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HOW DO WE DEFINE HYPERCALCIURIA IN 24 HR URINE?

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Objectives: Hypercalciuria can clinically present itself as gross hematuria, microscopic hematuria, dysuria or abdominal pain without urinary lithiasis. It is also one of main metabolic causes of urinary lithiasis in children. In Nelson pediatrics, hypercalciuria is defined by a 24 -hour urine for calcium excretion >4mg/kg/day. A spot urine calcium creatinine ratio of >0.22, is considered abnormal in older children and adolescents. 24hr urine collection is frequently under- or over-collected., which leads to 24hr urine hypercalciuria criteria >4mg/kg/day is inadequate methodology for the hypercalciuria detection. In this study, we evaluated the comparisons of 24 hr urine calcium creatinine ratio(Ca/Cr), 24hr urine calcium excretion(mg/kg)(Ca/Kg) and CCCR in school aged children.

Calcium creatinine clearance ratio(CCCR); (24-hour U-calcium/P-total calcium) / (24-hour U-creatinine/P-creatinine), as known as fractional excretion of calcium(FeCa)

Methods: We enrolled 250 normal kidney function patients who's age is 7 to 18 year, was able to collect 24 hr urine in a single hospital unit. We conducted 24 hr urine collection, serum calcium creatinine levels on the same day from January 2007 to December 2019. We analyze of each values. We used SPSS. 25.0

Results: Based on kappa statistics, Ca/Kg and Ca/Cr, Ca/Kg and CCCR, CCCR and Ca/Cr were relevant with each other. (P=0.01)(P=0.01)(P=0.01) In case of CCCR > 1% and Ca/Cr > 0.2mg/mg, kappa value was 0.807(+/- 0.050), which is almost perfect agreement. But in case of CCCR > 1% and Ca/Kg, Ca/Cr and Ca/Kg, each kappa value was 0.541(+/-0.077), 0.499(+/- 0.076), which is moderate agreement. But when we use CCCR > 2% criteria, agreement with Ca/Cr was fair. (kappa value=0.281 +/-0.080) Also agreement with Ca/Kg was fair too(Kappa value=0.370 +/- 0.113).

Conclusions: 24hr urine calcium / Kg shows less agreement with other values.

table1.png

Table 1. Mean(+2SD) values according to calculating method.

age	7-9 yr		10-12 yr		13-15yr		16-18yr		Total
sex	M(n53)	F(n34)	M(n33)	F(n25)	M(n48)	F(n28)	M(n14)	F(n15)	(n250)
Ca/kg	1.81(5.47)	1.81(4.70)	2.4 (8.67)	2.12(6.06)	1.74 (8.73)	1.83(5.53)	1.48(3.69)	1.06(2.48)	1.84 (6.50)
Uca/Cr	0.10(0.28)	0.15(0.49)	0.16 (0.6)	0.14(0.39)	0.10(0.50)	0.13(0.36)	0.08(0.23)	0.15(0.72)	0.13 (0.46)
CCCR	0.005 (0.014)	0.006 (0.018)	0.009 (0.033)	0.007 (0.018)	0.007 (0.046)	0.007 (0.014)	0.006 (0.017)	0.009 (0.039)	0.007 (0.028)

table2.png

Table 2. Frequency of hypercalciuria according to calculating method.

	7-9 yr	10-12 yr	13-15yr	16-18yr	Total	Satisfied both criteria	Satisfied all criteria
Ca/Cr	15(17.2%)	16(27.6%)	9(11.8%)	2(6.9%)	42(16.7%)	13(5.2%)	6(2.4%)
Ca/Kg	10(11.5%)	8(13.8%)	3(3.9%)	1(3.4%)	22(8.8%)		18(7.2%)
CCCR 2%	2(2.3%)	3(5.2%)	1(1.3%)	2(6.9%)	8(3.2%)		
CCCR 1%	16(18.4%)	15(25.9%)	11(14.5%)	4(13.8%)	46(18.4%)	37(14.8%)	