**Population Distribution of Haematocrit-Corrected Tacrolimus Concentrations in Renal Transplant Patients**

**Introduction:** Tacrolimus exhibits extensive binding to erythrocytes1. Clinically, trough tacrolimus settings are measured from whole blood concentrations2. Whole blood concentrations are expected to increase in proportion to erythrocyte binding (which itself is proportional to haematocrit) since tacrolimus is a low extraction rate drug3. Such increases in whole blood concentrations would not cause a change in therapeutically active, unbound concentrations3. In low haematocrit settings, dose titration may occur to maintain whole blood concentrations in the therapeutic range, leading to elevated unbound concentrations2. To account for the effect of haematocrit on whole blood tacrolimus concentrations (WBTC), the use of haematocrit-corrected tacrolimus levels has been suggested3,4.

**Objective:** To determine the effect of using two methods for determining haematocrit-corrected tacrolimus levels3,4 (designated HCTC-1 and HCTC-2 in this study) in a population of renal transplant patients.

**Methods:** Renal transplant patients who attended an outpatient clinic appointment in the Outpatient Department between October 2016 and May 2017 were retrospectively analysed. WBTC, haematocrit, serum creatinine and dose modification were retrospectively collected from laboratory software and clinic letters. HCTC-1 and HCTC-2 concentrations were then calculated using previously published equations.

**Results:** The results from 207 (122 male, 85 female) patient’s single clinic tacrolimus levels were analysed. The mean patient age was 53.6 ± 13.7 years old with a mean age of transplant of 5.3 ± 4.3 years. 80.7% of patients were receiving an anti-metabolite and 45.4% of regimens included prednisolone. The average WBTC was 6.2 ± 1.55 mcg/L (range 2.7 to 14.4 mcg/L). HCTC-1 concentrations were significantly higher than WBTC (p <0.0001) and with a greater variation (p =0.00061) [average HCTC-1 7.1 ± 1.97 mcg/L (range 3.0 to 13.7mcg/L)]. HCTC-2 concentrations were also significantly higher than WBTC (p<0.0001) and with a greater variation (p=0.012) [average HCTC-2 6.9 ± 1.85 mcg/L (range 2.9 to 13.9 mcg/L)]. In the clinic setting there were 11 dose increases (5.3%) and 13 dose decreases (6.3%) based on patient’s WBTC.

**Discussion:** Both methods for correcting tacrolimus concentrations based on haematocrit produced levels which were significantly higher than the WBTC. The greater population variation seen when correcting levels for haematocrit, raises the possibility of a greater variations in unbound tacrolimus than would be expected using WBTC alone. Further studies are required to assess the clinical significance of these findings.

**References.**

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