Platelet Products: General Transfusion Indications
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*(Last Updated March 29, 2011)*

**Platelet Products: Platelet Concentrate (PC) and Plateletpheresis (PP)**

**A. Dose and response:**
- In an average adult: PCs are usually administered in pools of 6 units; one PC should increase the platelet count by 5 – 10 x 10⁹/L (a pool of 6 PCs should increase the platelet count by 30 – 50 x 10⁹/L).
- A single PP should increase the platelet count by 30 – 50 x 10⁹/L.
- An adequate response and/or need for further therapy should be guided by comparing the pre-transfusion platelet count to a platelet count measured within 1 hour of the completion of transfusion.
- Causes for an inadequate response to platelets:
  - **Immune mediated:** Presence of HLA alloantibodies, platelet auto- or alloantibodies
  - **Non immune causes:** DIC, fever, infection, splenomegaly, many medications (Amphotericin B best known)
- In an infant: 10-15 ml/kg should increase the platelet count by 30 – 50 x 10⁹/L.

**B. Indications:**
- Transfusion of platelets is indicated for:
  - Prophylaxis in patients with counts of < 10,000 – 20,000 – usually in the setting of myelosuppression from chemotherapy, tumor invasion or primary aplasia
  - Treatment of patients with counts < 50,000 who are actively bleeding or are preparing to undergo an invasive surgical procedure
  - Treatment of patient with counts <100,000 who are bleeding in cardiopulmonary bypass surgery, neurosurgery, ophthalmic surgery.
  - Treatment of patients with platelet function defect and bleeding,
    - congenital
    - acquired
      - drug-induced, for example ASA, ticlopidine, Abciximab
      - Patients on cardiac bypass machine or ECMO

**C. The Role of Platelet Transfusion in Special Clinical Settings**
- **TTP**
  - TTP: Microangiopathic hemolytic anemia accompanied by consumption of platelet, resulting in neurological and renal dysfunctions and fever clinically
  - Platelets are considered to be CONTRAINDICATED in TTP, unless there is life-threatening bleeding. May add fuel to the fire
  - Treatment: Plasma exchange is treatment of choice for TTP
- **Heparin induced thrombocytopenia (HIT)**
Caused by antibody directed against the heparin/platelet(PF4) complex, leading to platelet activation, resulting in thrombocytopenia and thrombotic complications in some patients.

- Best option: discontinue the heparin, platelet count rises in several days
- Eliminate potential sources heparin: line flushes, catheters, LMW-heparin
- HIT is essentially a thrombotic disorder, thus platelets rarely needed, may add fuel to the fire.

- **ITP:**
  - Results from autoimmune destruction of autologous platelets T mediated most often by auto anti-GPIIb/IIIa
  - Transfused platelets similarly rapidly destroyed.
  - Transfusion not effective if goal is to raise counts. Consider only if there is bleeding.
  - Other treatment options: IVIg, Splenectomy, steroids
  - Usually not necessary to transfuse patient with platelet before and during splenectomy – due to release of sequestered platelets, count will usually rise.

- **NSAIDS/aspirin use:**
  - Aspirin irreversibly inactivates platelets for the remainder of their life span. Other NSAIDs cause only reversible inhibition.
  - If a bleeding patient has been taking aspirin/NSAIDs, transfusion may be needed regardless of the platelet count
  - Aspirin should be discontinue before platelet transfusion
  - However, aspirin is rapidly metabolized. Thus only 1-2 hours need to pass after the last dose of aspirin before platelets can be transfused without exposing them to the irreversible effects of aspirin.

- **Uremia**
  - Cause of platelet dysfunction unclear - toxic effect of uremia?
  - Transfused platelet almost immediately become “uremic” platelets, thus transfusion of platelets is not indicated
  - Treatment options:
    - Keep the hct 25-30% or above (rheostatic effect: RBCs can physically displace the platelets to the periphery of the vessel, and thus enhance platelet adhesion and aggregation)
    - Dialysis to remove “platelet toxins”
    - DDAVP (desmopressin)- Facilitates vWF release and possibly enhances platelet adhesion. However new package insert states that DDAVP is considered contraindicated in patients with moderate to severe renal impairment
    - Cryoprecipitate
    - Conjugated estrogens

- **Congenital platelet defects**
- Including Bernard Souliers, Glanzmanns, etc
- In a bleeding patient, platelet transfusion may be needed regardless of count
- Prophylactic platelet transfusion not advisable – risk of alloimmunization to HLA and RBC antigens

D. ABO and Rh Compatibility Issues:
  o ABO expressed on platelet but variably and weakly. May give platelets out of group due to inventory issues.
    ♦ However poor response to platelet transfusion sometimes occurs due to clearance of ABO incompatible donor platelets
    ♦ Can try ABO compatible platelets to see if response improves
    ♦ Due to the small blood volume of neonates, exposure to ABO incompatible plasma should be minimized – use ABO compatible platelets only, or reduce the plasma volume of non-ABO compatible platelets.

  o Rh antigens are not present on platelets
    ♦ But platelet concentrate may contain some contaminating RBCs with Rh antigens (In general, platelet concentrates have <0.5ml RBC, apheresis platelets have <2ml)
    ♦ Consider Rh prophylaxis with Rh incompatibility in females.