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Comparison of hydroxychloroquine concentration among whole blood, serum and plasma samples in Indian patients with lupus nephritis

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Objectives: Lupus nephritis (LN) is an important risk factor for morbidity and mortality in systemic lupus erythematosus (SLE). Hydroxychloroquine (HCQ) is an integral part of the therapeutic armamentarium for SLE, both in prophylaxis and treatment. Data regarding HCQ levels in whole blood, serum and plasma and recommended therapeutic cut-offs have not been reliably determined. The present study aims to estimate and correlate HCQ concentrations in whole blood and its components (serum and plasma) in LN patients in Indian subpopulation.

Methods: Lupus nephritis patients on HCQ therapy for a minimum of 3 months were included in this study. HCQ blood levels (ng/mL) in same patient from EDTA whole blood, plasma and serum were measured by liquid chromatography-tandem mass spectrometry and correlation among different bio sample was done.

Results: In this cohort study, 51 patients were included with mean age of 29.5±8.98 years and 88.2% being females. The mean HCQ dose was 4.9 ± 1.7 mg/kg. The mean HCQ levels were 934.3 ± 707.7 ng/mL in whole blood, 357.2 ± 259.4 ng/mL in plasma and 354.93 ± 276.44 ng/mL in serum. The mean levels in whole blood were approximately 2.5-fold the levels in serum and plasma. Whole blood concentrations of HCQ had positive linear correlations with both plasma and serum concentrations, with a correlation coefficient of 0.549 and 0.778 ($p<0.001$), respectively (Figure 1). Whole blood levels with dose of 200 mg/day were lower than 400 mg/day (736 ± 666.40 ng/mL vs 1117.45 ± 814.66 ng/mL).

Conclusions: This is the first Indian study to look at HCQ concentrations in patients with lupus nephritis between whole blood, serum and plasma. All three samples sources have good correlation and any sample can be used from clinical point of view.

Figure 1A: Scatter plots showing positive linear correlation between whole blood and serum concentrations of HCQ