Tissue factor activity in patients with multiple myeloma and its relation to venous thromboembolism

ABSTRACT

Tissue factor is a key component in the initiation of coagulation and may play a role in cancer-related processes such as hypercoagulability, tumor growth, angiogenesis, and metastasis. An early study by **(Flanga et al., 2008)** showed an increased expression of TF in hematologic malignancies as acute myeloid leukemia, polycythemia vera and essential thrombocythemia. However, the role of TF in multiple myeloma has not been studied in detail.

Our study included 75 MM patients, 52 males and 23 females with a mean age of 58.49 ± 6.78 years and 20 age and sex-matched healthy subjects who served as controls. All patients were subjected to detailed clinical examination and investigations which included CBC, liver & kidney functions tests, uric acid, serum calcium, CRP, serum protein electrophoresis, immunofixation, bone marrow aspirate and biopsy, B_{2}-microglobulin, serum albumin, PT, aPTT, D-dimmer, FDP_S, fibrinogen, tissue factor levels, skeletal survey and bilateral lower limb venous duplex.

Tissue factor was significantly higher in MM patients than controls (**P**= 0.0001). TF levels were significantly higher in patients expressing Lambda compared with those expressing Kappa chain (**P=** 0.04). It was higher in patients complicated with DVT than those without DVT (**P=** 0.0001). TF levels were higher in patients with positive markers of activated coagulation (D-dimer and FDPs) when compared to those with negative markers (**P=** 0.0001 & 0.002 respectively). TF was positively correlated with D-dimer and FDPs (**r** 0.4&0.3, **P=** 0.001&0.004 respectively),while negatively correlated with fibrinogen (**r** -0.3 & **P=** 0.01). According to therapeutic regimens, TF levels showed no statistically significant difference between patients received VAD-based regimens and those who did not (**P=** 0.9), it was lower in patients received brotezomib-based regimens compared to those who did not (**P=** 0.01) while it was higher in patients received thalidomide-based regimens than those who did not (**P=** 0.004). TF levels were positively correlated with duration of treatment with thalidomide (r 0.4, **P=** 0.001).

The sensitivity and specificity of the TF level as a marker of thrombosis in MM patients (as determined by the ROC curve) were found to be 77.3% & 90% respectively. Positive predictive value of 96.7 and negative predictive value of 51.4 and area under the curve of 0.88 were detected.

Tissue factor was found to be significantly higher in stage III patients when compared with those in stage I & stage II (**P=** 0.0001). Also we reported that TF is positively correlated with stage and duration of the disease (***r*** 0.4, **P=** 0.0001 & ***r*** 0.5 & **P=** 0.007 respectively) and B_{2}-microglubulins (***r*** 0.4, **P=** 0.001), but negatively correlated with albumin (***r*** -0.4, **P=** 0.0001).

Keywords: Multiple myeloma, tissue factor, thrombosis.