

Complex case of ejaculatory failure in a stallion

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Summary

Ejaculatory dysfunctions in stallions have a significant economic impact on horse breeders. Therefore, early recognition of a problem, timely diagnosis, treatment and management are crucial to rescue the remaining breeding season and ensure a satisfactory income for the horse breeder. This paper describes a complex case of an ageing stallion with ejaculatory failure resulting in infertility. A thorough evaluation of the reproductive tract revealed several physical abnormalities, such as chronic changes in the left testis and the epididymis, cystic uterus masculinus and midline cyst of the colliculus seminalis. Numerous attempts to collect semen were made, but the stallion did not ejaculate. A behavioural analysis of the video recordings of the semen collection attempts showed a pattern typical of stallions with musculoskeletal problems. Chronic orthopaedic issues were diagnosed and treated by an orthopaedic surgeon. Despite a significant improvement in lameness and comfort after treatment and 12 days of stall rest, the stallion did not ejaculate. Instead, a behavioural pattern typical of stallions occluded by midline cysts of the colliculus seminalis was observed. To collapse these cysts and to open up the ejaculatory ducts, a transurethral laser ablation procedure was performed under ultrasonographic guidance. Fourteen days after this procedure, the stallion successfully ejaculated. Several more ejaculates were collected in the clinic and frozen, and the stallion was discharged home. This case exemplifies the complexity of ejaculatory problems in stallions and the significance of collaborative efforts in diagnosing and treating these disorders.

Keywords: stallion, ejaculatory failure, lameness, midline cyst, colliculus seminalis, laser ablation

Copulatory or ejaculatory dysfunctions in stallions are very frustrating, especially during a busy breeding season. Lack of ejaculation leads to infertility and may cause tremendous financial losses to a horse breeder. Since top thoroughbred sires breed more than 120 mares per year (18) and a stud fee is often set between \$150000 and \$300000 per live foal, stallion infertility caused by anejaculation (inability to ejaculate) may be devastating.

Stallions affected by copulatory or ejaculatory dysfunction often show normal sexual arousal and normal pre-copulatory behaviour, but fail to ejaculate (9). Many of these stallions show problems with mounting and holding themselves on a live mare or a dummy mount (phantom); thus, they do not thrust properly, which leads to ejaculatory failure. They may also show signs of pain during copulation and dismount abruptly, which is often accompanied by a squeal. These copulatory dysfunctions are almost always associated with physical problems, such as musculoskeletal issues, aortic thrombosis, neurological deficits, epididymitis

or orchitis, urethritis or penile lesions (9). Other causes of copulatory dysfunctions include painful abrasions on the medial aspect of the carpus, inadequate conditions in the artificial vagina and negative experiences during breeding. Most of these problems can be identified and successfully treated or managed.

In contrast, stallions with specific ejaculatory dysfunctions have no problems with mounting or thrusting, but emission and/or ejaculation do not occur (9). These dysfunctions may have specific physical causes, such as aplasia/hypoplasia of the epididymides or the deferent ducts (1, 2, 4), the cystic uterus masculinus, a midline cyst of the colliculus seminalis, or occluded ampullae of the deferent ducts (1, 6, 12, 14, 15). There is no treatment for epididymal or ductal aplasia or hypoplasia. A midline cyst, however can be collapsed by the transurethral laser ablation technique, and occluded ampullae can be managed by transrectal massage of the ampullae and administration of oxytocin (7, 15). In other instances, the cause remains unknown. In such cases, various neuro-myotropic regimens are used to

enhance smooth muscle contraction, or alternative semen collection methods are used (9).

This paper presents a case of a stallion unable to ejaculate. The horse was diagnosed with three separate physical problems, two of which were successfully treated, and numerous ejaculates were obtained from this stallion.

Case presentation

Case history. A 21-year-old Andalusian stallion was referred to the University of Florida Large Animal Hospital Reproduction Service (UF LAH) after experiencing anejaculation, causing infertility. Furthermore, the horse had a history of being lame in the forelimbs because of navicular syndrome, which had been managed with corrective shoeing and anti-inflammatory medications.

Previously, mares had achieved pregnancies when mated naturally by this stallion, or when semen was used for artificial insemination. Furthermore, semen quality was evaluated and has been reportedly adequate. After a failure to achieve pregnancy in two mares that had been bred repeatedly, the stallion was evaluated at the local veterinary hospital, where it was noted that the left testis was smaller than the right one. Furthermore, the left epididymis had abnormal texture and ultrasonographic appearance. Several collection attempts resulted in no sperm in the collected fluid (azoospermia). Since seminal plasma had a low concentration of alkaline phosphatase (< 10 IU/L), azoospermia was probably caused by incomplete ejaculation or ejaculatory failure (anejaculation) (19). Pharmacologically induced ejaculation protocol using imipramine, xylazine, and oxytocin was also unsuccessful. Transrectal ultrasonography of the reproductive tract was performed, and a large midline cystic structure at the colliculus seminalis was identified. The case was referred to the UF LAH for further evaluation by experts in ejaculatory dysfunctions.

Initial evaluation. Clinical evaluation of the horse performed at the UF LAH, revealed normal vital parameters and no evidence of any physical abnormalities. The horse was sedated and placed in equine stocks for a detailed reproductive evaluation. Visual inspection, manual palpation, and ultrasound evaluation of the scrotal content were performed first. The left testis was significantly smaller than the right one. It was positioned high, at the external inguinal ring, was not movable, and its texture was more

rigid than that of the right one. The epididymal tail was small, had hard consistency and firmly adhered to the caudal pole of the testis. The right testis and the epididymis had normal position, orientation and texture. The parenchyma of both testes had a normal ultrasonographic appearance. However, the scrotal wall surrounding the left testis was thickened, and the left epididymal tail appeared abnormal. The left epididymal duct could not be visualized. Spectral Doppler ultrasonography revealed retrograde blood flow in the left testicular artery with a resistive index (RI) value of 1.0, which is abnormal (13, 16). These were probably consequences of chronic orchitis and epididymitis caused by a scrotal injury. The right epididymal tail had a normal ultrasonographic appearance, clearly visualizing a prominent epididymal duct. Blood flow in the right testicular artery had a normal, non-resistive pattern, with an RI value of 0.69. Testicular dimensions and volumes were $4.7 \times 4.9 \times 7.3$ cm, 87 cm^3 for the left testis; $5.3 \times 5.5 \times 9.5$ cm, 145 cm^3 for the right testis; and 232 cm^3 for both (total testicular volume). A transrectal ultrasonographic examination revealed normal bulbourethral glands and the ampullae of the deferent ducts, as well as prominent vesicular glands filled with moderately echogenic content. There was a large cyst at the colliculus seminalis with two compartments (1.93×0.98 cm; 0.8×1.4 cm) (Fig. 1A and B). There was also a large longitudinal cyst (3.07×0.53 cm) between the ampullae, probably a cystic uterus masculinus (Fig. 1C), which seemed to be affecting the shapes of the ampullae of the deferent ducts, which were slightly bent.

Numerous attempts were made to collect semen. The stallion was led to a breeding shed, showed high libido in the presence of an ovariectomized jump mare, a penile erection occurred within a couple of minutes, and the stallion mounted the dummy. A Missouri model artificial vagina was used. No pelvic thrusts were observed, and the stallion dismounted the dummy abruptly. Five more attempts were made with the stallion mounting the dummy readily and thrusting 2-6 times, but no ejaculation was achieved. The glans penis was engorged during the last two attempts. A light pink pre-sperm fluid was obtained, containing no sperm, but a small number of red blood cells and debris.

All attempts to collect semen were video-recorded and analysed. A typical behavioural pattern displayed by stallions with ejaculatory problems due to a midline cyst of the colliculus seminalis was not observed (14, 15).



Fig. 1. Ultrasonographic images of the midline cyst of the colliculus seminalis and the cystic uterus masculinus: A – left compartment of the midline cyst (a); B – right compartment of the midline cyst; D – cystic uterus masculinus (c)

In summary, the initial evaluation of the stallion confirmed the previous diagnosis made at a local veterinary hospital: anejaculation, chronic changes in the left testis and the epididymis, and a large midline cyst of the colliculus seminalis. In addition, we identified a cystic uterus masculinus. The behavioural pattern during semen collection attempts was consistent with musculoskeletal problems rather than occlusion by a midline cyst of the colliculus seminalis. Therefore, we requested an orthopaedic specialist at the UF LAH to perform a lameness examination on this horse.

Orthopaedic examination and treatment. The most significant findings from the lameness evaluation was thoracolumbar and sacroiliac joint sensitivity, which could explain the repeated dismounting during semen collection attempts. The left forelimb lameness was consistent with the history of navicular syndrome. An ultrasound evaluation revealed mild to moderate osteoarthritis of both sacroiliac

joints. The lumbosacral foramen had sharp focal osseous proliferation at the cranial aspect. Based on these findings, 10 mg of triamcinolone acetonide and 80 mg of methylprednisolone acetate with 500 mg of amikacin sulfate were injected into each SI joint under ultrasonographic guidance. In addition, the horse was started on an intensive phenylbutazone therapy (2 g, *per os* every 12 hours for 7 days; 1.5 g *per os* every 12 hours for another 7 days). A muscle relaxant, methocarbamol (25 mg/kg, *per os*, every 12 hours, for 14 days), was also administered. Due to the high phenylbutazone dose, omeprazole was added (4 mg/kg, every 12 hours, *per os*). The stallion was stall-rested during this time, the goal being to allow the horse to rest completely and target therapy to his sacroiliac region before re-evaluating his reproductive performance.

Post-treatment attempts to collect semen. A series of attempts to collect semen were made 15 days after the

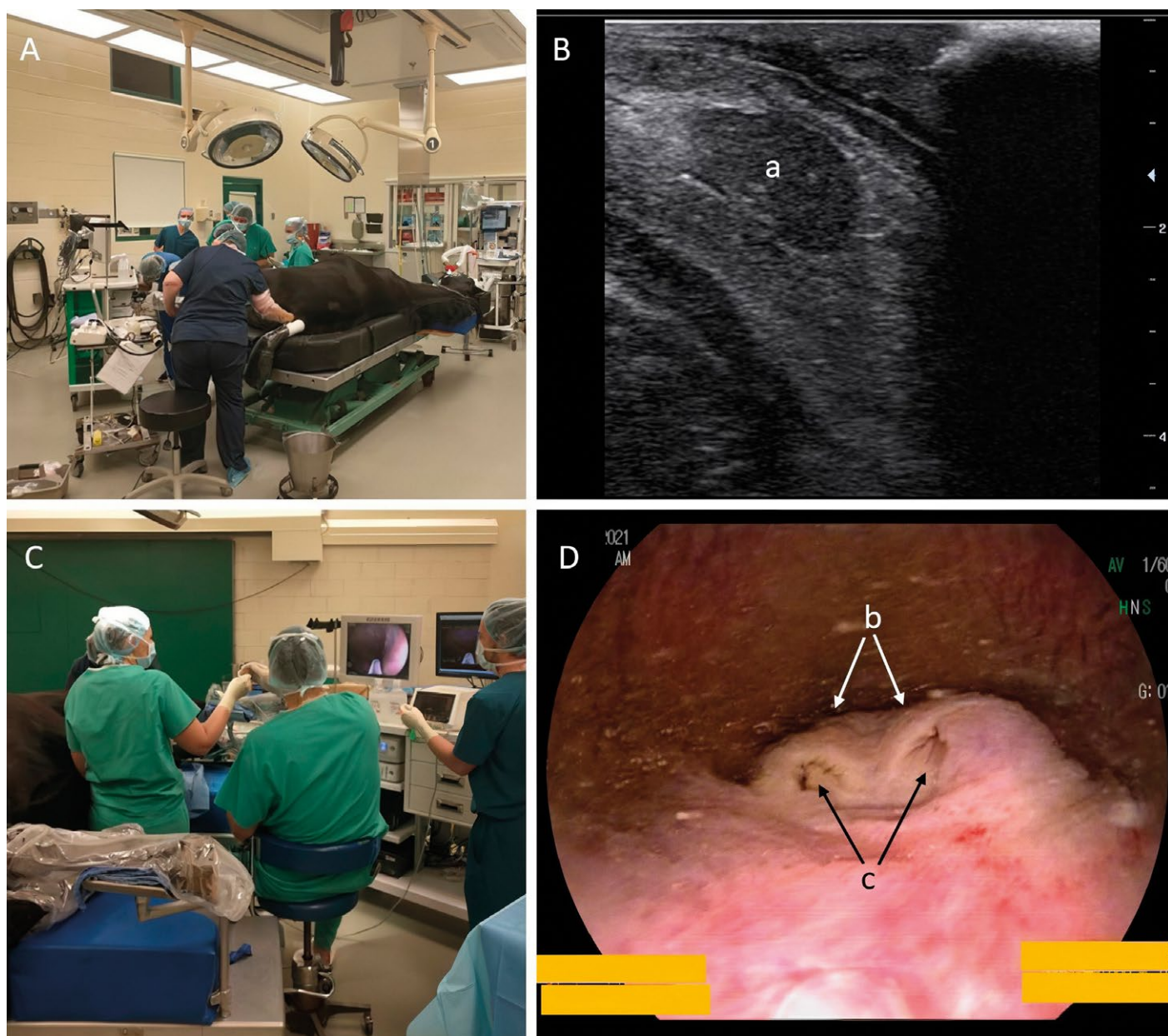


Fig. 2. Transurethral laser ablation of the midline cyst of the colliculus seminalis in a stallion: A – position of the horse under general anesthesia and transrectal ultrasonography performed simultaneously with the endoscopic procedure; B – ultrasonographic image of the cyst (a) during the procedure of laser ablation; C – transurethral procedure; D – endoscopic image of the colliculus seminalis (b) with the openings of the ejaculatory ducts (c)

initiation of treatment for orthopaedic issues. The stallion subjectively appeared more comfortable on the phantom, dismounting less and thrusting with increased vigour, but ejaculation did not occur. Additional techniques for increasing the ability to ejaculate, such as hot compresses applied on the base of the penis or administration of oxytocin and imipramine hydrochloride, were used, but to no avail. However, a different behavioural pattern was observed during these attempts. The stallion thrust eight to ten times vigorously, paused, adjusted his position, and thrust again. This pattern was consistent with the behavioural pattern displayed by stallions unable to ejaculate because of a midline cyst of the colliculus seminalis (14, 15).

The musculoskeletal pain resolved after targeted treatment, but the inability to ejaculate remained, most probably because of the midline cyst of the colliculus seminalis. The cystic uterus masculinus might have contributed to the problem as well. Therefore, a decision was made to perform a transurethral laser ablation of the midline cyst of the colliculus seminalis, as described before (9). To date, there is no treatment for the cystic uterus masculinus in stallions.

Transurethral laser ablation of the midline cyst of the colliculus seminalis. For the procedure, the horse was placed under general anaesthesia, and the penis was aseptically prepared. A linear ultrasound transducer was introduced to the rectum to visualize the midline cyst of the colliculus seminalis (Fig. 2A and B). A 1.5 m long and 10 mm wide flexible endoscope was passed to the proximal pelvic urethra at the level of the colliculus seminalis (Fig. 2C and D), and topical local anaesthetic (chilled 2% lidocaine) was applied to the urethral mucosa. A metal probe was inserted through a biopsy channel to locate each of the two compartments of the cyst under *per rectum* ultrasonographic guidance. A diode laser was used to make a vertical incision into the first compartment of the cyst (Fig. 3A, B and E, F). The probe was reintroduced, and ultrasonography was performed again to ensure the probe was now within the cyst (Fig. 3C and G). The laser was then reintroduced and used

to ablate the cyst (Fig. 3D and H). The same procedure was repeated on the second compartment of the cyst. A lateral incision was made between the two incisions to provide continuous drainage from both cystic cavities. A total of 1400 J was used for the entire procedure. The stallion recovered from anaesthesia without complications and was kept on treatment with anti-inflammatory and anti-microbial medications (flunixin meglumine, 1.1 mg/kg, every 12 hours, i.v.; dexamethasone, 0.05 mg/kg, once a day, *per os*; potassium penicillin 22000 IU/kg, every 6 hours, i.v., and gentamicin sulfate, 6.6 mg/kg, once a day, i.v.) for 24 hours.

After the procedure, the stallion was sexually rested for 10 days. He was maintained on treatment with 25 mg/kg of methocarbamol and 1 g of phenylbutazone *per os* once a day.

Eleven days after the procedure, a transrectal ultrasound evaluation was performed. No obvious cystic structures were seen at the colliculus seminalis, except a small amount/trace of fluid in this area.

Post-procedure attempts to collect semen. Further attempts to collect semen were made 12 and 13 days after the transurethral laser ablation of the cyst of the colliculus seminalis. Four attempts were made on day 12 and three on day 13, but only large numbers of epithelial cells were expelled. This is a known initial outcome of the transurethral cyst ablation procedure (15).

On post-procedure day 14, 1200 mg of imipramine hydrochloride was given *per os* two hours before another attempt to collect semen. The stallion mounted a dummy enthusiastically, thrust vigorously nine times, „flagged tail” 1-2 times (a typical behavioural sign of ejaculation), and expelled 15 ml of semen: skim milk colour, 61 million sperm/ml, 915 million sperm total, motility 70%/60% (general motility/progressive motility). After one hour, semen was collected again in the same way as before, and the stallion expelled 35 ml of semen: whole milk colour, 166.7 million sperm/ml, 5.8 billion sperm total, motility 60%/40%. Approximately 5 ml of gel was expelled, which confirmed a complete ejaculation.

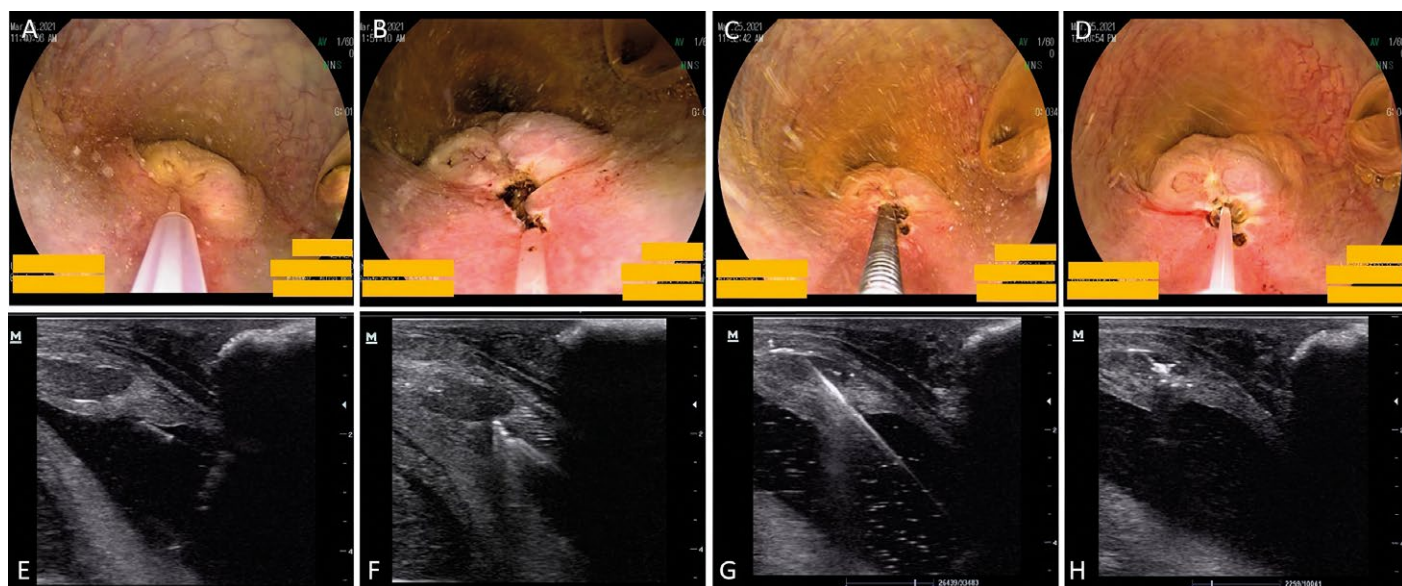


Fig. 3. Endoscopic (A-D) and ultrasonographic (E-H) images of the laser ablation of the midline cyst of the colliculus seminalis: A and E – laser fiber positioned at the cyst location; B and F – laser fiber cutting through the urethral wall to the cyst; C and G – metal probe inspecting the incision to the cyst; D and H – laser fiber inside the cysts during the ablation procedure

Seven more attempts to collect semen were made during the hospitalization of the stallion, four of which were successful (total sperm number ranged from 1.4 to 4.0 billion). Three attempts resulted in expelling large numbers of squamous epithelial cells. The quality of semen was improving, and 25 0.5 ml straws of semen were frozen. However, the last ejaculate had a tan/pink colour, suggesting blood contamination from the surgery sites. Therefore, further attempts to collect semen were discontinued, and the horse was discharged home. We recommended two additional weeks of sexual rest to allow complete healing.

Post-discharge follow-up. The stallion returned to the owner and was allowed to breed three mares on the pasture. Several attempts to mount individual mares were seen, but with no vigorous thrusts or signs of ejaculation. Instead, signs of increasing musculoskeletal problems were observed. Therefore, the stallion's exercise level was limited, and the targeted treatment for the orthopaedic issues was implemented at the local veterinary hospital. To avoid further exacerbation of the musculoskeletal issues causing unnecessary discomfort to the horse, semen was collected using a pharmacologically induced ejaculation protocol, which does not involve mounting or thrusting. Since navicular syndrome and sacroiliac osteoarthritis in the horse cannot be cured, management of these conditions, including specific exercises, corrective shoeing and anti-inflammatory medications, was recommended to the owner.

Discussion

Working with a stallion experiencing ejaculatory failure or dysfunction is often complicated and time-consuming. The case presented here clearly shows that several problems may contribute to these dysfunctions at once and that all of them need to be identified and addressed for ejaculation to become possible again.

A comprehensive evaluation is performed on all stallions with sexual behaviour problems, including gathering detailed history, general physical evaluation, detailed reproductive evaluation and behavioural analysis (8, 10). The owner provides information regarding reproductive experiences, housing and social arrangements, recreational and sports activities, all medical diseases, musculoskeletal injuries and any medications or supplements given to the horse. It is important to know whether the stallion was punished for displaying any reproductive behaviours, such as spontaneous erection, masturbation, mounting mares in undesirable situations, or strong libido in the breeding shed. Negative experiences associated with being punished for these normal reproductive behaviours may cause anxiety and often severely impact a stallion's libido and willingness to mount mares (11). There were no such problems with the horse presented here. He was not punished for reproductive behaviour and was exposed to mares on a nearby pasture. For breeding, the stallion was allowed to run free with mares in oestrus and to breed them naturally. Occasionally, semen was collected for the insemination of mares

located elsewhere. The stallion's libido in the breeding shed was excellent.

Next, a complete physical evaluation is performed to identify any present issues possibly affecting the stallion's performance in the breeding shed. In addition to general physical evaluation, a detailed evaluation of the external and internal genitalia and the pelvic urethra is performed using manual palpation and ultrasonography (8). In the present case, we identified chronic changes in the left testis and the epididymis. There were no signs of pain in these areas. Although such changes may affect sperm production and transport from a given testis, they should not affect sperm transport from the other epididymis and the ability to ejaculate. Furthermore, during the initial evaluation of the stallion, we identified a large midline cyst of the colliculus seminalis and the cystic uterus masculinus. It has been demonstrated that not all cystic structures affect ejaculation in stallions (12, 14). Therefore, to determine whether a cyst/cysts contributes/contribute to the ejaculatory problem of a particular stallion, a behavioural analysis of his sexual behaviour has to be performed. Video recording of all attempts to collect semen is highly recommended (10, 14). Viewing these recordings in slow motion is very helpful in identifying clues, such as head throw, pinning ears, poor coupling with the dummy, weak pelvic thrusts, quick dismount, etc. These clues are helpful in diagnosing specific problems. In our case, we initially observed typical signs displayed by stallions unable to ejaculate because of musculoskeletal problems. Therefore, we requested a consultation with an orthopaedic specialist, who diagnosed several issues that were immediately addressed. After targeted treatments and two weeks of stall rest, the horse displayed a typical behavioural pattern displayed by stallions with ejaculatory dysfunction caused by a midline cyst of the colliculus seminalis.

Currently, there is no established treatment for a symptomatic midline cyst of the colliculus seminalis in stallions (14). A similar condition in men, a midline cyst of the prostate, is treated by transurethral resection of the deferent ducts with a cystoscope and an electrocautery loop, called "deroofting" (3) or by transurethral ablation of a utricular cyst with a holmium laser (5, 17). These techniques lead to the cyst collapsing and opening the ejaculatory ducts, which permits ejaculation and improves fertility. Recently, we have successfully utilized a transurethral laser ablation to collapse a midline cyst of the colliculus seminalis that completely occluded the deferent ducts (15). After the ablation procedure and the expulsion of accumulated material, the stallion produced normal semen and successfully impregnated mares during the following breeding season. The case presented here is the third one in which we used the transurethral laser ablation procedure to collapse a midline cyst to treat ejaculatory failure. Although all three stallions were able to ejacu-

late after the procedure, we cannot conclude that the transurethral ablation procedure is a method of choice to treat anejaculation caused by a midline cyst of the colliculus seminalis in stallions. Only a few horses have been subjected to this procedure, and we do not know the long-term consequences of this treatment. Furthermore, our most recent case, presented here, involved many factors contributing to ejaculatory dysfunction. The chronic musculoskeletal issues affected the stallion's ability to thrust during copulation. The targeted treatment temporarily resolved the stallion's discomfort, and transurethral laser ablation collapsed the cyst, permitting normal ejaculation. However, once the stallion was allowed to exercise on the pasture and breed mares, the musculoskeletal problems returned, limiting his ability to thrust and reach the ejaculatory threshold.

The case presented here shows the complexity of sexual behaviour problems in stallions. Each case must be thoroughly evaluated, since many physical and psychological issues may contribute to these problems. It is essential to analyse the horse's history, perform a detailed physical examination and video-record all aspects of sexual behaviour for further analysis. Consultation with specialists, such as orthopaedic surgeons and/or neurologists, is also highly recommended. Finally, collaboration between horse owners and veterinarians is important, since follow-up management is crucial for returning these stallions to successful breeding careers.

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