Putting the “P” in Peanut

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April 12, 2019

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Introduction:

Priapism in the horse is described as having persistent erection of the penis that occurs in the absence of sexual stimulation. It has been documented to be a sequela to phenothiazine tranquilizer administration, or less commonly, neoplasia of the pelvic canal. Stallions are more commonly affected, but geldings are still at risk (Pozor 5). This condition should be considered an emergency in order to try and prevent irreversible damage to the penis and ultimately, long-term paralysis. “The condition is economically devastating when a valuable breeding stallion is affected, because impotence is the usual outcome, and phallectomy may be required” (Schumacher 31). The purpose of this case report is to examine a case of priapism in a horse that presented with a history of prior acepromazine administration and the effects that led to his condition at presentation.

History and presentation:

Peanut was a 25-year-old, Quarter Horse, gelding who presented to MSU-CVM on 1/8/19 for priapism of approximately 3 days duration. In his younger years, his main job was being ridden in parades, but recently was ridden occasionally and turned out on pasture. Prior to presentation, he was a normal healthy horse with no extensive medical history. He was receiving routine veterinary care when the potential inciting event occurred.

Peanut's owners noticed the priapism on Sunday (1/6/19). They were unaware of any trauma that could have caused it. However, they did report that Peanut received acepromazine a few days prior, for sedation, while having his teeth floated. Peanut last received vaccines in August of 2018 and was dewormed on December 31st, 2018. He was not on any medications and the owners expressed no other concerns.

On physical examination, Peanut was dull but responsive. He weighed 928 pounds with a body condition score of 3 out of 9. Peanut had an elevated heart rate of 64 beats per minute (normal 28-44 beats/min), respiratory rate of 24 breaths per minute (normal 10-24 breaths/min), and his rectal temperature was 100.1 degrees F (normal 99.5-101.5 F). His heart and lungs auscultated normally. Normal gastrointestinal sounds were heard in all four quadrants. His mucous membranes were pink and moist with a normal capillary refill time of less than 2 seconds, indicating adequate hydration and perfusion. Peanut's penis was erect, edematous, and protruding from the sheath. Even though it was apparent this had been ongoing for a few days due to the amount of edema observed, his penis was still warm to the touch and had a healthy-pink coloration.

Pathophysiology:

Normal physiology of erection begins as a result of smooth muscle relaxation in the corpus cavernosum and corpus spongiosum and subsequent engorgement with blood. Rigidity is achieved by contraction of the striated muscle cells of the perineal musculature and leads to full erection during times of arousal (Mckinnon *et al.*, 2007). The filling of the corpus cavernosum with blood, along with simultaneous contraction of the ischiocavernosus muscles leads to penile vein occlusion. Both of these mechanisms lead to increased pressure within the penis and the obvious appearance of an erection (Senger 251). However, there are several ways in which this process may become disrupted.

Phimosis is defined as the failure to be able to fully protrude the penis from the sheath. This may be noted in foals due to normal physiologic fusion of the internal preputial lamina to the shaft of the penis, but usually resolves after the first month of age. In mature horses, this can

result from constriction of the external preputial orifice or preputial ring by neoplastic lesions or local trauma.

Paraphimosis is the inability to retract the penis back into the prepuce, commonly due to considerable preputial edema, swelling or trauma. Penile prolapse usually occurs initially with increased swelling preventing full retraction of the penis within the sheath. Even though trauma is thought to be the main inciting cause, administration of tranquilizers, such as acepromazine, and diseases such as EHV-1, purpura hemorrhagica, and dourine are other possible etiologies (Brinsko *et al.,* 2011). As further stated by the Manual of Equine Reproduction, "priaprism and penile paralysis are commonly complicated by secondary paraphimosis" (266). It is hypothesized that Peanut experienced something similar, having priapism initially, with paraphimosis resulting from edema and chronicity.

Priaprism can be further defined as failure of the penis to detumesce, or return to the flaccid state, on its own, which is due to a problem with arterial inflow of blood or venous drainage. There are two types of priapism: high and low flow priapism. High flow priapism in which arterial supply overwhelms venous drainage, whereas low flow priapism occurs due to disruption of venous drainage or the over riding of the sympathetic impulses that initiate detumescence and allow for persistent erection. Low flow priapism is most commonly the cause of priapism in horses (Pauwels *et al.,* 2005). It is documented that phenothiazine tranquilizers, acepromazine, can cause this alpha-adrenergic blockade which is likely applicable in Peanut's case (Brinsko *et al.,* 2011). At a microscopic level, the blood stasis causes increased partial pressure of carbon dioxide in the stagnant blood to rise, leading to the red blood cells taking on a sickled shape. Venous drainage is occluded due to the distorted shape of the erythrocytes, and fluid becomes trapped within the corpus cavernosum trabeculae. If this is left untreated, fibrosis

within the trabeculae can occur and lead to an inability to have normal erections and decreased sensitivity within the penis (Pauwels *et al.,* 2005). Similarly, if the penis remains out of the sheath for a prolonged period, the decreased venous outflow and lymphatic return further exacerbate preputial swelling and can ultimately lead to swelling within the internal preputial ring. The internal preputial ring is largely inelastic and which leads to further swelling and propagation of inflammation within the penis (Gunn 45).

Diagnostic approach:

Clinically, diagnosis is made by observation and palpation of a semi-erect, turgid penis that is engorged and protruding from the sheath. The corpus cavernosum can be palpated to reveal a turgid feel that indicates engorgement with stagnant blood. Furthermore, when examined with ultrasonography, the corpus cavernosum will appear densely echogenic in chronic cases. Additionally, the edematous penis and prepuce can become excoriated and infected if not managed appropriately after diagnosis (Schumacher 32).

Treatment and management:

The use of hydrotherapy with support slings or bandages are mainstay management therapies used in cases of priapism and/or paraphimosis. Hydrotherapy aims at reducing inflammation within the penis, while bandaging and support slings work to prevent the dependent edema from resuming within the penis and prepuce (Gunn 45). If the cause of priapism can be attributed to acepromazine administration, an acetylcholine antagonist, benzotropine mesylate, can be administered intravenously. Treatment is more successful if initiated as soon as possible after onset of the condition. However, if a horse does not respond to

drug administration within a few hours or if the condition is chronic, as in this case, irrigating the stagnant blood from the corpus cavernosum is the next treatment modality (Pauwels *et al.*, 2005).

Irrigating the stagnant blood is accomplished by placing two trochar needles in the corpus cavernosum penis, one in the distal penis and another in the perineal region and lavaging heparinized saline between the two locations. This is used to remove the clotted blood occluding the venous drainage to re-establish normal circulation throughout the penis. Irrigating and lavaging the corpus cavernosum penis can help prevent permanent damage to the corporeal tissue and can be considered a first line therapy (Schumacher 32). If the penis remains erect and fails to respond to irrigation and lavage, creating a vascular shunt within the penis is the next possible treatment modality.

In chronic cases of priapism, there is a possibility that the corpus cavernosum penis can become fibrotic, as a result of inflammation and blood stasis. At this point, a vascular shunt to the corpus spongiosum would hopefully alleviate the venous occlusion, since the corpus spongiosum is not involved with the condition of priapism and would allow for alternative venous drainage (Pauwels *et al.*, 2005). The creation of the shunt has been shown to cause impotence in bulls, but stallions have not been documented as having the same side effects (Schumacher 33). It is important to note creation of the shunt should be done before the pudendal and corporeal tissue become irreversibly damaged, however this timeline has not been fully established. If a vascular shunt does not relieve the priapism, a phallectomy, or surgical removal of the penis, can be performed as a salvage procedure (McKinnon *et al.*, 2007).

Case Outcome:

At the time of presentation, Peanut's penis was examined, and a priapism was evident, but it was unclear how long it had been erect. Peanut's attitude was dull, and he appeared moderately uncomfortable during this time. At this point, it was discussed with the owners that an attempt to relieve his erection was necessary to allow his penis to be able to retract normally. The owners agreed and consented to attempting to drain the excess blood from his engorged penis. Peanut's extended penis and prepuce were prepped with betadine scrub, while his perineal region was clipped and cleaned with chlorhexidine scrub and alcohol. To ensure the urethra remained patent during the procedure, a stallion catheter was used as a urinary catheter and passed through the urethra. A sterile trochar needle was placed in the corpus cavernosum penis distally, and a second needle was placed in the corpus cavernosum penis in the perineal region. Blood from the corpus cavernosum was drained from the trochar needles. Approximately 500 ml of heparinized saline was lavaged through the corpus cavernosum. The initial fluid that drained from the needles was a dark, thick sanguineous discharge consistent with stagnant, clotted blood. However, it became evident that fresh blood was entering the corpus cavernosum penis as the lavage continued. The penis gradually became more flaccid but did not fully detumesce. This indicated that arterial flow to the penis was patent; however, venous blood flow out of the penis was likely still obstructed. It was speculated that the venous occlusion was due to the chronicity of the priapism, and subsequent fibrosis.

At that time, the owner's elected to donate Peanut to MSU-CVM for teaching purposes and further treatment due to financial implications. Peanut's trochar needles were removed and he was allowed to rest for the remainder of the day while a diagnostic and treatment plan was formulated. He was given 1 mL of phenylephrine directly into the corpus cavernosum penis to

promote vasoconstriction and aid in reduction of his priapism. This seemed to have no immediate effect. Additionally, a stockinette soaked in Nitrofurazone was applied topically to the penis as an emollient to prevent excoriation. This stockinette was changed twice daily to allow visual monitoring for resolution.

The following morning, he was assessed for any signs of increased swelling or discomfort and for further disease progression. At this time, it was determined that a vascular shunt needed to be made from his corpus cavernosum penis to his corpus spongiosum penis in an effort to establish drainage and hopefully lead to detumescence. Injectable anesthesia was used to maintain anesthesia in the field. A stallion catheter was placed in the urethra, for ease of identification during the procedure. The shunt was established by making a 3 cm longitudinal incision through the tunica albuginea and into the corpus cavernosum penis, at a point midway between the glans penis and the preputial ring. Clotted blood was flushed from the cavernosum using heparinized saline, and then an incision was made into the spongiosum to establish communication between the two erectile tissues. The incised tunic of the spongiosum was sutured to the tunic of the cavernosum to ensure shunt patency. Recovery from anesthesia was unremarkable, but at this time, it was suspected that detumescence had still not been achieved due to chronicity of disease and the extent of the fibrosis.

Over the course of the next couple of days, Peanut's penis continued to be monitored daily for any decrease in size or reduction in swelling that would indicate successful venous drainage and resolution of the priapism. However, it was apparent that his condition had not improved. As stated earlier, performing a phallectomy is considered a salvage procedure, but in Peanut's case and physical condition, humane euthanasia was elected to prevent suffering and physical decline.

A necropsy was performed to further investigate the disease process. Upon examination of the penis, there was evidence that the stoma created during the vascular shunt procedure was in fact effective, and that communication between the corpus cavernosum penis and corpus spongiosum penis was achieved. However, due to the chronicity of the disease at the time of presentation, the trabeculae of the cavernosum had experienced fibrosis before any treatment modalities were attempted and therefore, led to poor response to treatment. As is commonly discussed in medicine, if treatment had been implemented earlier, and near the onset of clinical signs, it is likely the outcome would have been more successful.

References

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