Cytobiological study of stored Platelets for transfusion

Introduction: Platelet transfusion is the common way used to treat a variety of clinical conditions such as blood loss and active bleeding. Platelet storage at room temperature has been the main method of storage for years. However, despite the limited storage time of five (5) days, the frequency of bacterial platelets contamination remains high. The cold storage of platelets is attractive due to the reduction of the bacterial proliferation potential and the maintenance of platelet function over five (5) days of storage. However, it still constitutes a challenge for transfusion medicine as the clinical effects to the patient / recipient are not known to date.

Purpose: The main objective of the present study is the cytobiological study of platelets intended for transfusion in humans and stored in the cold (+ 4 ° C), with the aim of creating a new blood derivative, the frozen platelets.

Materials and Methods: Two different strategies of platelet storage will be studied: human platelets stored in cold (+ 4 ° C) (N = 25) and platelets (N = 25) stored at room temperature (+ 22 ° C). The cells will be studied for their functionality, morphological characteristics by electron microscopy, cell clearance, aging, and programmed cell death markers. The supernatant plasma will be studied for its antioxidant potential as well as the expression of soluble adhesion and apoptosis molecules. Finally, platelet microbes from the soluble part of the plasma will be isolated and the expression of cellular clearance, adhesion, aging and apoptosis molecules will be examined. The data will be processed by statistical analysis.

Expected Results: Given the controversial results of cold-stored platelets, the present study, through a multitude of factors and a large number of platelets, is expected to answer the question of whether sustainability levels, recovery numbers, haemostatic function, and bacterial load of the platelet units stored in cold are at similar or different levels than those stored under an environment of standard temperature conditions.

Conclusions: Having some notable evidence that stored cold stored platelets exhibit satisfactory viability and functionality indicators, maintenance of platelets in cold (4 ° C-8 ° C) may in the future be the optimum way of storage and transfusion of platelets.