High phosphate diet increases arterial blood pressure via a parathyroid hormone mediated increase of renin.


Abstract

BACKGROUND: There is growing evidence suggesting that phosphate intake is associated with blood pressure levels. However, data from epidemiological studies show inconsistent results.

METHOD AND RESULTS: The present study was designed to evaluate the effect of high circulating phosphorus on arterial blood pressure of healthy rats and to elucidate the potential mechanism that stands behind this effect. Animals fed a high phosphate diet for 4 weeks showed an increase in blood pressure, which returned to normal values after the addition of a phosphate binder (lanthanum carbonate) to the diet. The expression of renin in the kidney was higher, alongside an increase in plasma renin activity, angiotensin II (Ang II) levels and left ventricular hypertrophy. The addition of the phosphate binder blunted the increase in renin and Ang II levels. The levels of parathyroid hormone (PTH) were also higher in animals fed a high phosphate diet, and decreased when the phosphate binder was present in the diet. However, blood P levels remained elevated. A second group of rats underwent parathyroidectomy and received a continuous infusion of physiological levels of PTH through an implanted mini-osmotic pump. Animals fed a high phosphate diet with continuous infusion of PTH did not show an increase in blood pressure, although blood P levels were elevated. Finally, unlike with verapamil, the addition of losartan to the drinking water reverted the increase in blood pressure in rats fed a high phosphate diet.

CONCLUSION: The results of this study suggest that a high phosphate diet increases arterial blood pressure through an increase in renin mediated by PTH.

PMID: 24979301 [PubMed - in process]
High phosphate diet increases arterial blood pressure v...