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1: J Am Soc Nephrol. 1998 Jul;9(7):1242-8.

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Potassium citrate/citric acid intake improves renal function in rats with polycystic kidney disease.

Tanner GA.

Department of Physiology and Biophysics, Indiana University School of Medicine, Indianapolis 46202, USA.

Polycystic kidney disease (PKD) has been shown to be exacerbated by acidosis or a low potassium intake, and there is evidence that administration of alkali might have a beneficial effect. This study determined whether ingestion of potassium citrate and citric acid would ameliorate PKD. Healthy normal and heterozygous littermate Han:SPRD rats with autosomal dominant PKD were provided with either tap water or 55 mM K3citrate/67 mM citric acid solution (KCitr) to drink starting at the age of 1 mo. Renal clearance measurements and histologic assessments were performed when the rats were 3 mo old. KCitr intake did not affect body weight or urine flow, but completely prevented the decline in GFR found in untreated rats with PKD. In rats that drank tap water, left kidney GFR averaged (in microliter/min per 100 g body wt) 503 +/- 78 (n = 9) in normal animals and 242 +/- 56 (n = 6) in rats with PKD. In rats that drank KCitr, GFR averaged 562 +/- 123 (n = 7) in normal animals and 534 +/- 103 (n = 7) in rats with PKD. Kidneys of rats with PKD were approximately double normal size. KCitr treatment did not affect kidney size, but led to fewer interstitial abnormalities and smaller cysts in cystic kidneys. KCitr ingestion led to a significantly lower (P < 0.001) plasma [K+] in rats with PKD (3.3 +/- 0.2 versus 4.1 +/- 0.2 mEq/L in rats on tap water). Chronic KCitr intake in the young heterozygous Han:SPRD rat with PKD yields a modest improvement of kidney histology and a dramatic improvement in GFR. The mechanism of action of KCitr and the long-term effects of this treatment on renal structure and function in PKD deserve further study.

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