

Chronic Renal Failure in 99 Horses

Harold C. Schott II, DVM, PhD; Kristi S. Patterson, BS;
Scott D. Fitzgerald, DVM, PhD; and A. Bruce King, DVM

Chronic renal failure occurs in all ages and breeds of horses, although Thoroughbreds and stallions greater than 15 years of age may be at greater risk. The most common presenting complaint is weight loss. Congenital disorders may account for up to 15% of all cases of chronic renal failure. Approximately half of the acquired cases of chronic renal failure are the result of glomerulonephritis, and the remainder are due to chronic interstitial nephritis. Authors' addresses: Dept. of Large Animal Clinical Sciences (Schott and Patterson) and Animal Health Diagnostic Laboratory (Fitzgerald), D-201 Veterinary Medical Center, Michigan State University, East Lansing, MI 48824-1314, and 5120 North Cloverleaf Rd., Post Falls, ID 83854 (King). © 1997 AAEP.

1. Introduction

Although the syndrome of chronic renal failure in horses has been well described in equine medicine textbooks,^{1,2} to our knowledge supportive data are limited to individual case reports and three retrospective studies detailing a maximum of nine cases.³⁻⁵ Presenting complaints have included weight loss, ventral edema, and polyuria-polydipsia. In addition to azotemia, reported clinicopathologic abnormalities have included hyponatremia, hypochloremia, hyperkalemia, hypercalcemia, hypophosphatemia, hypoproteinemia, and metabolic acidosis. Urinalysis has revealed isosthenuria and a varying degree of proteinuria. Pathologic findings in biopsy or postmortem tissue samples included glomerulonephritis, chronic interstitial nephritis, obstructive nephrolithiasis or ureterolithiasis, pyelonephritis, and papillary necrosis. Although equine chronic renal failure (CRF) has many similarities to CRF in other species, in our experience there are also differences. Thus, the purposes of this retrospective case study were (a) to better characterize CRF in horses

by a review of a large number of cases, and (b) to compare the disorder in horses with CRF in other companion animal species.

2. Materials and Methods

The prevalence of CRF was determined from data from the Veterinary Medical Data Base at Purdue University for all horses admitted to veterinary teaching hospitals during the years 1964-1996. For characterization of the clinical syndrome of CRF, the case records of 29 horses with this diagnosis (from the Santa Barbara Equine Practice, Washington State University, and Michigan State University) were reviewed. Data from these case records were combined with that collected from 70 previously reported cases of spontaneously occurring CRF⁶ for a review of 99 total cases of equine chronic renal failure. Information retrieved from case records and previous reports included signalment, presenting complaint, laboratory data (complete blood count, serum chemistry profile, and urinalysis), and gross

NOTES

MEDICINE I

and histologic findings obtained at necropsy or by an examination of renal biopsy samples.

Causes of CRF were categorized as congenital or acquired. Congenital causes included renal agenesis–hydronephrosis, renal hypoplasia, renal dysplasia, and polycystic kidney disease. Acquired causes included glomerulonephritis, chronic interstitial nephritis, and end-stage kidney disease. Chronic interstitial nephritis was further subcategorized in association with obstructive nephrolithiasis or ureterolithiasis, pyelonephritis, or papillary necrosis. End-stage kidney disease was a catch-all term used for cases in which secondary changes were too advanced to determine the primary cause of renal failure.

3. Results

The prevalence of CRF in horses admitted to veterinary teaching hospitals during the years 1964–1996 was 0.12% (515 of 442,535 horses; data from the Veterinary Medical Data Base at Purdue University). Chronic renal failure appeared to be more a problem of older horses, as the prevalence increased to 0.23% in horses greater than 15 years of age. An increased risk in stallions was suggested by a prevalence of 0.51% for intact males greater than 15 years of age.

Chronic renal failure occurred in a variety of horse breeds but was most commonly reported in Thoroughbreds (29%), Standardbreds (10%), and Clydesdales (10%). Sex distribution included 44% mares, 40% geldings, and 16% stallions. One third of all cases occurred in horses that were younger than 6 years of age. The most common presenting complaints included weight loss (79/92 = 86%), polyuria–polydipsia (38/68 = 56%), and ventral edema (34/80 = 42%). Other complaints included poor performance, partial anorexia, and rough hair coat.

Horses with CRF had varying degrees of azotemia at the time of initial diagnosis, but the majority (85%) of affected horses had a blood urea nitrogen-to-creatinine ratio (BUN:Cr) greater than 10. Further abnormal laboratory data accompanying CRF included mild anemia (40%), a serum albumin concentration <2.5 g/dl (86%), hyponatremia (65%), hyperkalemia (56%), hypochloremia (46%), hypercalcemia (67%), and hypophosphatemia (47%). Metabolic acidosis accompanied the terminal stages of CRF in the few horses for which acid-base balance was assessed.

Congenital renal disorders were found in 16% of horses with CRF and included renal agenesis–hydronephrosis, renal hypoplasia, renal dysplasia, and polycystic kidney disease. Acquired disease was the cause of CRF in the remaining cases (84%). Approximately half of the acquired cases were attributed to glomerulonephritis (53%), and the remainder had chronic interstitial nephritis (39%) or end-stage kidney disease (8%). Chronic interstitial

nephritis was most commonly associated with obstructive nephrolithiasis or ureterolithiasis, followed by pyelonephritis.

4. Discussion

The results of this retrospective case study documented that chronic renal failure is a disorder that may affect all ages and breeds of horses. In comparison with dogs and cats, for which the prevalence of CRF is 0.9% and 1.6%,⁷ respectively, the prevalence in horses was 0.12%. As with dogs and cats, CRF in horses appeared to be more a problem in older horses. Although CRF was most commonly reported in Thoroughbreds, and stallions appeared to be overrepresented, these findings may simply reflect a greater degree of veterinary care in these groups of horses. Of interest, however, were the findings that up to one third of affected horses were younger than 6 years of age and that congenital disorders were responsible for up to 15% of all cases of chronic renal failure.

Approximately 50% of the acquired cases of chronic renal failure were the result of glomerulonephritis, and the remainder were due to chronic interstitial nephritis or end-stage kidney disease. Although in most instances, cases of chronic interstitial nephritis could be further subcategorized into cases of obstructive nephrolithiasis or ureterolithiasis, pyelonephritis, or papillary necrosis, this was not always the case. For example, papillary necrosis consequent to nonsteroidal anti-inflammatory drug toxicity was sometimes accompanied by obstructive nephrolithiasis.

Unfortunately, corrective treatment for chronic renal failure in horses is not available; however, supportive care may be successful in prolonging life for months to years in some horses.

References

1. Divers TJ. Diseases of the renal system. In: Smith BP, ed. *Large animal internal medicine*. St. Louis: Mosby, 1990; 876–880.
2. Whitlock RH. Chronic renal failure. In: Robinson NE, ed. *Current therapy in equine medicine 3*. Philadelphia: Saunders, 1992;628–631.
3. Tennant B, Kaneko JJ, Lowe JE, et al. Chronic renal failure in the horse, in *Proceedings*. 23rd Annu Conv Am Assoc Equine Practnr 1978;293–298.
4. Divers TJ. Chronic renal failure in horses. *Compend Cont Educ Pract Vet* 1983;5:S310–S317.
5. Ehnen SJ, Divers TJ, Gillette D, et al. Obstructive nephrolithiasis and ureterolithiasis associated with chronic renal failure in horses: eight cases (1981–1987). *J Am Vet Med Assoc* 1990;197:249–253.
6. Schott HC, Bayly WM. Urinary tract disorders. In: Reed SM, Bayly WM, eds. *Equine internal medicine*. Philadelphia: Saunders, 1997;850–869.
7. Polzin DJ, Osborne CA, Bartges JW, et al. Chronic renal failure. In: Ettinger SJ, Feldman EC, eds. *Textbook of veterinary internal medicine*. 4th ed, vol 2. Philadelphia: Saunders, 1995;1734–1760.