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Abstract:

BACKGROUND: Intraosseous (IO) vascular access is increasingly used as an emergency tool for achieving access to the systemic circulation in critically ill patients. The role of IO transfusion of blood in Damage Control Resuscitation is however questionable due to possible inadequate flow rate and hemolysis. Some experts claim that IO transfusion is contraindicated. In this study we have challenged this statement by looking at flow rates of autologous fresh whole blood reinfusion and hemolysis using two of the commonly used FDA-approved and CE-marked sternal needles. Additionally, the success rate of sternal access between the two devices is evaluated.

METHODS: Volunteer professional military personnel, were enrolled prospectively in a non-randomized observational study design. We collected 450 ml of autologous whole blood from each participant. Participants were divided into the following three groups of 10: T.A.L.O.N. IO, FAST1 IO, and intravenous (IV) group. The reinfusion was done by gravity only. Blood sampling was performed before blood collection, and 30 minutes after reinfusion. Investigation of hemolysis was performed by measurements of haptoglobin and lactate dehydrogenase (LD). Success rate was evaluated by correct aspiration of bone marrow.

RESULTS: Median reinfusion time was 46.2 ml/min in the FAST1 group, 32.4 ml/min in the T.A.L.O.N. group and 74.1 ml/min in the IV group. Blood samples from all participants were within normal ranges. There was no statistically significant difference in haptoglobin and lactate dehydrogenase between the groups. In the Fast 1 group 1/11 (9%) procedures failed. In the T.A.L.O.N group 4/14 (29%) procedures failed.

CONCLUSION: Although preferable, achieving peripheral venous access in the bleeding patient is a major problem. Our findings suggest that fresh whole blood transfusion through the IO route is safe, reliable and provide sufficient flow for resuscitation.

LEVEL OF EVIDENCE: Level III Therapeutic/Care management.

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Reference:

Bjerkvig, C.K., Fosse, T., Apelseth, T.O., Sivertsen, J., Braathen, H., Eliassen, H.S., Guttormsen, A.B., Cap, A.P. and Strandenes, G. (2018) Emergency sternal intraosseous access for warm fresh whole blood transfusion in Damage Control Resuscitation: 'Sternal intraosseous access in DCR'. The Journal of Trauma and Acute Care Surgery. February 17th. .

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