Hemorheological pattern in disorders of plasma composition

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AIM: An altered plasma composition can cause an increase in blood viscosity (BV). Plasma viscosity (PV) is mainly determined by the total protein concentration and by the presence of abnormal protein fractions. A polyclonal hypergammaglobulinemia is common in systemic autoimmune disorders and rare conditions of plasma hyperviscosity are cryofibrinogenemia, cryoglobulinemia, dysfibrinogenemia. However, plasma hyperviscosity is most often associated with paraproteinemias, in which an abnormal immunoglobulin is secreted by malignant B-lymphoid cells of monoclonal origin. The aim of this study was to investigate the rheological pattern in patients with multiple myeloma (MM) and monoclonal gammopathy of undetermined significance (MGUS).

METHODS: We measured BV at high and low shear rates, haematocrit, PV at high and low shear rates and some derived indexes; we also evaluated erythrocyte deformability by diffractometry at the shear stresses of 6, 12, 30, 60 Pa.

RESULTS: In MM patients we observed, as expected, a decrease in hematocrit and a marked increase in PV, but also a significant reduction of the erythrocyte deformability. A low erythrocyte deformability was also demonstrated in MGUS subjects, who showed a normal hematocrit and an increase in PV, especially at low shear rates.

CONCLUSIONS: The altered erythrocyte deformability observed in patients with paraproteinemias seems to be related to an alteration of membrane lipids and could be a therapeutic target.