

White Particulate Matter in Blood Bag: Revisited

Sir,

White particulate matter (WPM) refers to visible white macroaggregates of varying sizes and shapes observed in the blood units. Although the occurrence of WPM is well known in the past, it is more frequently observed these days. WPM contains mainly platelets and few white blood cells, in some cases, fibrin.^[1]

WPM is mostly observed in red blood cell components albeit less frequently encountered in whole blood units. In our center, whole blood unit is used for only massive transfusions. A unit of whole blood stored at 4°C was found to have WPM on day 22. The whole blood was collected in a bag with 49 ml citrate-phosphate-dextrose-adenine-1 and was nonleukoreduced. In accordance with the keys released to the American Association of Blood Banks by American Red Cross Blood Services, we classified the WPM as type I matter, i.e. white small-sized aggregates >50 in number were seen while the bag was laid flat, label side down and undisturbed for 10 min [Figure 1].^[2] The other red cell units stored in the refrigerator were not found to have WPM. Samples from the implicated unit were collected in a sterile glass tube, and particles were isolated by sterile 22-gauge needles (using the technique described by Rentas *et al.*).^[3] A crush smear was prepared from the WPM and a hematoxylin and eosin stain was performed and examined under a bright-field microscope using oil immersion (×1000). The preparation was found to contain platelets and fibrin [Figure 2]. The blood culture was sterile. Complete blood count and lipid profile of the donor were within the normal limits.

Electron microscopy of these aggregates reveals that they are composed of platelets, fibrin, and WBCs, mixed with cellular fragments, with or without granules.^[3] In a random analysis of 356 units with

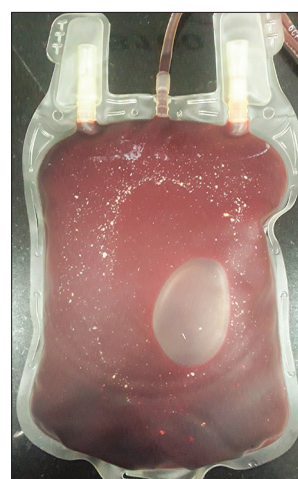


Figure 1: Blood bag showing multiple small (starry sky pattern) white aggregates

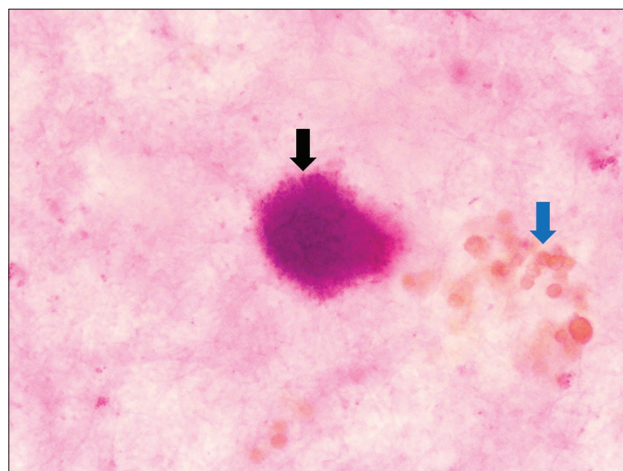


Figure 2: Smear prepared from the white particulate matter shows clump composed of platelets entangled in a meshwork of fibrin (black arrow). The blue arrow indicates erythrocytes. The pale background is due to serum (H and E, ×1000)

WPM, 12 units were whole blood units containing citrate-phosphate-dextrose,^[2] while another study could

find WPM only in red cell units but not in whole blood units.^[4] Formation of WPM in whole blood units is rare and is attributed to increased adhesiveness of WBCs and platelets. It has been proposed that platelets and white blood cells become sticky during storage and on exposure to cold. Such tendency could also be due to the exposure of phosphatidylserine on the surface of the platelets at the time of apoptosis.^[1] By and large, WPM appears to be a normal phenomenon, occurring as a part of storage lesion irrespective of the donor characteristics.^[5] Till date, units with WPM have not been vividly associated with any transfusion-related adverse events. Buffy coat removal and leukofiltration prevent the formation of WPM in blood components. Although sufficient evidence is not available that these units could endanger patients' safety, the use of standard filters or leukoreduction filters during transfusion is warranted.^[1] It is recommended that all centers should establish their own institutional policy while releasing such units in emergency situations.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Quick Response Code:



Website: www.gjtmonline.com

DOI: 10.4103/GJTM.GJTM_9_17

How to cite this article: Subramanian R. White particulate matter in blood bag: Revisited. *Glob J Transfus Med AATM* 2017;2:70-1.

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