



Conquering Blood Diseases –  
From Research to Patient Care

## ***Platelet Transfusions: An Historical Perspective***

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Platelets represent a crucial part of the normal homeostasis of living organisms by contributing importantly to the maintenance of vascular integrity. Platelets are thus able to respond quickly to a vascular injury, but patients with low circulating platelet levels are at increased risk for bleeding. Such bleeding (minor and serious) can occur either spontaneously or following even minor trauma. It is important to note, however, that until the 1970s thrombocytopenic bleeding was a major cause of serious morbidity and mortality in patients undergoing intensive chemotherapy for a malignancy, such as acute leukemia. Since the advent of routine platelet transfusions such events are quite uncommon.

The existence of platelets and their possible contribution to hemostasis was described in the 1870s, but it was not until 1910 that transfused platelets were shown to reverse the risk of bleeding in thrombocytopenic patients. The first such report, by W.W. Duke, was in a 20-year-old man who had profound mucocutaneous bleeding associated with a platelet count of only  $6 \times 10^9/L$ . When he became moribund as the result of uncontrollable epistaxis, he was given fresh whole blood transfusions. The transfusion of a “large” amount of such blood was associated with the dramatic cessation of his bleeding, at which time his count had increased to  $123 \times 10^9/L$ ! Because of the many obstacles that prevented the ready availability of platelets for transfusion, many years elapsed before platelet transfusions became routine practice in the treatment of thrombocytopenic patients. It was not until approximately the 1970s that the routine availability of platelet transfusions became a reality. This became possible when Drs. Scott Murphy and Frank Gardner (reported in 1969) provided evidence that platelets could be stored at  $22 \pm 2^\circ C$ , for up to 3 days and still maintain their hemostatic function. Subsequent improvements, including the availability of improved storage containers, enabled the provision of platelets for transfusion after 5 or even 7 days of storage. At the present time, the possibility of 10-day storage looms clearly on the horizon.

Platelet transfusions are very effective in ameliorating the risk of thrombocytopenic bleeding; however, many questions remain about the optimal use of platelets and how we should deal with some of the significant adverse events associated with platelet transfusions. These include the ongoing risk of the transfusion transmission of microbiological agents, including viruses, bacteria, parasites and prions. The dawn of the twenty-first century has, however, seen the very realistic possibility of the introduction of several pathogen inactivation techniques to considerably improve the microbiological safety of platelets for transfusion. The evolution of such a proactive paradigm shift will likely be realized over the next 5 to 10 years, but it is important to note that the use of pathogen-inactivated plasma and platelets is slowly being introduced in Western Europe to reduce the risk of the transfusion transmission of various microbiological agents (known and unknown).

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