NEPHROTIC SYNDROME IN THE HORSE: 2 CASE REPORTS

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Introduction *- The nephrotic syndrome (NS), defined as the concurrent presence of proteinuria, hypoalbuminemia, systemic hypertension and extravascular fluid accumulation, is a rare but well-recognized complication of glomerular disease in small animals and humans. NS in horses is not well documented, because alterations in blood pressure in cases of chronic kidney disease (CKD) with proteinuria are not routinely evaluated. Because NS is an important factor leading to the progression of CKD, medical treatment of proteinuria and hypertension has become an important aspect in the management of CKD in small animals and humans. In particular, the administration of angiotensin-converting enzyme inhibitors (ACEIs) is widely used to slow the progression of CKD. There are no reports of the use of ACEIs in horses with CKD and proteinuria, possibly due the elevated cost of daily treatment.*

Description of the case *- Two 7 year-old French warmblood horses, a female (case 1) and a male (case 2) were referred to our Unit for progressive weight loss, poor athletic performance and ventral edema (case 1) and polyuria-polydipsia arising after a previous episode of hematuria (case 2). Physical examination in case 1 revealed a poor body-condition score (2/5) and a moderate ventral edema; a cardiac murmur, (intensity III/VI) was detected with the point of maximum intensity located on the tricuspid area. Both patients showed pale mucous membranes. Laboratory examinations showed moderate anemia (6.03 and 6.46 x 106 /µL in case 1 and 2 respectively), hypokaliemia (3.0 and 2.5 nmol/L), marked hypoprotidemia (3.4 and 4.8 gr/dL) and hypoalbuminemia (1.8 and 2.1 gr/dL); serum protein electrophoresis revealed a marked increase in the alpha-2 globulin region in both cases. Urinalysis showed proteinuria (307 and 106 mg/dL) with normal specific density but with a high urine proteine/creatinine ratio (2.15 and 2.34). Electrolyte clearance ratio of Na+ and K+ was altered in both horses; urine GGT-index and GGT-activity were markedly elevated in case 1 only (60.8 and 87 U/L respectively). SDS-agarose gel electrophoresis allowed the qualitative evaluation of the proteinuria; case 1 showed a mixed glomerular and tubular pattern (protein with high and low molecular weight), while case 2 was characterized by a glomerular pattern only (molecular weight > 80KDa). Transabdominal ultrasonography was performed and both kidneys in case 1, and left kidney in case 2 were enlarged, with normal echogenicity between cortex and medulla but abnormal cortical thickness. Color Doppler was performed in case 2, and an increase in the renal vascular flow was detected. In case 1, echocardiography revealed a mild (II/IV) tricuspid regurgitation jet. Resting systemic blood pressure was measured indirectly with the use of an ultrasonic Doppler device with an inflatable cuff placed on the coccygeal artery. Systolic and diastolic pressure readings were increased (153 and 127 mmHg in case 1 and 182 and 161 mmHg in case 2).*
According to the results of the above mentioned procedures, a diagnosis of early CKD and nephrotic syndrome was made. To minimize further loss of renal function, both nutritional and pharmacological managements were recommended, and the exclusion of the horses from athletic activity was suggested. A treatment with ACEIs benazepril (0.5 mg/kg, PO, sid) was suggested, and the horses

were discharged to continue home therapy. The owner of case 1 entered the treatment, unlike the owner of case 2, whose athletic activity was prolonged during the following four months. The follow up of case 1 was performed every 4 months for the following year, with good results regarding renal function; furthermore, the horse was able to perform some limited work. On the opposite, the clinical condition of case 2 worsened in the next 3 months, developing azotemia. A further hospitalization allowed to monitor and stabilise the renal function with a dosage of 1 mg/kg of benazepril.
***Conclusion** - The clinical features observed in our two cases are specific and characteristic of nephrotic syndrome. The prevalence of this condition in the horse is unknown, and investigation on the relationship between renal impairment and alteration in blood pressure in the horse is still lacking. Proteinuria in small animals and humans is a negative prognostic factor for CKD, and is associated with progressive worsening of azotemia to End-Stage-Kidney Disease; for this reason this feature must be considered as a warning in the equine species in the same way. The ACEIs Benazepril seems a valid therapeutic option in reducing proteinuria and hypertension, since it doesn't seem to have any adverse effect. Future investigations are recommended to identify the minimal dose that results to be effective and the frequency of administration to decrease the costs related to its use.*

Bibliography

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