



# Theriogenology Question of the Month

## History

A 4-year-old Standardbred stallion was retired from racing because of an injury to a tendon in the right forelimb. The owners intended to sell the stallion for use as a stud. A series of prepurchase semen evaluations conducted by personnel at the breeding farm consistently revealed low spermatozoa motility.

The breeding manager also observed that the horse would intermittently turn its head abruptly and gaze toward its groin. The horse would sometimes bite at its flank, kick out with both hind limbs, and pace in a circle. Since early race training when the stallion was 2 years old, it had frequently kicked at the walls of its stall and pinned back its ears without provocation. This behavior had been attributed to typical stallionlike aggression.

The stallion was referred to our facility for a breeding soundness examination and evaluation of the abnormal behavior. Specifically, the breeding manager was concerned that the poor semen quality and behavior were related (eg, some abnormality was causing physical discomfort in the groin region and poor semen quality).

To evaluate the reported unusual behavior, continuous 24-hour videotape samples were recorded and examined. Multiple episodes of abnormal behavior were identified. Intensity and form of the episodes varied. Behavior included quietly gazing back toward the groin, kicking out with 1 hind foot or tossing of the head, explosive crow-hopping, bucking, kicking out violently with both hind feet while vocalizing, biting at the flanks, and spinning. Typically, biting was on the left side and spinning was toward the left, but the horse also was observed spinning to the right and biting on the right side.

Episodes of abnormal behavior were detected throughout the day and night, with intervals between major episodes varying from a few minutes to > 11 hours. Episodes abruptly interrupted typical ongoing activities and behaviors, such as resting and eating, mostly without identifiable provocation. Some episodes developed before or after urination.

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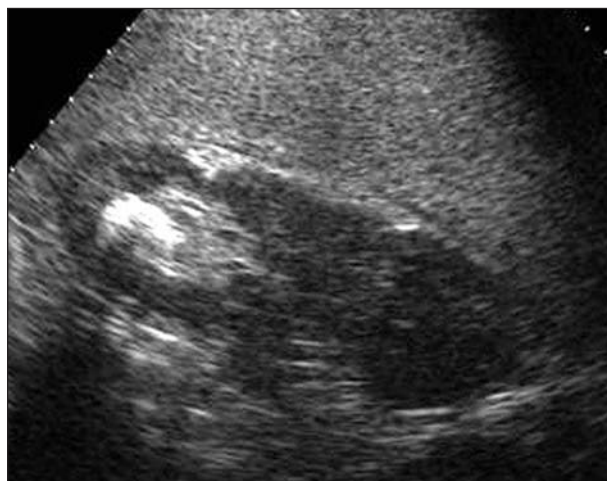


Figure 1—Image obtained during transabdominal ultrasonography of the left kidney of a 4-year-old stallion with unusual behavior. Marks on the ultrasonogram are at intervals of 1 cm.

A general physical examination was performed, and no abnormalities were identified. Manual and ultrasonographic examination of the testes; remainder of the external and internal portions of the reproductive tract; and bladder, terminal portion of the aorta, and origins of the iliac arteries revealed no noteworthy abnormalities. Results of per rectal palpation of the horse's abdominal contents when at rest and also during one of the more severe prolonged behavioral episodes were unremarkable.

The stallion did not appear to be uncomfortable during semen collection. Semen quality was consistent with results obtained by personnel at the breeding farm. There were low numbers of morphologically normal, progressively motile spermatozoa. Grossly and cytologically, the semen did not have evidence of genital tract inflammation.

Blood samples were obtained and submitted for a CBC, biochemical analysis, and fibrinogen analysis. All values were within the respective reference ranges.

Gastroscopy was performed, and results were within anticipated limits. Urinalysis was performed on a midstream-catch urine sample; results were within acceptable limits. Transabdominal ultrasonographic examination of the abdomen was performed (Figure 1).

## Question

What is the probable cause of this stallion's behavior?  
*Please turn the page.*

## Answer

The episodes of kicking, flank biting, and spinning were attributed to physical discomfort caused by a nephrolith located in the caudal pole of the left kidney.

## Results

Transrectal ultrasonography of the left kidney revealed a nephrolith (5 cm in diameter) in the caudal pole (Figure 2). After identification of the nephrolith, endoscopy of the urethra and bladder was performed, but both appeared normal. Urine samples were obtained by use of the endoscope from the left and right ureters in an attempt to identify an underlying cause for the nephrolith. No specific cause was identified; however, urine from the left ureter contained blood, which indicated active disease in that ureter or the associated kidney. Microbial culture of urine samples from each of the ureters did not yield any important organisms.

Evaluation of urine and blood analyses suggested that the nephrolith was not currently compromising renal function in the horse. However, on the basis of the size of the nephrolith, we believed that leaving it in place eventually could result in substantial compromise of renal function in the left kidney. The nephrolith was not likely to be the cause of the stallion's poor semen quality. However, it apparently was causing the horse to have intermittent episodes of pain that resulted in behavior that could cause injury to itself or its handlers. Thus, we recommended surgical removal of the nephrolith.

Laparoscopic surgery was performed. Initially, an attempt was made to spare unaffected tissues in the left kidney and remove only the nephrolith through a nephrotomy incision. However, we were unable to safely remove a large cluster of nephroliths from the left kidney. Therefore, unilateral nephrectomy was performed via laparoscopy.

The underlying cause of the nephrolith was not determined. The prognosis for the future systemic health of the stallion was considered fair because of the possibility that additional nephroliths could develop in the contralateral kidney.

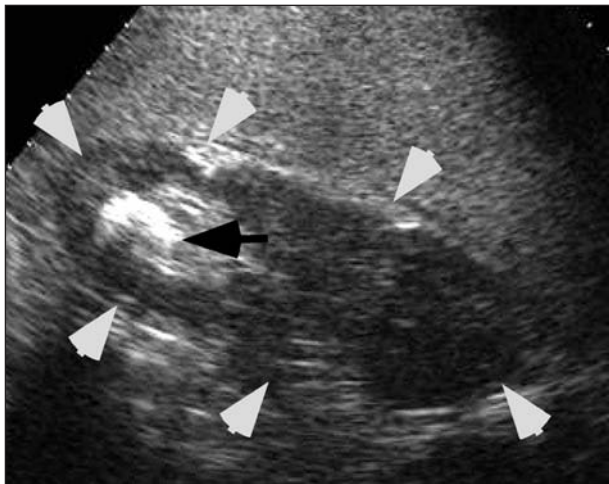


Figure 2—Same ultrasonographic image as in Figure 1. Notice the borders of the kidney (white arrowheads) and the nephrolith (black arrow) located in the caudal pole of the left kidney. Marks on the ultrasonogram are at intervals of 1 cm.

## Discussion

It is probable that the stallion reported here was affected by pain caused by the nephrolith for some time prior to admittance to our facility. The flank biting, kicking out with both hind limbs, and circling had historically been interpreted incorrectly as normal stallionlike aggression. Typical behaviors characteristic of stallions include socially provoked intermale aggression and sexual excitement in response to mares.<sup>1</sup> However, in our experience, the behaviors displayed by this stallion are more typically associated with underlying physical discomfort.

One differential for the behavior of this stallion was self-mutilation syndrome.<sup>2</sup> Self-mutilation syndrome is an uncommon disorder seen in stallions and geldings. This syndrome is marked by self-directed olfactory investigation and self-directed mutilation that appear to be elicited by a social stimulus (eg, a mare walking by a stallion in a stall, sighting another stallion, or encountering a fecal pile) or a stereotypy associated with elimination-marking behavior (defecation, sniffing feces, or sniffing oily male residues on walls or doorways). This aberrant intermale-type behavior typically does not interrupt ongoing behaviors (eg, eating, standing at rest, or sexual interaction) without obvious social provocation. Careful observation of the onset of episodes can be helpful in differentiating self-mutilation syndrome from physical discomfort.

When self-directed aggression is the result of physical pain, onset of the aberrant behavior is usually not associated with social or olfactory provocation, is of variable form and intensity, and interrupts ongoing normal behaviors and activities. In our experience, most self-directed aggression is attributable to an underlying physical abnormality that results in discomfort.<sup>2</sup> Elimination of the underlying cause typically eliminates the behavior. This was the situation for the stallion reported here.

When trying to localize the site of possible physical discomfort, analysis of less severe episodes is often more useful than analysis of violently explosive episodes because analysis of mild behavioral abnormalities may better suggest the area of discomfort. Accordingly, long-term videotape surveillance is recommended to allow for efficient evaluation of a series of both mild and more violent episodes. In this regard, careful evaluation of videotape samples strongly suggested that the behavior in this case was, in fact, the result of physical discomfort in the caudal portion of the abdomen and led us to pursue additional diagnostic testing that revealed the large nephrolith. Surgical removal of the nephrolith resulted in cessation of the abnormal behavior.

Most urinary calculi in horses are found in the bladder, and nephroliths are reported infrequently.<sup>3,6</sup> Stallions may be affected more frequently.<sup>3</sup> Suspected causes of uroliths include preexisting infection and nephrotoxins (including nonsteroidal anti-inflammatory drugs). Additionally, the typical characteristics and constituents of equine urine (alkaline pH, crystalluria, and mucoid debris) may predispose horses to forming uroliths. In horses, most calculi are composed

of calcium carbonate, a common component of equine urine. In other species and sometimes in horses, uroliths may develop around an existing nidus.

Clinical signs of nephroliths are often associated with chronic renal failure and include weight loss, poor performance, decreased appetite, or a combination of these.<sup>7</sup> There may also be chronic, low-grade colic in association with one or more of these signs. The stallion described here had only intermittent, acute discomfort in the caudal abdominal area and had no signs of renal disease or other systemic abnormalities, possibly because the nephrolith was not yet obstructive. In some horses, uroliths have been found in several sites within the urinary tract (eg, urethra, bladder, ureters, or kidneys). A detailed examination of the stallion of our report identified the abnormality in only 1 kidney. However, recurrence of uroliths is relatively common,<sup>3</sup> and it is possible that this stallion will subsequently develop calculi at other sites.

### Outcome

Evaluation of a 24-hour videotape of the stallion recorded on the second day after unilateral nephrecto-

my revealed no unusual behavior. Follow-up communication with the farm manager 6 months after surgery revealed that no abnormal behavior had been observed and that the horse had resumed race training.

### References

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