Transfusion Matters

NHS Blood and Transplant

SPRING 2012
9th EDITION

PLATELETS – SAFE AND APPROPRIATE USE

The ongoing increase in platelet demand is not unexpected; however, recent data indicates that a significant percentage of this increase is due to inappropriate use and wastage. It is important to raise awareness about the safe and appropriate use of platelets to ensure they are only given to those patients who genuinely need them.

Chart 1 overleaf shows that in late 2001 platelet issues to hospitals were around 210,000 per year and remained fairly steady until 2008. A dramatic increase has been seen since 2008 and the current annual total of platelets issues for 2011/12 is around 260,000 units.

NHS Blood and Transplant

Platelets

Don't use two...

...when one will do

For prophylactic use in a 70kg adult, one adult therapeutic dose (ATD) typically gives an immediate rise in platelet count of

approximately 20 - 40 x 10^9/l (1)

Do not administer double dose platelets for prophylactic transfusions as this practice does not decrease the risk of bleeding (2)

Request and administer one unit/ATD, then reassess your patient.

A platelet increment can be obtained 10 minutes after completion of the transfusion (3)

1. McClelland DBL (Ed) (2006) Handbook of Transfusion Medicine 4th Edition, The Stationery Office
2. Slichter SJ, Kaufman RM, Assmann SF, et al. Dose of prophylactic platelet transfusions and prevention of haemorrhage. N Engl J Med 2010;362:600-13.
3. O'Connell B, Lee EJ, Schiffer CA. The value of 10-minute post transfusion platelet counts. Transfusion 1988; 28: 66-67.

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BETTER BLOOD TRANSFUSION TEAM

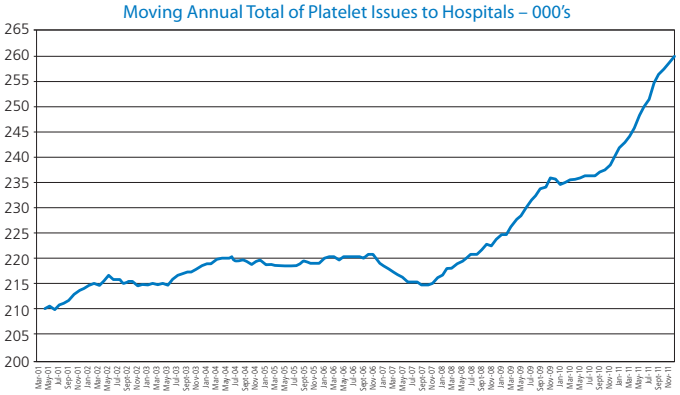
Welcome to the 9th edition of Transfusion Matters. This newsletter is produced for hospital staff by NHS Blood and Transplant's (NHSBT) Customer Services Better Blood Transfusion (BBT) team.

The primary role of the BBT team is to support clinical colleagues in raising awareness of transfusion issues among staff in hospitals. This newsletter is one of the initiatives to help share information about the current issues surrounding platelet transfusions within the NHS and promote appropriate use. There has been a 16% increase in platelets issued to hospitals over the past three years and in order for NHSBT to meet future demand it is important that the reasons for the increase are understood.

This edition will focus on platelet demand, the indications for platelet transfusions, the associated risks and explains how you can help to ensure they are used safely and appropriately.

If you have any comments or suggestions for future editions please email either of the editors anne.davidson@nhsbt.nhs.uk or denise.watson@nhsbt.nhs.uk

Chart 1



There are a number of contributing factors for the increase including:

- inappropriate transfusion of platelets, including 'double dosing'
- the ageing population
- new approaches to medical care
- advances in treatments and available options
- the introduction of trauma/major haemorrhage packs.

What has the national audit shown us?

The 2010 National Comparative Audit (NCA) of platelet transfusions in Haematology audited 3,296 platelet transfusions over a three month period against the standards in the British Committee for Standards in Haematology (BCSH) Guidelines for the use of platelet transfusions (2003) and found that:

- 28% of the platelet transfusions were inappropriate
- 69% of the platelet transfusions were given as prophylaxis, 34% of these were inappropriate and 10% were double-dose transfusions
- 15% of the platelet transfusions were given pre-procedure and 23% of these were inappropriate
- 13% of the platelet transfusions were therapeutic and less than 5% of these were inappropriate.

There are two key recommendations of the audit with regard to the use of prophylactic platelet transfusions:

1. Platelet transfusion is not required routinely prior to bone marrow aspiration/biopsy or as prophylaxis in stable patients with long term bone marrow failure.

2. Double dose platelet transfusions should not be used routinely.

Did you know?

In the 2010 NCA report it is estimated that 915 out of the 3,296 platelet transfusion episodes could potentially have been avoided[1].

What are platelets and why do we need them?

Platelets are tiny cell fragments produced in the bone marrow and are essential for clotting (haemostasis). When, as a result of injury, platelets come into contact with tissue other than the lining of blood vessel walls, they become activated and stick together (aggregate) to form a plug. This plug forms an initial seal and activates the coagulation factors to form a stable clot.

Platelets are processed by NHSBT in two ways:

- Apheresis, a single donation using a cell separator – more than 80% of platelets are prepared this way
- Pooled from on average four separate whole blood donations.

One unit of platelets/Adult Therapeutic Dose (ATD) contains 2.5 – 3 x 10^{11} platelets[2].

A unit of platelets also contains plasma which is required to maintain platelet function during storage. Platelets must be stored between 20°C and 24°C on a platelet agitator to ensure viability and prevent aggregation. Since May 2011, platelet donations have been tested for bacterial contamination which has allowed extension of the shelf life from five to seven days. The risk of rapid bacterial proliferation is greater if the storage temperature exceeds 24°C, therefore platelets must be stored and transported at room temperature.

Did you know?

To prevent aggregation platelets must NEVER be chilled or stored in a fridge.

Platelet components vary in colour usually from yellow straw to light strawberry, they may even have a greenish tinge.

Specialist platelets

Neonatal platelets: these are produced by splitting an apheresis collection into four. They are tested to ensure they are negative for Cytomegalovirus (CMV) and free of significant antibodies.

Irradiated platelets: these are indicated to reduce the risk of Transfusion Associated Graft-versus-Host Disease (TA-GvHD) in immunocompromised patients[3].

Human Leucocyte Antigen (HLA) matched platelets. HLA forms the basis of a person's "tissue type". Most patients receive platelets from unselected donors, however there are two groups of patients who need HLA matched platelets from specially selected donors:

1. Patients with hereditary platelet disorders e.g. Glanzmann Disease.

2. Refractory patients (patients who don't have a satisfactory response to a normal platelet transfusion).

Did you know?

A full HLA type match is very difficult to achieve, it is more likely to be a partial match and some of these will be more effective than others.

It is essential to provide blood samples for incremental data after each transfusion and forward the results to the HLA laboratory. This will ensure that if the incremental rise is poor the level of matching will be increased to try and provide the best possible response for the patient.

Nationally NHSBT only receives 34% of the incremental data required.

A blood sample to determine the platelet increment can be obtained 10 minutes after completion of the transfusion[4].

Did you know?

All HLA matched platelets are irradiated and cost more than £400 per ATD.

When would you transfuse platelets?

Platelet transfusions may be required in the event of haemorrhage, as prophylaxis or pre-procedure. As with all transfusions the risks and benefits should be carefully considered.

The following are general guidelines to identify when a platelet transfusion is indicated[5,6]. Please note specialist haematology advice should be sought for patients with platelet function disorders, platelet consumption e.g. disseminated intravascular coagulation or immune thrombocytopaenia.

1. With haemorrhage:
   a. Aim for a platelet count of >75 x 10^9/l
   b. In multiple trauma, eye or Central Nervous System (CNS) injury keep the platelet count >100 x 10^9/l
2. Prophylaxis:
   a. Platelet count <10 x 10^9/l (***not indicated*** *in stable patients with long term bone marrow failure)*
   b. Platelet count <20 x 10^9/l in the presence of additional risk factors for bleeding (e.g. sepsis)
3. Pre-procedure
   a. Platelet count <50 x 10^9/l prior to an invasive procedure (e.g. laparotomy) ***not indicated*** *prior to bone marrow aspiration or biopsy*
   b. Platelet count <100 x 10^9/l prior to a procedure involving the CNS or eye.

The National Blood Transfusion Committee's (NBTC) 'Indication Codes for Transfusion – An Audit Tool' provides recommended threshold counts for the transfusion of all blood components and was updated in October 2011. This can be accessed via the following link:

http://www.transfusionguidelines.org.uk/docs/pdfs/nbtc_bbt_indication_codes_2011_10.pdf

Did you know?

Platelets should only be given to patients with Thrombotic Thrombocytopenic Purpura (TTP) in life threatening haemorrhage as they may make the condition worse.

Acute thrombosis could result from platelet transfusion in patients with Heparin Induced Thrombocytopenia (HIT).

One ATD typically gives a rise in platelet count of 20 - 40 x 10^9/l[2]. A platelet increment sample is required to evaluate the effect.

Remember!

A sample to determine the platelet increment can be obtained 10 minutes after completion of the transfusion.

How do you transfuse platelets?

- Once platelets arrive in the clinical area, check for leaks and that the contents do not show clumping, appear cloudy or discoloured. If in doubt do not transfuse and contact the hospital transfusion laboratory for advice.
- Platelets should be transfused immediately using a blood administration set or specific platelet infusion set (refer to local policy).
- Use a fresh giving set for each infusion of platelets, not one that has already been used for other blood components.
- Platelets should be infused over 15-30 minutes and no longer than 60 minutes.
- It is vitally important to observe the patient during and after transfusion for any signs of a reaction. Observations of temperature, pulse, blood pressure and respiratory rate must be recorded pre-, during (after 15 minutes) and post-transfusion as a minimum (refer to local policy).

Did you know?

Due to the plasma content transfusion reactions are much more likely with platelet transfusions compared to red cells.

Why should we avoid unnecessary use?

Transfusion of any blood component is not without risk and platelets have a higher incidence of certain transfusion reactions.

There is a higher risk of TRALI (Transfusion Related Acute Lung Injury) associated with platelets than with red cells and this can lead to significant morbidity and mortality.

Allergic reactions are more frequent with plasma rich components, including platelets. These are usually minor but anaphylaxis can occur and result in death or major morbidity as reported every year by the Serious Hazards of Transfusion (SHOT) scheme.

Febrile reactions are also more frequent with platelet transfusions. These are not usually serious but may result in further investigations to exclude a more significant cause.

Bacterial contamination of blood components is rare, but is more often reported with platelets; this being due to the need to store them at room temperature. Bacterial screening has been introduced to reduce the risk of bacterial Transfusion Transmitted Infections.

Did you know?

The cost of a standard ATD is around £230.

How can you help?

It is unlikely that the demand for platelets will significantly reduce to the levels seen prior to 2008, but addressing the issue of inappropriate use and wastage of platelets is a priority for all healthcare professionals. If platelets have been ordered and you no longer require them, please tell the transfusion laboratory straightaway to avoid them being wasted. Also ensure that double dose prophylactic platelet transfusions are not routinely being used in your hospitals as administering two ATDs does not decrease the risk of bleeding[7].

References:

1. National Comparative Audit, NHS Blood and Transplant (2011), Re-audit of the use of platelets in Haematology, *http://hospital.blood.co.uk/library/pdf/Platelet_Re-audit_report-St_Elsewheres_NHS_Foundation_Trust_2010.pdf*
2. McClelland DBL (Ed) (2006) Handbook of Transfusion Medicine 4th Edition, the Stationary Office.
3. British Committee for Standards in Haematology (2010) Guidelines on the use of irradiated blood components, *http://www.bcshguidelines.com*
4. O'Connell B, Lee EJ, Schiffer CA. The value of 10-minute post transfusion platelet counts. Transfusion 1988; 28: 66-67.
5. British Committee for Standards in Haematology (2003) Guidelines for the use of platelet transfusions, *http://www.bcshguidelines.com*
6. Association of Anaesthetists of Great Britain and Ireland. Blood Transfusion and the anaesthetist: management of massive haemorrhage. Anaesthesia 2010; 65: 1153-1161
7. Slichter SJ, Kaufman RM, Assmann SF, *et al*. Dose of prophylactic platelet transfusions and prevention of haemorrhage. N Engl J Med 2010; 362: 600-13.

Additional copies of Transfusion Matters and the educational resources can be obtained from your Hospital Transfusion Practitioner or Customer Services in Oxford on Tel: 01865 381042 or via Email *nhsbt.customerservices@nhsbt.nhs.uk*

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