

Validation Of Functional Immunoassay Technology For Gadolinium-DTPA To Measure Glomerular Filtration in Dogs.

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Measurement of glomerular filtration rate (GFR) to assess renal function in dogs is important in clinical and research settings. However, analytical barriers such as the use of radioactive substances, and technical difficulties with accurate urine collection, have limited broad clinical use of this test. In this study, we report the use of a novel method of measuring gadolinium-DTPA (Gd-DTPA) to determine GFR by plasma clearance, based on functional immunoassay technology (FIT).

Ten clinically normal dogs and four dogs with polydipsia and polyuria but no biochemical evidence of renal disease were studied. The GFR of each dog was determined by performing simultaneous iohexol and Gd-DTPA plasma clearance. Blood samples were drawn from the jugular vein at baseline and at 2, 3, and 4 hours post IV administration of 46.9 mg/kg Gd-DTPA, and iohexol at a dose of 300 mg iodine/kg. Iohexol serum concentrations were determined using two methods, high-performance liquid chromatography (HPLC) and neutron activation (NA). Gd-DTPA concentrations were determined using FIT.

The range of GFR values were 2.02-5.32 ml/min/kg. GFRs obtained by FIT using Gd-DTPA were comparable to GFRs obtained by HPLC ($R = 0.96$) and NA ($R = 0.98$) using iohexol. All but one dog had FIT-GFRs within 12% of the iohexol values measured either by HPLC or NA. There was no statistical difference between FIT-GFR values and those obtained by either HPLC or NA. We conclude that plasma clearance of Gd-DTPA determined by FIT can be used to measure GFR in dogs.

