

EXPANDED PLASMA VOLUME IN
WALDENSTROM'S MACROGLOBULINEMIA AS
EVIDENCED BY IGM REDUCTION RATIOS DURING
THERAPEUTIC PLASMA EXCHANGE (TPE)

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Patients with hyperviscosity syndrome are reported to have expanded plasma volumes due to increased oncotic pressure. We report that the IgM removal kinetics during TPE support the existence of an expanded plasma volume and its normalization after substantial removal of IgM.

A patient presents with an IgM level of 7455 mg/dl (60-292 mg/dl), a total protein of 13 g/dl (6.2-8.1 g/dl) and a serum viscosity of 6.44 (1.10-1.80). Estimation of plasma volume using the standard formula [EPV=Weight(kg) x 0.065 x (1-Hct)] yielded a calculated volume of 4 liters. After the first 4 liter exchange with albumin replacement, IgM reduction was only 47% instead of the expected 63% as is calculated by 1st order kinetics ($X_1 = X_0 e^{-Ve/EPV}$ where X_1 equals the final plasma concentration, X_0 equals the initial concentration, Ve equals the volume exchanged and EPV equals the patient's estimated plasma volume). During the two subsequent 4 liter exchanges, IgM reduction was 58 and 57%, respectively, yielding a calculated EPV of 4.6 and 4.7 liters, more closely resembling the expected EPV.

We conclude: 1) calculation of the IgM reduction ratio from TPE can provide evidence of an expanded plasma volume; 2) IgM removal appears to restore plasma volume towards normal; 3) Patients presenting with hyperviscosity syndrome may require increased exchange volumes in order to adequately reduce IgM levels.