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Influence of parathormone on renal transport of amino acids in children.

Clearance studies were performed in children with no tubular disease (I) with vitamin D resistant rickets (II) with hypoparathyroidism (III) and with vitamin D deficiency rickets (IV). The urinary excretion rate (U_{AAV}), clearance (C_{AA}) and percentage tubular reabsorption ($\%T_{AA}$) of 15 free amino acids were calculated before and after an acute intravenous injection of PTH. The following results were obtained: In group I-III there was no significant change in U_{AAV} , C_{AA} and $\%T_{AA}$ after PTH injection. In contrary there was a marked increase in U_{AAV} (9.9 to 13.9 nmol/min/1.73 m²) in C_{AA} (5.3 to 7.4 ml/min/1.73 m²) and a decrease in $\%T_{AA}$ (96.7 to 92.9%) in the group of vitamin D deficiency rickets. These results indicate, that PTH obviously exerts a measurable influence on the tubular reabsorption of amino acids only in vitamin D deficiency.

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"Urinary calcium and phosphorus excretion in the first week of life".

With the permission of their parents 24 newborn babies of varying weights and gestational ages have been studied with respect to their urinary excretion of calcium and phosphorus. Timed specimens of urine were collected as continuously as possible during the first 3 days and on the 7th day of life; venous specimens of blood were also obtained on each of these days. Calcium, phosphorus, sodium and creatinine measurements were performed on these specimens. It was found that both sodium and calcium excretion followed a similar course with high levels of excretion soon after birth falling during the first 3 days and rising by the end of the first week. There were no statistically significant differences between groups of babies classed as pre-term, small for dates or mature. Serum calcium levels fell during this week while phosphorus levels rose. Urinary phosphorus excretion was low soon after birth but rose rapidly until by the end of the week phosphorus excretion seemed considerably to exceed phosphorus filtration. Assuming that creatinine handling by the kidney of the newborn is similar to that of older infants and that creatinine clearance represents an approximation to glomerular filtration, these infants (fed on artificial phosphate rich diet) clearly ingest a gross excess of phosphate and seem able actually to secrete phosphorus into their renal tubules in an attempt to remove it.

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A syndrome of hypertension, hyperkalaemia and acidosis with normal renal and adrenal functions.

A 14 years old boy was observed with constant hypertension (up to 170/100 mm Hg), hyperkalaemia (up to 8.2 mEq/l) and metabolic acidosis (blood HCO_3^- 16 mEq/l) for over 6 years. The somatic development was normal. C_{IN} and C_{PAH} , proximal and distal tubular functions (including response to an acid loading test) were within the normal limits except for a lowered bicarbonate threshold (19,3 mEq/l). Total body potassium (K), plasma renin and aldosterone levels as well as secretion rates of hydrocortisone, aldosterone, corticosterone, DOC and substance S were normal. There was an inverse relationship of serum K and bicarbonate levels ($r = -0.672$, $p < 0.001$). No correlation could be shown between serum K and urinary K excretion, nor between urinary Na and K excretion. Mean arterial blood pressure was correlated to serum K ($r = 0.714$; $p < 0.001$) but not to urinary Na excretion. By dietary restriction serum K and hypertension were diminished but not normalised. The clinical findings point to an abnormal mechanism of renal handling of K which has not been previously described.

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Compensatory adaptation after contralateral nephrectomy in adult and newborn rabbits.

In dogs and rats undergoing saline diuresis, removal of one kidney induces adaptive changes in the excretion of water, Na and HCO_3^- . This 'compensatory adaptation' of renal function was further defined in adult and newborn rabbits. Clearance studies were performed on anesthetized animals maintained on a constant fluid balance. In adult animals exclusion of one kidney induced an immediate increase in urine flow, GFR, and in the fractional excretion of Na, K, Ca and P. A transient increase in effective renal plasma flow was observed. In animals undergoing hypertonic saline diuresis, contralateral nephrectomy did not depress free-water reabsorption in the remaining kidney, thus indicating that Na transport in the ascending limb of Henle's Loop was not inhibited in this condition. These observations suggest that contralateral nephrectomy depresses water and electrolyte transport in the proximal tubule of the remaining kidney. Occurrence of 'compensatory adaptation' was studied in eight 1-month-old rabbits. In none of them did contralateral nephrectomy induce compensatory changes in the remaining kidney. The absence of 'compensatory adaptation' in newborns could reflect an inability to depress proximal sodium reabsorption.
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