Platelet Capture Efficiency During Formation of a Fibrin Clot.

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Abstract:
Introduction
The purpose of this study was to calculate the platelet capture efficiency during the formation of a fibrin clot by measuring the platelet level in a sample of whole blood pre- and post-clot formation.
Methods
Thirty five cc of whole blood was obtained via venipuncture from 10 healthy volunteers with no history of clotting abnormalities and no recent use of nonsteroidal anti-inflammatory medication. Five cc of the whole blood was placed in a standard blood collection tube for a complete blood count (CBC) evaluation. The remaining 30 cc of blood was immediately placed into a sterile fibrin clot-forming container with a sintered glass cylinder supported by the lid. The container was then swirled in a circular fashion for 10 minutes causing a fibrin clot to form around and adhere to the glass cylinder. The cylinder and attached fibrin clot was then removed and an additional 5 cc of the plasma remaining in the cup after fibrin clot removal was then placed into an additional tube for CBC evaluation. The CBCs for the pre-fibrin clot and post-fibrin clot samples were then compared.
Results
The mean values for the pre-clot samples were platelets 187.80 x103/uL, white blood cells (WBC) 5.52 x103/uL, red blood cells (RBC) 4.47 x106/uL, neutrophils (NE) 57.10%, and lymphocytes (LY)32.4%. The mean values for the post-clot samples are platelets 4.40 x103/uL, WBC 4.79 x103/uL, RBC 4.59 x106/uL, NE 53.4%, LY 37.64%. The post-clot sample had a significant decrease in platelets ($p<.01$, 2 tail T-test). There was no significant change in the post clot sample for WBC, RBC, NE or LY. By comparing the change in mean value for pre- and post-clot platelet level it was calculated that formation of the fibrin clot captured 92% of the available platelets.
Discussion
Recent research has focused on the potential of PRP to aid tissue healing; past research demonstrates that use of an endogenous fibrin clot can enhance tissue repair. It is also known that a fibrin clot captures platelets during clot formation. This study demonstrates that after the formation of a fibrin clot there is a significant decrease in the number of platelets remaining in the post-clot plasma thus determining a 92% efficiency of platelet capture by the fibrin clot.
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