NZBS POLICY ON THE USE OF FRESH BLOOD

SCOPE

This Policy relates to NZBS Manufacturing sites and all Hospital Blood Banks in New Zealand.

DEFINITIONS

The term 'Fresh Blood' refers to any transfusion of red cell components that involves the selection of red cell units on the basis of age. The use of Fresh Blood should be restricted to those recipients for whom there is a valid clinical indication.

BACKGROUND

The initial version of this policy was introduced over 10 years ago. At this time there was significant debate concerning the clinical impact of the 'red cell storage lesion'. This was exacerbated by publication of retrospective data suggesting that transfusion of older red cells was associated with adverse outcomes in cardiac surgery patients. The ensuing debate lead to initiation of a number of randomised control trials addressing the question as to whether transfusion of fresher red cells improved clinical outcomes when compared with the use of older red cells. The results of these studies have now been published and show no benefit to the use of fresher red cells in a range of clinical conditions. These include:

- The RECESS study involving 1434 patients undergoing cardiac surgery[1]. Patients were randomised to receive either fresher red cells (< 10 days old) or older units (>21 days). No difference in outcomes, mortality or change in MODS score, was seen in the two groups.
- The INFORM study evaluated outcomes in a general population of 20,585 hospitalised patients in four countries[2]. The study was pragmatic and compared the use of the freshest available red cells versus the oldest available red cells. No difference in mortality was seen in the two groups. The study included a subgroup analysis of patients undergoing cardiac surgery with no difference in outcome seen.
- The TRANSFUSE study was performed by the ANZICS group[3]. 4994 critically ill patients were randomised to receive the freshest available red cells versus standard issue red cells. No difference in outcome was seen (based on all cause 90 day mortality).
- The ARIPI study involved 377 premature infants (less than 37 weeks with weight less than 1250g)[4]. Patients were randomised to fresh (<8 days old) versus standard issue red cells. No difference in outcome was seen.
- There is only limited evidence available for paediatric cardiac surgery patients. One study investigated the effect of red cell age on blood provided for priming cardiopulmonary bypass systems[5]. This was a prospective observational study involving 400 patients all weighing between 2.2 and 13.5 kg. The study concluded that storage duration of PRBCs used for priming the paediatric CPB circuit neither affects the metabolic profile of the patients on CPB or early after surgery, nor it has any association with postoperative complications and mortality. No good quality randomised studies are yet available.

The consistency of outcomes in the fresh blood studies is particularly reassuring and indicates that most patients will not benefit from the use of fresher red cells.

Red cell components produced for transfusion of large volume transfusion to neonates have a shelf life of less than 5 days old. This reflects concerns over the metabolic consequences of storing older components to this vulnerable population. A similar principle applies to paediatric cardiac surgery involving blood prime of the CPB circuit.

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The International Thalassaemia Federation (TIF) recommend that where possible those patients receiving regular transfusion support should receive red cells which are less than 14 days old[6]. The British Committee for Standards in Haematology (BCSH) recommends that patients with sickle cell disease should, where possible, receive red cell components that are less than 10 days old for top-up transfusions and less than 7 days old for exchange transfusion[7].

The practice of reserving 'fresh' RBC units for certain groups of patients can lead to problems with inventory management in blood banks, leading to distortion of supply patterns and wastage. Its use should therefore be restricted to settings where there is evidence of clear benefit.

POLICY

NZBS Manufacturing Centres are responsible for supply of blood components to hospital blood banks. NZBS will adopt a 'first in first out' policy in relation to supply of red cell components. NZBS will normally aim to provide red cell components supplied to hospital blood banks that are less than 15 days old. In practice many components will be fresher than this. The only exceptions to this policy will be:

Blood components produced for transfusion of neonates

a) Red cell components destined for intra-uterine transfusion. Only units less than 5 days old should be used for this purpose.
b) Red cells for exchange transfusion in neonates. Only units less than 5 days old should be used for this purpose.
c) Red cells for use in neonatal settings. NZBS will continue to provide split red cell units for this purpose. These components can be transfused up to the end of the standard shelf life unless they have been irradiated.

Irradiated red cell components

d) Irradiated red cell components. Only units less than 14 days old will be selected for irradiation. The shelf life of the component shall then be 14 days from the date of irradiation

Components provided for patients undergoing cardiac surgery

e) Red cells components, including whole blood, for use in recipients undergoing cardiopulmonary bypass surgery.
    i) For paediatric patients less than 20kg red cell components will normally be less than 5 days old.
    ii) For adults and paediatric patients weighing 20kg or over standard red cell components will be provided.

Red Cell components provided for patients with thalassaemia and sickle cell disease

f) Transfusion protocols will be developed on a case by case basis for patients with thalassaemia major and sickle cell disease. This will take into account the patient's red cell phenotype and ability to provide phenotyped matched red cells to avoid allo-immunisation. Where possible, appropriately phenotyped blood components less than 14 days old will be used.

Other patients

g) Standard red cell components should be used for all patients including renal patients, haematology patients and patients on regular transfusion regimes with the exception of those identified in (a) to (f) above.

h) NZBS does not recommend that attempts should be made to supply fresher red cell components to critically ill patients nor to patients requiring massive transfusion.

i) It remains possible for individual clinicians to discuss other specific clinical situations with an NZBS Transfusion Specialist where they believe the use of 'fresh' blood to be indicated. Except in these exceptional circumstances, RBC should be issued from Blood Banks on a 'first-in-first-out' basis.

This policy will continue to be reviewed and will be amended if compelling new evidence becomes available from clinical trials addressing this issue.

References

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