

Evaluation of hemoglobin, hematocrit, hemolysis, leucocytes and residual protein contents in 40 red cell concentrates used for the treatment of patients with B-thalassemia major

A thesis submitted for partial fulfillment of master degree in clinical and chemical pathology

By

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Summary

Thalassemia major is the most severe form of thalassemia diseases and treated with blood transfusion. Severe anemia becomes apparent in the first two years of life when the switch from γ to β -chain should take place (*Athanasios et al, 2005*). The most common treatment for patients who have beta thalassemia major is regular blood transfusion to suppress endogenous erythropoiesis to minimize complications such as hepatosplenomegaly, bone changes, and inhibit increased gastrointestinal absorption of iron (*Cunningham et al., 2004*).

Although red cell transfusions are lifesavers for patients with thalassaemia major, they are responsible for a series of complications as iron overload, infection, hemolytic, non hemolytic reactions and alloimmunization, transfusion-related acute lung injury (TRALI) and transfusion-induced graft versus host disease (TI-GVHD) (*Angelucci et al, 2000*).

To avoid these complications patients with thalassaemia should receive leukoreduced packed red cells. Leucoreduction is done through different technical procedures like; Gamma irradiation of blood and blood components, glycerolization and freezing, washing or filtration (*John et al, 2008*).

In our study we treated 40 units of red cell concentrates (RCCs), in Fayoum University Hospital, either by filtration only or by filtration and washing techniques to evaluate their quality for subsequent transfusion to thalassemic patients. We categorized the forty RCCs according to type of treatment into three study groups: Group (1): Ten blood units were filtered within 2 days of donation (post-storage filtration), Group (2):

Twenty units were filtered within 2 hours of donation then washed on request (pre-storage filtration) and Group (3): Ten blood units were filtered firstly then washed within 2 days of donation (post-storage filtration& washing).

For all PRBC units we measured Hb, HCT, WBCs and residual protein content before and after treatment to evaluate their quality for transfusion.

Filtration plus washing of RCCs are preferred than filtration only this is because:

- Filtration offers high efficiency leucocyte removal (less than 0.5×10^6 WBCs per unit) in the processed red cells with high red cell recovery.
- Saline washing of the donor product removes plasma proteins that constitute the target of antibodies in the recipient and does not result in adequate leucocyte reduction.
- Washing of RCCs should not be used as a substitute for leucoreduction. Instead, washing should be used in conjunction with filtration