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Hemodialysis Cast Nephropathy: Removal of Serum Free Light Chains by High Cut-off Haemodialysis

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Objective: Cast nephropathy in multiple myeloma is a consequence of high serum levels of immunoglobulin free light chains (FLC). Excess monoclonal FLC results in obstructing intratubular cast formation and tubular toxicity causing acute kidney injury (AKI). This study aims to investigate the efficacy of serum FLC removal by high cut-off haemodialysis (HCO-HD) in patients with cast nephropathy.

Methods: From 9/2012-9/2013, 3 patients (patients 1, 2 and 3) with dialysis-dependent AKI secondary to biopsy-proven cast nephropathy were started on HCO-HD. All were Chinese; 2 females, 1 male, with mean age 65.3 years. Ultraflux EMiC2 dialyzer (polysulfone, surface area 1.8 m², cut-off 40kDa, albumin sieving coefficient 0.01, Fresenius Medical Care, Germany) was used. Pre-treatment FLC and albumin levels were retrospectively reviewed.

Results: Patient 1 had IgA-lambda myeloma with high serum lambda FLC level and patients 2 and 3 had kappa light chain myeloma with high serum kappa FLC level. Their mean serum creatinine level on presentation was 755 μmol/L and serum FLC levels of patients 1, 2 and 3 were 14,800, 12,231 and 11,200 μmol/L respectively. All patients were treated with 6 daily sessions of extended HCO-HD, 8 hours/session with blood flow rate 150–200 mL/min. Bortezomib-based chemotherapy was started on the day of 2nd HD session in patient 1 and 5th HD session in patient 2, and 1 day before HCO-HD in patient 3. The mean % reduction of serum FLC level after each HD session in patients 1 and 2 was 17.8%, 73.7% and 57.9%, and the % reduction after 6 sessions of HCO-HD were 55.7%, 88.3% and 85.4% respectively. Albumin infusion of 20–220 g during the 6 HCO-HD sessions was required and there was no decrease in serum albumin post-HCO-HD. 1/3 patients (patient 1) became dialysis independent after HCO-HD.

Conclusion: High cut-off hemodialysis using Ultraflux EMiC2 dialyzer combined with bortezomib-based chemotherapy effectively removes serum FLC in patients with cast nephropathy. Further prospective studies are needed to assess whether HCO-HD can improve renal or patient survival.

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