Estimated plasma volume status in patients with primary myelofibrosis and associated thrombotic and mortality risks

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Background

Context: Blood plasma experiences substantial changes in both volume and composition in patients with chronic myeloproliferative neoplasms (MPN) and represents large reservoir of cytokines and other mediators of inflammation. Higher estimated plasma volume status (ePVS) has recently been shown to correlate with increased thrombotic risk in polycythemia vera patients.

Objective: To estimate clinical and prognostic associations of ePVS in patients with myelofibrosis.

Materials & Methods

Design: Retrospective cohort study.

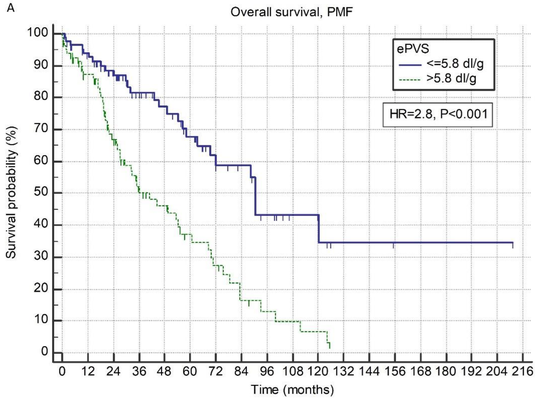
Setting: 6 hematology centers.

Patients: 238 myelofibrosis patients, 168 with PMF, 34 with post-PV SMF and 36 with post-ET SMF.

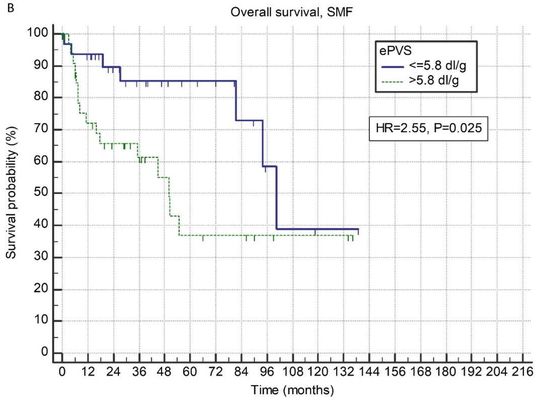
Interventions: ePVS was calculated using the Strauss derived Duarte formula: (100-hematocrit (%))/hemoglobin (g/dL) and expressed as dl/g.

Main outcome measures: Overall survival (OS) and time to thrombosis (TTT).

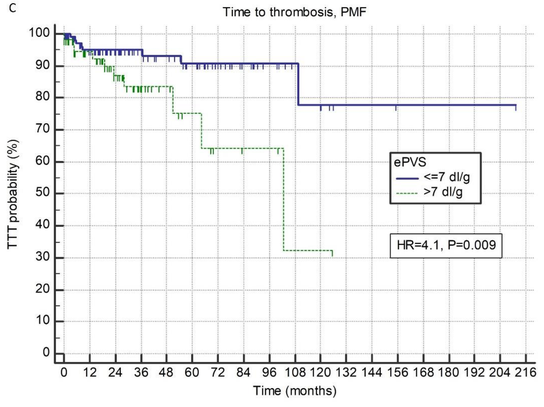
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B



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Conclusions

Myelofibrosis patients with more advanced disease features and more pronounced inflammation have higher ePVS, indicative of expanded plasma volume. Higher ePVS is associated with impaired survival in PMF and SMF and higher thrombotic risk in PMF patients.

Results

Median ePVS was 5.8 dl/g and it did not significantly differ between PMF and SMF patients.

Among other associations, higher ePVS was significantly associated with higher degree of bone-marrow fibrosis, absence of JAK2-mutation, lower white-blood-cells (WBC), platelets and hemoglobin, presence of circulatory-blasts, higher C-reactive-protein, higher lactate-dehydrogenase, lower albumin and higher Charlson-comorbidity-index in an overall cohort, as well as with more pronounced splenomegaly and higher DIPSS risk in PMF and higher Mysec-PM risk in SMF patients (P<0.05 for all analyses).

Higher ePVS (>5.6 dl/g) was associated with shorter overall-survival (OS) in PMF (HR=2.8, P<0.001) and SMF (HR=2.55, P=0.025) and with shorter time-to-thrombosis in PMF (>7 dl/g, HR=4.1, P=0.009) patients.

Associations with OS diminished in multivariate analyses after adjustments for DIPSS and Mysec-PM, respectively. Association with TTT remained significant independently of JAK2, WBC and chronic kidney disease.