

Summary

The Calculated Reference Value of the Tubular Extraction Rate in Infants and Children: An Attempt to Use a New Regression Equation

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This study was designed to investigate the empirical tubular extraction rate (TER) of the normal renal function in childhood and then propose a new equation to obtain TER theoretically.

The empirical TER was calculated using Russell's method for determination of single-sample plasma clearance and $^{99m}\text{Tc-MAG}_3$ in 40 patients with renal disease younger than 10 years of age who were classified as having normal renal function using diagnostic criteria defined by the Paediatric Task Group of EANM.

First, we investigated the relationships of the empirical value of absolute TER to age, body weight, body surface area (BSA) and distribution volume. Next we investigated the relationships of the empirical value of BSA corrected TER to age, body weight, BSA and distribution volume. Linear relationship was

indicated between the absolute TER and each body dimensional factors, especially regarding to BSA, its correlation coefficient was 0.90 (p value). The BSA-corrected TER showed a logarithmic relationship with BSA, but linear regression did not show any significant correlation.

Therefore, it was thought that the normal value of TER could be calculated theoretically using the body surface area, and here we proposed the following linear regression equation;

$$\begin{aligned} \text{Theoretical TER (ml/min/1.73 m}^2\text{)} \\ = (-39.8 + 257.2 \times \text{BSA})/\text{BSA}/1.73 \end{aligned}$$

The theoretical TER could be one of the reference values of the renal function in the period of the renal maturation.

Key words: $^{99m}\text{Tc-MAG}_3$, Renal maturation, Body surface area, Regression equation.