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RESEARCH ARTICLE

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CESARIAN SECTION IN A SOW WITH UTERINE TORSION AND VAGINAL PROLAPSE

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ABSTRACT

The incidence of vaginal prolapse in sows is low and their predisposition may be associated with the delivery process, while uterine torsion is rare and can lead to fetal death. The article describes the procedure performed on a sow that presented with vaginal prolapse. During transvaginal palpation there was a cervical opening, but palpation was prevented at some point. This led to the suspicion of uterine torsion and an emergency cesarean section surgery was performed, where the diagnosis was confirmed. Seven piglets were born with life and a mummified fetus. The vaginal prolapse was corrected and the sow and piglets are well. It is concluded that rapid diagnosis was essential to save the life of the sow and the piglets. The procedure and the anesthesia used were effective.

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INTRODUCTION

Uterine torsion usually occurs in a pregnant uterine horn and is defined as the twisting of the uterus on its longitudinal axis (Purohit *et al.*, 2011). The torsion of the uterus represents 9% of the dystocia cases in bovines and it's also common in buffaloes, but has few reports in ewes and goats (Scott, 2011) and is rare in mare, bitch and sow (Kalaswa *et al.*, 2018). Factors like weakness of the ligaments of the musculature, low uterine muscles tonus associated with sudden movements of the female and the fetus can increase the occurrence of uterine torsion (Ghuman, 2010). Clinical signs of torsion of the uterus are tense abdomen, dyspnea, tachycardia, pain and locomotion difficulty. Spontaneous reversion can happen in the mild torsions, but severe cases can lead to uterine necrosis with disappearing of the symptoms, fetal death, physical exhaustion and maternal weakness (Prestes, 2017). The prognostic depends on the degree of uterine torsion and its duration. The precise diagnostic is important for successful treatment, however in some cases it's only possible by laparotomy. The correction can be surgically or by manual pressure directly on

the fetus and uterus, followed or not by cesarean section (Prestes, 2017). Prolapses in sows can occur in the uterus, vagina or rectum, and if not treated it can lead to the death of individuals (Iida *et al.*, 2019). The vaginal prolapse occurs when the vaginal wall is projected outwards through the vulva. The predisposition of the prolapse is directly related with the anatomic disposition of the uterus, ovaries and ligaments. That way, this pathology occurs frequently in cows, small ruminants, sows and bitches (Prestes, 2017). Other factors that could influence the vaginal prolapse in sows are: (1) low food quality, containing micotoxinas; (2) hormones associated with parturition, like estrogen, progesterone and relaxin; (3) genetic predisposition. The diagnostic of vaginal prolapses is simple and based on the visualization of the exteriorized organ (Supakorn *et al.*, 2017). Anderson and Mulon (2019) provide that the prolapse must be sanitized and lubricated before gently pushing it back through the lips of the vulva. The treatment is usually made using a Bühner's suture to decrease the chances of recurrence and antibiotics can be administered to decrease the risk of infection (Supakorn *et al.*, 2017). The aim of this study is to describe the veterinary care to a sow in labor that was unable to give birth and had prolapsed vagina. From the

clinical signs and animal inspection and through emergency cesarean surgery, a uterine torsion was diagnosed.

MATERIALS AND METHODS

The service was held in the city of Piratuba - SC, Brazil. At a swine breeding, the owner complained that the animal, a nulliparous sow with expected delivery for that week. That day in the morning the owner related that the sow had gone into labor but had difficulty giving birth and had a vaginal prolapse. The owner applied diclofenac sodium 1mg/kg on the sow as instructed by the technician of the partner company. He also reported that he had already tried to undo the prolapse and pull the piglets through the vaginal canal, but was unsuccessful. In the beginning of the afternoon, the veterinarian surgeon took care of the patient. The first finding when inspecting the sow was the vagina prolapsed. On transvaginal palpation it was realized that there was opening of cervix, however, at a certain point the progression of palpation was impeded, thus reaching the suspicion that it was a uterine torsion. The decision was to perform the emergency cesarean section surgery in order to save the piglets and the sow's life.

The animal weighed around 100kg. It was opted for dissociative anesthesia at a dose of 3.6 mg/kg of active principle of tiletamine and zolazepam administered by the auricular vein. Trichotomy and antisepsis were performed with disinfectant based on quaternary ammonia and glutaraldehyde. With the animal already in right lateral decubitus position, local anesthesia was performed with 7 mg/kg of lidocaine hydrochloride in a straight line in the left paralumbar fossa, where the incision would be made.

Then the skin, external abdominal oblique muscle, internal abdominal oblique muscle, transverse abdominal muscle and peritoneum were incised using a scalpel. The uterus was located and the left uterine horn was exposed. The incision of the uterine horn was 8-10 cm and was made on the head of one of the piglets using a scalpel and taking care not to incise the uterine vessels and the piglets were delivered from this horn. The incision was closed with a continuous single stitch suture pattern and cushioning overlapping in order to invaginate the stitches. The right uterine horn was located and the procedures repeated in this horn. During the synthesis of this horn, it could be seen that it was already friable. By exploring the cavity was possible to find the uterine torsion point at the body of uterus, cranial to cervix, with a rotation of approximately 90 degrees counterclockwise and swollen, which prevented the piglets from passing through at delivery. The peritoneum and muscle layers were sutured in a continuous single stitch pattern, and the skin was sutured in a Ford pattern. In the immediate post-surgical period was administrated an association of enrofloxacin and pyroxicam intramuscular at a dose of 2.5 mg/10kg. The vaginal prolapse was reduced, but Bühner's suture was not performed for fear that it would prevent the expulsion of the fetal wraps. The owner was recommended to administer tulatromycin at a dose of 2.5 mg/kg the following day, as well as apply healing spray until the complete closure of the surgical wound.

RESULTS

During the cesarean section six piglets with life were delivered from the left uterine horn while only one live piglet and one mummified fetus from the right uterine horn. The

torsion of the uterus was found by exploring the cavity and it was successfully undone. After birth the neonates were left to the care of another team, which applied the drying powder to the piglets and cut the excess umbilical cord. They were able to suck the colostrum and then they were placed in the piglet creep area. After a few weeks the owner gave feedback that the sow had survived after the surgery and the piglets had already been weaned. The owner was instructed to remove the sow of the reproductive function, so that similar problems could be avoided in the future.



Figure 1. (A) Sow presenting vaginal prolapse at the time of care; (B) and (C): after incision of the left uterine horn the piglets were removed; (D) Sows recovering from anesthesia and the piglets already trying to suck the colostrum

DISCUSSION

Uterine torsion can be confused with incomplete cervical dilatation (Scott, 2011). The exploration of the vagina enables to obtain complementary data for diagnosis confirmation (Prestes, 2017). When performed on the sow it directed the diagnosis of uterine torsion. Between the main causes of uterine torsion, the asymmetry between the pregnant and non-pregnant horn (Prestes, 2017) is suspected to be the cause of the uterine torsion in the sow, since one horn had only two piglets inside it and the other six. This asymmetry being the cause of the dystocia was also described in a report of a goat with a single fetus in a uterine horn, which caused uterine instability (Chahar *et al.*, 2018). The clinical signs of uterine torsion vary depending on the degree of torsion (Prestes, 2017). However, the only change the owner had noticed in the sow was vaginal prolapse and difficulty to farrow. It should also be taken into account that the owner had applied sodium diclofenac, and this due to its analgesic action, made the animal not show the clinical signs beyond the vaginal prolapse. The torsion of the uterus must be considered an emergency, because of the chances of fetal death that may happen following torsion and the uterine adhesions with visceral organs that could develop. It leads to dystocia because of the stenosis of the birth canal (Jeengar *et al.*, 2014).

However, as verified during the sows surgery, there were no signs of necrosis of the uterine tissue and the piglets were alive, which leads to believe that the torsion was recent. The ideal anesthetic protocol in pigs should provide fast and reliable immobilization, minimal cardiovascular and respiratory depression, and adequate analgesia and muscle relaxation (De Monte *et al.*, 2015). The dissociative anesthetic protocol used in the procedure was a combination of tiletamine and zolazepam is described in the literature as a usable anesthetic for pigs, and has the benefit of using a lower volume of application compared, for example, to ketamine

(Anderson and Mulon, 2019). The dissociative anesthesia used promoted fast analgesia, tranquilization, muscle relaxant and sedation. The physical and chemical characteristics of most anesthetics make them cross the placental barrier to a greater or lesser degree and affect the fetuses. Zolazepam exceeds the transplacental barrier of sows causing partial anesthesia of newborns, while tiletamine does not (Li *et al.*, 2017). After birth it was possible to notice that the piglets were a bit lethargic and less responsive than a newborn piglet by normal delivery would be, however, after a few minutes they started to become more active. By preference of the surgeon the approach performed in the surgical procedure was the paralumbar fossa, which has its benefits in relation to the paramedian or ventral approach, which have a higher risk of postoperative infection, besides the care to be taken to avoid the incision of the mammary veins (Anderson and Mulon, 2019). It is recommended to make the incision on the uterus as close as possible to the uterine bifurcation, but this wasn't possible to perform in the surgery because of the presence of the piglets, which made it difficult to manipulate the uterus. For this reason it was necessary to make two different accesses to the uterus to deliver the piglets. Different from what was used in the reported procedure, Anderson and Mulon (2019) indicate the suture in Cushing or Utrecht pattern for healthy uterus closure instead of the patterns that were used in the procedure. About 21.2 to 28.2% of prolapses that occur in female pigs are vaginal (Supakorn *et al.*, 2017). Some of the possible causes of vaginal prolapse are: hereditary predisposition, exaggerated relaxation of the vaginal fixation system in the pelvic cavity by the high concentration of estrogen released by the placenta at the end of pregnancy, increased intra-abdominal pressure and the existence of multiple fetuses (Prestes, 2017). In this case it's believed that the prolapse was secondary to uterine torsion, which caused an increase in excessive intra-abdominal pressure, as it precluded the exit of the piglets through the birth canal. The administration of diclofenac sodium made by the owner generates a good analgesia (Spinosa *et al.* 2011), which may have taken the sow to decrease the intra-abdominal pressure. Thus, combined with the intervention of the veterinarian, prevented the evolution of the prolapse due to the energetic pressure of the abdomen and dryness of the mucosa, which becomes irritated and inflamed, eventually evolving to even greater mass exposure (Prestes, 2017).

When the primary cause can be found, it must be treated (Anderson and Mulon, 2019). Cleaning and lubrication of the prolapse is important before put the organ back in place. Sedation and epidural anesthesia using lignocaine and xylazine is recommended (Supakorn *et al.* 2017). In this case it wasn't made because the sow was already under dissociative anesthesia. Prevention of reoccurrence depends on restoration of uterine tone and complete and correct replacement of the uterus (Nath *et al.*, 2019). So Bühner's suture should be done and antibiotic therapy may decrease the risks of secondary infections (Supakorn *et al.*, 2017). In the reported case the cleaning was performed with cold water, but, as mentioned above, Bühner's suture was not performed with the fear that it would prevent the expulsion of the fetal wraps. Antibiotics therapy was made and recommended to the owner. He was also advised to rule the sow out from the reproductive function because of the chances of recurrence of the prolapse and possible future welfare problems. The postoperative treatment consisted in the application of antibiotics to prevent subsequent infection, with enrofloxacin being a broad

spectrum antibiotic with rapid absorption (Spinosa *et al.*, 2011). Tulatromycin belongs to the class of macrolides, is administered in a single dose and has prolonged action, besides acting against gram-negative pathogens that affect mainly the respiratory system of pigs (Waag *et al.*, 2008). The financial viability of sows in herds is one of the most important economic indicators for the swine breeding. The financial losses from sow mortality include the value of dead sows and piglets lost when pregnant, the opportunity cost of piglets that would be produced when the sow is pregnant, the cost of early replacement, and the decline in herd quality that is difficult to estimate (Morés, 2007). It's not that common to perform surgeries on pigs, mainly due to complaints from owners or pig farmers regarding the costs of procedures and medications. This leaves the veterinarian in a complicated situation, because he must also ensure that these procedures are performed properly and humanely (Anderson and Mulon, 2019).

Conclusion

For the author's knowledge, this is the first description of a cesarean section in a sow with uterine torsion and vaginal prolapse. It is concluded that vaginal prolapse and uterine torsion are conditions that can occur in sows, although they are not as frequent. In this case the vaginal prolapse probably was secondary to the uterine torsion. The anesthetic procedures were efficient and guaranteed good sedation and analgesia of sows. The surgical procedure was effective but it is valid to emphasize the importance of immediate intervention to save the lives of piglets and gilts.

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