The Pharmacology of Furosemide in the Horse. II. Its Detection, Pharmacokinetics, and Clearance From Urine

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After intravenous (IV) injection of furosemide, plasma levels of this drug declined rapidly ($t_{1/2}$ = 5 minutes), then somewhat less rapidly to give a terminal or metabolic phase half-life of between 32 and 38 minutes. After intramuscular (IM) injection, complete and rapid absorption of the drug was observed but plasma levels of the drug declined more slowly ($t_{1/2}$ = [illegible] minutes). Furosemide was about 95% bound to equine plasma proteins.

Up to 60% of the amount of furosemide injected was rapidly excreted unchanged in urine, apparently due to secretion by the organic acid transport system of renal tubules. Urinary concentrations of furosemide therefore ranged up to 1,000-fold greater than plasma levels of the drug, and furosemide was detectable in equine urine for up to 3 days after its administration. Less sensitive analytical methods, such as thin layer chromatographic (T.L.C.) screening, detected furosemide for about 12 hours after [illegible] routine injection. Because the cardiovascular and diuretic effects of furosemide are over within 2 hours after its IV injection, thin layer chromatographic screening seems adequate for [illegible].

Introduction

Furosemide[a] is a member of the high ceiling group of diuretics which is widely used in equine medicine.[5,17] It is used in the treatment of various forms of edema, in azoturia, to reduce space-filling lesions, and, more recently, in the prophylaxis of epistaxis in racing horses.[13] It is also suspected in racing circles of being used to "dilute out" prohibited drugs [illegible] urine of racing horses.[20] Its approval in recent years by some racing authorities for the prophylaxis of epistaxis in horses has resulted in its greatly increased use in horses racing in these jurisdictions. However, this increased use of Lasix®[a] is, in many instances, much greater (up to 80% of all horses) than the known incidence of epistaxis in horses (<5%).[3]

Because of this widespread use of furosemide in racing horses, many questions concerning its actions and use in the racing horse have arisen. The diuretic effect of this drug is not well characterized in the horse, particularly with respect to dose and time response relationships.[7] The pharmacokinetics and disposition of this drug in the horse are essentially unknown, and in particular the "clearance" time for the drug in the urine of horses has not been reported. Recent

[a] Lasix®, Hoechst-Roussel Pharmaceuticals, Somerville, NJ.