

Parathyroid Hormone (PTH) in Children with Chronic Renal Failure; characterisation of the 1-84 PTH:C-PTH Ratio.

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Current intact immunoradiometric (iIRMA) assays for parathyroid hormone (PTH) cross-react with long carboxyl-terminal PTH fragments (C-PTH) that antagonise the biological actions of 1-84PTH. Development of an assay (CAP-PTH) that is specific for 1-84PTH, enables estimation of the agonist (1-84PTH) to antagonist (C-PTH) ratio. In adults this ratio may be predictive of bone turnover; it may also be relevant to growth. We have demonstrated normal growth in children maintained with normal range (NR) PTH levels. In a cross-sectional study we have shown that the 1-84 PTH:C-PTH ratio is lower in children with PTH levels outside the NR. The aim of this study was to characterise the ratio in a longitudinal study.

195 patients, median (range) age 9.9 years (0.3-17.1), were recruited: 168 with a GFR <60 mls/min/1.73m² (including 42 transplanted patients), 19 on peritoneal- and 8 on haemo-dialysis. Over a median period of 1.1 years (0.5-1.7) children attended 5 (3-15) clinics and iIRMA PTH and CAP-PTH were measured. Average values were calculated for each patient. iIRMA PTH was higher than CAP-PTH (45.1 vs 28.5 pg/mL, p<0.001). The mean of the 1-84 PTH:C-PTH ratio was lower in patients on peritoneal dialysis and transplanted patients compared to those with CRF, 1.6 and 2.0 respectively vs 3.0 (p=0.002 and p<0.001). Furthermore the ratio was significantly lower (p=0.038) in those with PTH levels above the NR.

These longitudinal data confirm our cross-sectional data, that there is a relative excess of C-PTH in dialysed patients and with PTH levels outside the NR. If the ratio is related to bone turnover, these findings would suggest that the maintenance of normal range PTH is appropriate in children with CRF.

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