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Peripheral blood hematopoietic progenitor cells correlate with clinical outcome of trauma haemorrhagic shock

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Background: Haemorrhagic shock (HS) accounts up to 50% of early trauma deaths. Hematopoietic failure has been observed in experimental animals and human following shock and injury. One of the facets of bone marrow failure is multiple organ dysfunction syndrome and is commonly seen in patients recovering from severe trauma and haemorrhagic shock. Bone Marrow (BM) dysfunction is associated with mobilization of hematopoietic progenitor cells (HPCs) into peripheral blood. Present study explored the association of peripheral blood hematopoietic progenitor cells (HPCs) with mortality in trauma haemorrhagic shock patients (T/HS).

Materials & Methodology: Prospective cohort studies of patients presenting within 8 hrs of injury with T/HS in the Department of Emergency Medicine, Jai Prakash Narayan Apex Trauma Center, All India Institute of Medical Sciences were recruited. Peripheral blood samples were collected in each patient for measurement of peripheral blood HPCs. Peripheral blood progenitor cell (PBPC) quantification was performed by measuring HPCs counts using the haematology analyzer (Sysmex XE-2100). Clinical and laboratory data were prospectively collected after consent. Ethical approval was taken and data was analyzed by Stata 11.2.

Results: 39 patients with T/HS and 30 normal healthy controls were recruited. HPCs were significantly higher ($P<0.001$) in the T/HS as compared to control. Among study group, 14 patients died within 24 h at the hospital admission, and found HPCs concentrations were highly significant ($P<0.001$) in non-survivors ($n=14$) when compared with survivors ($n=25$) among T/HS patients.

Conclusions: Our studies suggest the peripheral blood HPCs may be early prognostic marker for mortality among patients who presented with trauma haemorrhagic shock on admission. But the exact molecular mechanism and signalling pathway involved in the change of the behaviour of bone marrow microenvironment is still unclear.

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