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Warm storage of whole blood for 72 hours

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Abstract

BACKGROUND: In field emergency medicine, fresh whole-blood units are stored at room temperature up to 24 hours or occasionally longer. Few data exist on the integrity and in vitro functional properties of whole blood stored warm beyond 24 hours.

STUDY DESIGN AND METHODS: Ten citrate phosphate dextrose solution whole-blood units were collected and divided into two equal volumes. One-half of each unit was stored at 19°C and the other half was stored at 25°C, encompassing the accepted range for room temperature storage. At 6, 24, 48, and 72 hours, aliquots were collected from each unit and whole blood analyzed for cell counts, gases, and clotting function with thromboelastography, red cells for intracellular analytes, platelet (PLT)-rich plasma for aggregometry, and the supernatant for hemoglobin, potassium, glucose, lactate, and plasma clotting studies.

RESULTS: Whole-blood units stored at room temperature maintained cellular counts and coagulation activity for up to 72 hours. Units stored at 19°C demonstrated greater RBC adenosine triphosphate and 2,3-diphosphoglycerate (DPG) content and stronger responses in PLT aggregation studies when compared

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CONCLUSION: Storage of whole blood at room temperature for 72 hours leads to marked reductions in pH and DPG, but the observed reduction in PLT function and plasma coagulation factor activity was surprisingly modest compared to literature values. These findings should prompt additional investigation, given their potential importance for whole blood processing and field-expedient transfusion.

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