

# White particulate matter in a packed red blood cells unit

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## Introduction

Aggregate formation in blood units has been known since long. Particulate matter visible to naked eye, white in color, has been described in detail by Rentas *et al.*<sup>[1]</sup> White particulate matter (WPM) in blood bags is reported to be composed of normal blood elements, namely aggregates of platelets, with variable amounts of fibrin and trapped red and white cells and not of extraneous material or organisms.<sup>[2]</sup>

Enhanced visual inspection has been implemented by American Red Cross<sup>[1]</sup> for the observation of WPM at all the blood transfusion centers. Under this, the blood bag is kept with the labeled side down on flat surface, undisturbed for 10 minutes. At our department, we are issuing blood units after strict visual inspection as per the departmental standard operating procedure (SOP). We recently encountered one packed red blood cell (PRBC) unit having WPM. There are no clear guidelines regarding the transfusion of WPM containing blood units. Looking at the sensitivity of the issue and the ill effects that can be associated with transfusion of such units, we thought that the information should be shared with other staff involved in issue of blood units.

## Observation

Many small and few large white particles [Figure 1] were observed on day 1 in a nonleucoreduced PRBC unit. This was prepared from 450 ml whole blood with CPDA-1 anticoagulant utilizing soft spin. The blood donor's investigation revealed normal serum protein, triglyceride, and cholesterol. Complete blood counts including platelet count were also within normal limits. Donor was not on any medication prior to the blood donation. Leishman stained smears from the WPM showed only granular material. Blood culture was sterile.

## Pathophysiology of event

Mechanisms that predispose to WPM formation are not clear, but high platelet counts, lipemia, and use of hard spin during component preparation can all favor the formation.<sup>[1,2]</sup> Swank<sup>[3]</sup> reported that high

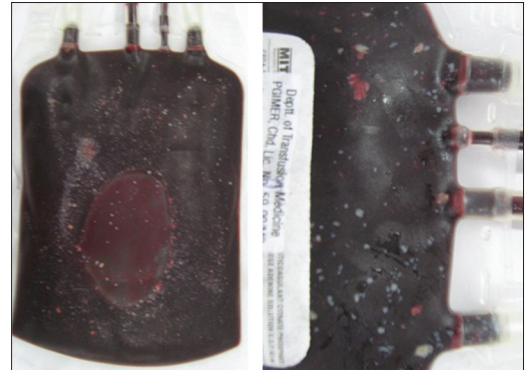


Figure 1: PRBC unit depicting many small and few large white particulate matter

pressures were necessary to force stored whole blood through a filter and increase in pressure correlates with increase in storage time. He attributed this to formation of compact aggregates of platelets and white blood cells due to increased adhesiveness during routine storage of blood, and therefore, was responsible for increased filter occlusion. Reiss *et al.*,<sup>[4]</sup> reported that the rate of flow of platelet-rich blood units was almost half as compared to platelet-poor red cell units. They attributed this finding to a higher microaggregate content found in 170 µm pore filters when platelet-rich units were filtered. Robertson *et al.*,<sup>[5]</sup> observed macroaggregates in up to 85% of additive red-cell units stored for 28 days. The formation of WPM is removed by leucoreduction and removal of platelets from whole blood.<sup>[1,2]</sup>

## Clinical implications

The latest update on the United States Food and Drug administration does not conclusively rule out a potential association between particulate formation in blood units and some adverse events.<sup>[2,6]</sup> Therefore, such an appearance should call for detailed investigations including culture of the implicated blood units and their quarantine till the investigation reports ascertain the normal findings.

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