen and nutrients (Frazer et al., 2002). Similarly, a rise in cortisol blood levels above 30ng/ml is reported in mares presenting with UT (Santschi et al., 1991).

The degree of torsion will affect the prognosis due to the restricted blood flow to the foal (Masko et al., 2020). Pressure on the UT is higher in late pregnancies due to the physiological increase in blood supply and the reduction in vascular resistance caused by fetal growth and the presence of a particularly diffuse epitheliochorial placenta, as seen in equines (Ousey et al., 2012). Ousey et al. (2012) further state that older mares have reduced placental microvilli and decreased blood flow from the uterine arteries, predisposing foals from such mares to a worse prognosis in UT cases.

Feasible therapies for UT are rolling, flank laparotomy, and midline celiotomy. The rolling technique is not advised as it can cause colon displacement, uterine rupture, and septic shock (Frazer et al., 2002; Vandeplassche et al., 1972). The need for general anesthesia and dorsal decubitus for an exploratory midline celiotomy can exacerbate the UT-derived vascular congestion even further, increasing risks for the foal (Ousey et al., 2012). Moreover, the dorsal decubitus would move the fetus dorsally, thus hindering the relocation of the uterus to its anatomical position. The flank exploratory laparotomy was proved more efficient for foal survival (Chaney et al., 2007; Derbala et al., 2024b; Spoormakers et al., 2016), with a survival rate of 83,2% and 66,6% for mare and foal, respectively (Derbala & Mosallam, 2019). The technique allows, as well, a better evaluation of the uterine wall, as complications such as uterine rupture, irreversible thrombosis, venous congestion, and hematoma can occur (Vandeplassche et al., 1972). Therefore, taking into consideration the late stage of pregnancy of the mare, the anesthetic challenges (Maney & Quandt, 2012), and constraints in the budget for the procedure, the method of choice was the flank exploratory laparotomy. Sadly, due to fetal death, the impossibility of uterine repositioning, and the postoperative prognosis, the mare was submitted to euthanasia with the owner's consent.

4. Conclusion

In the present case, the main factors responsible for the worsening of the prognosis were the severe uterine torsion, elevated heart rate, advanced stage of pregnancy, and delayed hospital referral. These factors ultimately led to fetal death and negatively impacted the mare's prognosis. Similar cases of uterine torsion have not been reported. Therefore, we hope this case report may contribute to better knowledge and understanding of uterine torsion, encouraging further research, improvements in treatment options and techniques, and better prognoses for both mare and foal.

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