Recurrent Urolithiasis Associated with Unilateral Pyelonephritis in Five Equids

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Recurrent obstruction of the lower urinary tract, especially with obstructive urethrolithiasis, is an indication for further evaluation for upper urinary tract disease. This problem may be attributable to unilateral pyelonephritis, for which several management options are available. Author's address: Department of Large Animal Clinical Sciences, D-202 Veterinary Medical Center, Michigan State University, East Lansing, MI 48824-1314. © 2002 AAEP.

1. Introduction

Lower urinary tract stones may cause dysuria and hematuria, most commonly observed after exercise, or complete urethral obstruction leading to bladder distension, frequent posturing to urinate, and renal colic. Bladder and urethral stones are more common in male horses, and treatment of affected horses involves surgical removal of the urolith and a course of prophylactic antibiotics. In many instances of lower urinary tract lithiasis, further diagnostic investigation of the upper urinary tract is not performed, and a favorable prognosis is issued after successful surgical removal of the stone.

The purpose of this article is to describe a series of four horses and one burro with recurrent lower tract lithiasis associated with unilateral upper urinary tract disease (unilateral pyelonephritis) in which complete evaluation of the urinary tract, including ultrasonographic, endoscopic, and nuclear scintigraphic examinations, was used to document concurrent upper and lower urinary tract disease.

2. Materials and Methods

The case records of four horses and one burro with either two (n = 4) or four (n = 1) episodes of lower urinary tract lithiasis were reviewed.

3. Results

In addition to the burro, the four horses included an Arabian, a Thoroughbred, a Quarter Horse, and a crossbred. Age at initial presentation ranged from 3 to 19 yr, and all five equids were geldings. Four had recurrent urethral obstruction (presented for colic and urine dribbling), and one had recurrent cystolithiasis (presented for exercise-associated hematuria). At the time of initial presentation, all five animals had had the urolith removed through perineal urethrotomy (n = 4) or crushing of a distal urethral stone by compression of the penis. Two of the five equids had mild azotemia at initial presentation that resolved after surgery, and the other three horses were not azotemic. Further evaluation of the upper urinary tract for concurrent urinary tract infection was not performed on any of the affected animals during the initial episode of uroli-
Urolithiasis. Dietary recommendations varied with the location of the horses (California, Washington, and Michigan), but in all instances, owners were instructed to avoid alfalfa hay. None of the animals were medicated with urine acidifying agents.

Urolithiasis recurred within 9–58 mo after initial stone removal. All five equids remained non-azotemic, and further diagnostic evaluation included renal ultrasonography (n = 5), endoscopy of the urethra and bladder (n = 5), and nuclear scintigraphic assessment of individual kidney function (n = 2). These diagnostic tools revealed abnormalities in the left kidney of four animals and in the right kidney of one horse. Ultrasonography revealed increased echogenicity (n = 4) and presence of one or more nephroliths (n = 3) in the affected kidney. In one horse, the kidney seemed to have been replaced by flocculent fluid, consistent with a renal abscess. Endoscopic examination of the lower urinary tract was most useful for assessment of the structure of the ureteral orifices (one was abnormal in all five animals) and observation of urine flow from each ureteral orifice (one side was decreased or absent in all five animals). In addition, endoscopic examination allowed catheterization of each ureter (through passage of polyethylene tubing through the biopsy channel of the endoscope) for collection of urine samples for bacterial culture (n = 3); in one horse, the endoscope was passed into the renal pelvis, allowing direct visualization of a nephrolith.

Evidence for concurrent urinary tract infection was found in four animals, and bilateral ureteral catheterization revealed unilateral upper tract infection in two horses. Organisms recovered included *Streptococcus zooepidemicus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Enterobacter* sp. Nuclear scintigraphy was performed in two horses to evaluate remaining renal function to determine whether a nephrectomy should be pursued. Technetium 99m (130 millicuries) tagged to glucoheptone (GH) with static images collected 3 h after injection was performed in one horse. In the other case, 100 millicuries of technetium 99m (130 millicuries) tagged to glucoheptone (GH) with static images collected 15 and 20 min after injection. Static images were collected 15 and 20 min after injection. In both animals, markedly diminished function was detected in the affected kidney and led to a recommendation for unilateral nephrectomy. This surgical procedure was pursued in one animal, but the animal had to be euthanized after development of antibiotic-associated enterocolitis. Nephrectomy was declined by the owner of the other horse.

Three of five animals were eventually euthanized: one for antibiotic-associated enterocolitis after nephrectomy; one for four episodes of recurrence accompanied by polyarthritises secondary to chronic bacterial infection; and the burro developed postrenal azotemia caused by a complete urethral stricture within the penile lumen 6 wk after the second perineal urethrotomy was performed for removal of a distal urethral stone. Unilateral pyelonephritis was confirmed at necropsy in the two horses, whereas the burro had developed bilateral renal disease at the time of final presentation. Currently, one horse is doing well with a non-functional left kidney containing a nephrolith in the renal pelvis, and another horse is also free of clinical signs, although it has maintained a chronic urinary tract infection with *E. coli* despite long-term antibiotic treatment.

4. Discussion

Although uncommon, these five cases provide evidence that recurrent lower tract lithiasis may often be a consequence of upper urinary tract disease in horses. Despite the fact that most equine surgical texts state that recurrence of urolithiasis after surgical removal of a cystolith or a urethrolith is low, 12 of 29 horses (41%) with follow-up in a retrospective study of 68 horses with urolithiasis had recurrence of urolithiasis within 1–32 mo of initial stone removal. Furthermore, 25 of the 68 horses (37%) in that review were euthanized after initial evaluation or during hospitalization. Although 15 of these horses were euthanized because of other problems (chronic renal failure in 10 and unrelated diseases in 5), 10 of 68 (15%) were euthanized for problems directly related to urolithiasis. Because both the rate of recurrence and euthanasia in this retrospective review were higher than commonly described in most equine texts, this information should perhaps call into question the more favorable prognosis issued for most horses treated for urolithiasis. Furthermore, the results of this retrospective study and the experience gained with the five animals described in this report suggest that all equids affected with urolithiasis could benefit from a full diagnostic evaluation of the urinary tract. At a minimum, renal ultrasonography, endoscopic examination of the urethra and bladder, and submission of urine for bacterial culture would seem warranted.

References