Platelet transfusion is one of the important blood component therapies frequently employed in patient care in secondary and tertiary care hospitals. In our set up, as majority of hospitals do not stress on any international or national transfusion guideline, the practices in blood component therapy, including platelet transfusion, are not uniform, and leave a lot of room for improvement. In this editorial, general principles of platelet transfusion will be discussed.

Platelet transfusion can be of significant value in preventing or treating haemorrhage in patients with thrombocytopenia or impaired platelet function. The decision to transfuse platelets should be based on the judgment of the attending physician after careful review of the patient’s condition and clinical situation. The cause of thrombocytopenia must be established prior to platelet transfusion. This is very important as platelet transfusions are not indicated in all cases and may be contraindicated for certain conditions, such as heparin-induced thrombocytopenia and thrombotic thrombocytopenic purpura/hemolytic uremic syndrome.\(^1\) Once the cause of thrombocytopenia has been established, the decision to transfuse platelets should not be based solely on the patient’s platelet count but it should be supported by clinical judgment. Platelet transfusion should be given only after the risks associated with transfusion have been considered and only when the benefits outweigh the risks.\(^2\) Because platelets have a limited shelf life, platelet products are often in short supply. Most hospitals do not routinely stock platelets, so hospital blood banks must anticipate their possible platelet requirements.

Platelets are prepared from whole blood (by centrifugation within 6 hrs) or by platelet apheresis. Standard requirements for donor selection and mandatory microbiological testing must be fulfilled.

**Random-donor platelets:** Each platelet unit contains at least \(5.5 \times 10^9\) platelets suspended in 40-70 ml of plasma.\(^3\) The typical platelet prescription is 10 ml/kg to a maximum of five random-donor platelet units. Each platelet unit is derived from a different donor. An important disadvantage with such type of preparation is transfusion of platelets from multiple donors; therefore platelets prepared by such method predispose recipient to higher donor exposure.\(^4\)

**Single-donor apheresis platelets:** Each apheresis platelet unit contains at least \(300 \times 10^9\) platelets suspended in 200 to 400 ml of plasma and is derived from a single donor. Apheresis platelet units are preferred when a patient becomes refractory to random-donor platelet unit. This procedure may yield 1-3 therapeutic doses of platelets. Additional filtration to achieve leukocyte depletion may be done if required.

Screening for infections (Hepatitis B, C HIV) is mandatory for all components. Platelets should be visually inspected at each stage of processing and prior to issue. The bag should be discarded if there is evidence of leakage, damage, excessive air in bag, microbial contamination, platelet clumping, turbidity or abnormal colour change.

Platelets are stored at \(2^\circ\pm 2^\circ\)C with continuous agitation. Shelf life = 5 days

**Platelet Selection:** Platelet concentrate given should be ABO and Rh D group specific. Use of group O platelets for group A, B and AB should be avoided unless it is negative for high titer anti A and anti B.\(^5\)

**Transfusion Trigger:** Several studies have recommended a transfusion trigger of \(10 \times 10^9/\text{l} \) platelets.\(^6,8\) It is also stressed that patients should be monitored clinically for the early detection of signs and symptoms of increased risk of bleeding and when required increasing the transfusion threshold. Factors that indicate that patient is at increased risk of bleeding include, raised body temperature, rapid decrease in platelet count and sepsis. However transfusion triggers differ for some clinical conditions.

**Platelet Count Threshold for Prophylactic Platelet Transfusions is \(10 \times 10^9/\text{l} \) in acute leukaemia and aggressive chemotherapy of solid tumours, \(5 \times 10^9/\text{l} \) in aplastic anaemia and MDS, and \(50 \times 10^9/\text{l} \) with massive transfusion. In case of acute promyelocytic leukemia due to presence of coagulopathy this threshold should be kept above \(20 \times 10^9/\text{l} \) particularly in patients who are bleeding.\(^7\)

**Risks associated with platelet transfusion** include alloimmunization, transmission of infection (Hepatitis B and C; HIV; CMV and bacterial sepsis), allergic reactions and transfusion related acute lung injury (TRALI).

**Prophylaxis for Surgery:** For lumber puncture, epidural anesthesia, insertion of indwelling lines, or similar procedures platelet counts should be raised to at least \(30 \times 10^9/\text{l} \). For operations on critical sites as brain or eyes the
platelet count should be raised to at least 100 x 10^9/l. Platelet should be transfused just prior to surgery. It should not be presumed that that platelet count will rise just because of transfusion and preoperative platelet count should be checked to ensure that threshold has been achieved.

**Platelet Function Defects:** Patients with platelet function disorders rarely need platelet transfusions. Usually platelet transfusion is required when there is risk of hemorrhage from vital organs. However, in patients with Glanzmann thrombasthenia, if bleeding is uncontrollable, consideration should be given to the use of rFVIIa.9

**DIC:** In patients with DIC first step is to manage underlying cause along with coagulation factor replacement. Frequent estimation of platelet count and coagulation screening tests should be done and platelet count should be maintained > 50 X 10^9/l. In chronic DIC or in absence of bleeding, platelet transfusion should not be given merely to correct low platelet counts.10

**Dengue fever:** Dengue virus infection is rapidly becoming a major public health threat and has emerged with an incidence several fold higher than in past. Outbreaks of dengue fever in Pakistan (2006 in Karachi and 2011 in Lahore) have resulted in high rate of morbidity and mortality.11 Thrombocytopenia is always present in patients with dengue. and is due to bone marrow suppression combined with peripheral destruction of platelets during febrile and early convalescent phase and the count may be as low as 5000/µl. Platelet transfusion in dengue fever should be limited to those with bleeding12 or impending bleeding manifestations.

**Immune thrombocytopenia:** There is no indication for platelet transfusion in immune thrombocytopenia and platelet transfusion should be reserved for patients with life threatening bleeding from GIT, CNS or other sites with severe thrombocytopenia. However in case of Neonatal alloimmune thrombocytopenia the optimal approach is to transfuse compatible platelets as soon as possible to avoid risk of serious bleeding.

**Contraindications for Platelet Transfusion:** Platelet transfusion is contraindicated in Thrombotic thrombocytopenic purpura and Heparin induced thrombocytopenia (as acute arterial thrombosis may occur).

**Response to platelet products:** Typically one unit of random-donor platelets should increase the platelet count in a 70 kg adult by 5 x 10^9/l

**Platelet dosage:** In majority of patients, a standards platelet dose of about 3-6 x 10^11 platelets is required for hemostasis.13 Within one hour after transfusion approximately 100 x 10^9/l of increment occur when one unit of platelet concentrate is transfused to an average adult.

One hour Corrected Count Increment (CCI) of 10-20 x 10^9/l is considered to be an excellent response, while a response of <7.5 x 10^9/l is a poor response.

**Platelet Refractoriness** is defined as post-transfusion increment less than expected; and if the 1-hour CCI is less than 5-10 x 10^9 it is suggestive of refractoriness.14 Platelet refractoriness may occur in many conditions, like splenomegaly, infection, fever, DIC, previous transfusions, previous pregnancies and development of anti-HLA antibodies after platelet transfusion from multiple donors.

**References**