International Forum on Policies and Practice for transfusion of ABO and RhD non-identical platelets: responses

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INTERNATIONAL FORUM

Vox Sanguinis ISBT International Society of Blood Transfusion

International Forum on Policies and Practice for Transfusion of ABO and RhD Non-Identical Platelets: Responses

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RUSSIA

Eugene Zhiburt

Question 1

We have apheresis (70%) and whole blood derived (buffy coat) (30%). Each pool is derived from four to five donors. Whole blood processing is mostly manual.

Platelets are suspended in plasma or in SSP+ [1].

Platelets for neonates/infant transfusion have the same specification as those for adults but more often are irradiated [2].

Question 2

According to our national/governmental guide:

- Transfusion of platelet concentrate non-identical in the ABO system is allowed, obtained using an additional solution;
- Transfusion of whole-blood derived platelet concentrates from a blood units of group O or apheresis platelet concentrates AB group to a recipient with any blood group is allowed.
- 21% platelet transfusions are ABO non-identical.

Question 3

Among those mentioned strategies only storage of platelets in PAS is used to mitigate the risk of haemolytic transfusion reactions due to ABO incompatibility.

Plasma transfusion of the AB group to the recipient with any blood group is allowed

Question 4

I did not observe cases of haemolytic transfusion reactions to platelets, and no such cases reported in national haemovigilance scheme.

Question 5

According our national/governmental guide, the compatibility of the donor and adult recipient in terms of red blood cell antigens D, C, c, E, e, K is not taken into account when transfusing platelet concentrates obtained using apheresis or using an additional solution or pathogen-reduced platelet concentrate.

Question 6

We do not have any guide for preventive treatment with anti-D.

Question 7

We do not routinely assess the level of red cell contamination of platelets.

Question 8

During last 20 years I did not see issued 'red' platelets.

Question 9

We do not have a system for routinely capturing cases of alloimmunization to RhD due to platelet transfusions.

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INDIA

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Question 1

Platelets products:

- Both apheresis and whole blood-derived platelets are supplied by our centre. Whole blood-derived platelets are prepared from routine blood donations while apheresis platelets are collected only after the demand is received. The PRP method is used for preparing platelets from whole blood donations. The pooling of platelets is not done. The processing is by manual/semi-automated methods.
- Around 90% of the demand is met by whole blood-derived platelets while the remaining 10% need the apheresis product.
- Platelets are suspended in plasma. Platelet additive solutions are not used.
- Same platelets are used for transfusion in adults and neonates/infants, but the volume of required platelets varies as per weight of the infant.

Question 2

The recommendations of the local Hospital Transfusion Committee (HTC) are used as the guiding policy for transfusion of ABO non-identical platelets. The standard practice is to give ABO identical platelets, followed by ABO (plasma) compatible platelets (avoiding minor incompatibility), only after ensuring there is no RBC contamination. Out of group platelet transfusions are mostly an emergency requirement and account for nearly 5% of total platelets issued.

Question 3

Strategies to mitigate the risk of haemolytic transfusion reactions due to ABO incompatibility:

- For planned/non-emergency requirements, only ABO identical platelets are provided. ABO non-identical platelets are only issued after the treating clinician has been informed and the demand form mentions that ABO non-identical platelets may be provided as an emergency measure. Platelets of the blood group 'O' are avoided while giving to other blood groups.
- Volume reduction is done only for apheresis platelets (if the situation permits adequate time), the final product is around 100–110 ml.
- Platelets are not stored in PAS.
- Testing of donor/product for anti-A/-B.
  a. The donor or the product is not tested for anti-A/-B titres. Blood grouping and antibody identification are performed on the donor samples.
  b. Not Applicable
  c. No.
  d. Do you also test plasma/whole blood for transfusion?
  Answer: Yes
  e. There is no written policy, but the guiding principle is similar to transfusion of ABO-incompatible platelets. In practice, ABO-incompatible plasma is rarely issued as the group identical plasma is usually available. Cryoprecipitates are more commonly issued across the ABO blood group.

Question 4

The haemolytic transfusion reactions due to platelets are rare and no such reaction has been reported in past 1 year at the centre. The fact that it is mostly carried out during an emergency and often subclinical, makes it less likely to be reported or observed. There is a provision to report them to the National Hemovigilance Programme of India while submitting the monthly haemovigilance report.

Question 5

There are no national/regional clinical polices with respect of transfusion of RhD-negative platelets. Females in the child-bearing age group are specifically considered for RhD-negative platelets. If available, RhD-negative platelets are given and in case apheresis is planned, Rh Negative donors are preferred.

Question 6

The platelets which do not have any visible RBC contamination are given. The decision to administer anti-D rests with the treating clinician and varies from one case to another. In case of obstetric patients, anti-D is more commonly given prophylactically.

Question 7

A assessing the level of red cell contamination of platelets:

- The level of red cell contamination of platelets is routinely assessed by visual examination of all platelets to ensure there is no pink/red discolouration. The absence of pink/red discolouration is taken as the RBC levels to be below 0.5 ml in the bag (which corresponds to a count of 5×10^9 RBCs).
- This information is not put on the label.

Question 8

Yes, the answers apply to all types of platelets. If there is any visible red cell contamination, the RhD-positive platelets are not issued to such patients.

Question 9

There is no specific provision for capturing cases of alloimmunization in such patients. A common transfusion reaction reporting form is issued along with all the blood products and any transfusion-associated complication may be reported back to the blood centre.

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SWEDEN

Jesper Bengtsson & Magnus Jöud

Question 1

We supply platelet components (PCs) derived both from whole blood and apheresis. In 2019, 7480 PCs were transfused in our region. The majority, 93.2%, were whole blood-derived (pooled) PCs and 6.8% were apheresis PCs. We normally only produce group O and group A PCs.

Pooled PCs are produced via the Reveos automated blood processing system and interim platelet units (IPUs). We have two platelet production lines, fresh blood (FB) and overnight (ON). Typically four IPUs are pooled to form a platelet concentrate, on occasion three, five or six IPUs can be used for a pooled platelet concentrate. The pooled IPUs are suspended in platelet additive solution, T-PAS+ (PAS-E). Pooled PCs produced by Reveos contain about 40% plasma.

Apheresis PCs are collected on Trima Accel system from (preferably) male donors, generally blood group O and A. The apheresis PCs are also suspended in T-PAS+ with a plasma content of 35%.

Platelets for neonatal or infant use have the same specifications as those for adults, with the exception that split units from the same donor are generally reserved for the patient in order to minimize donor exposure.

Question 2

We have local policies that outline how ABO non-identical PCs are allowed to be transfused. If ABO identical platelets are not available, we use ABO minor incompatible or, to a lesser extent, ABO major incompatible PCs. All group A platelet apheresis donors are phenotyped for A1 and PCs from group A_2 donors are considered to be functionally group O.

In 2019, 21.7% of platelet transfusions were ABO non-identical: 18.1% minor, 3.2% major and 0.4% bi-directional incompatible. Furthermore, 10.7% of all PCs were transfused to patients with undeterminable ABO-group following ABO non-identical allogeneic haematopoietic stem cell transplantation (aHSCT).

Question 3

Both whole blood- and apheresis-derived ABO minor incompatible PCs are used but anti-A/-B is only considered for apheresis PCs. High-titre apheresis PCs can also be washed to remove ABO-incompatible plasma. This is sometimes necessary to provide compatible platelets to HLA-immunized patients when the matching apheresis donor has a high anti-A/-B titre. All platelets are stored in PAS-E.

At present, we measure anti-A and/or -B titres only once in platelet apheresis donors. Depending on the titre, all PCs derived from the donor are regarded as being low or high titre and PCs labelled

accordingly. Anti-A and -B titres are measured in anti-IgG and -NaCl gel cards, representing IgG and IgM titres, respectively. IgM titres ≥64 and IgG titres ≥256 are considered high.

We do not use ABO-incompatible plasma, cryoprecipitate or whole blood for transfusion.

Question 4

At our centre we have not seen any haemolytic transfusion reactions due to anti-A/-B in PCs, at least not the past 15 years.

In the last decade, only one incident of an acute haemolytic transfusion reaction due to an ABO minor incompatible platelet transfusion has been reported to the Swedish national haemovigilance system. This reaction was reported from another blood centre in 2011, with no further details available.

Question 5

RhD-negative PCs are indicated for all RhD-negative patients according to our local policy, with some exceptions. When the supply of RhD-negative platelets is insufficient RhD-positive PCs are also transfused to RhD-negative patients unless they are children (<18 years) or women of childbearing age (<50 years). If the supply of RhD-negative platelets is very low, a laboratory physician can be consulted and approve the selection of RhD-positive platelets to RhD-negative children and women of childbearing age. Following aHSCT with RhD mismatch between donor and recipient, RhD-negative PCs are transfused if available. When multiple PCs are ordered due to trauma or major bleeding, our policy allows for any platelet unit to be transfused regardless of the patient RhD phenotype, age and gender.

In 2019, 4.9% of all PCs were RhD-positive PCs transfused to RhD-negative patients. No RhD-positive PC was transfused to a RhD-negative child and only 9 units were given to three different RhD-negative women of childbearing age. Two out of these women had been treated with aHSCT with graft from an RhD-mismatched donor and the third was a patient undergoing sex reassignment therapy.

Question 6

For most RhD-negative patients, no steps are taken reduce the risk of alloimmunization following the transfusion of RhD-positive platelets. However, if RhD-positive platelets are given to children or women of childbearing age, we recommend that patients are given anti-D prophylactically.

Question 7

We do not measure red cell content in PCs on a routine basis. The IPUs are visually inspected after production, if they appear reddish they are generally discarded. Hence, there is no need to label PCs.

Question 8

All types of PCs are considered equal in terms of red cell contamination.

Question 9

No, we do not have a systematic follow-up to capture RhD immunization following the transfusion of RhD-positive platelets. We consider the risk of immunization to be low.

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SPAIN

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Question 1

Platelet components are supplied by Blood and Tissue Bank (BST is the Catalan acronym). Blood component preparation is automated with Reveos devices and the majority (95%) of platelet components are obtained with this method (interim platelet unit, IPU) [1,2]. The minimum acceptable platelet content is 2.5×10^{11} per pool after mixing four or five IPUs with platelet additive solution (PAS). The final result is that platelets are stored in plasma/PAS C in a proportion 35%/65%.

Apheresis platelets (5%) are used only for special purposes (e.g., refractoriness, HPA-1 negative supply) and, occasionally, when there are not enough platelets from whole blood.

Platelets for neonate/infant transfusion are obtained after pooling three IPUs obtained from three CMV-negative donors. The minimum acceptable platelet content is 1.5×10^{11} per pool.

Question 2

We do not have national/local clinical policies with respect to transfusion of ABO non-identical platelets. We are not aware of how many platelet transfusions are ABO non-identical, but we prioritize major compatibility because our platelet components are suspended in plasma/PAS C.

Question 3

We are strict about ABO compatibility only when there is a visible red blood cell contamination in the platelet product, which is very infrequent. The risk of haemolytic transfusion reaction because of minor ABO-incompatibility is mitigated because platelet components are suspended in plasma/PAS C. Anti-A/-B is not routinely tested in our donors [3].

We always apply ABO compatibility in plasma transfusion but not with cryoprecipitate.

Question 4

We have not observed any case of haemolytic transfusion reactions after platelet transfusion, at least in the last 30 years. As it is the case with every blood component, any haemolytic transfusion reaction should be reported to the national haemovigilance register.

Question 5

We do not have national/regional clinical policies with respect to transfusion of RhD-negative platelets. RhD-negative platelets are indicated for women with childbearing potential.

Question 6

The administration of anti-D prophylactically is recommended for women <50 years, in case of platelets red blood cells contaminated transfusion.

Question 7

The presence of red blood cells in platelet components is assessed by the quality control plan performed by the Blood and Tissue Bank [4]. Flow cytometry is used to quantify the amount of RBCs in platelet components. There is no upper limit considered acceptable to issue platelets. However, reddish coloured platelets bags are not issued.

Question 8

The answers to Questions 5 and 6 do not depend on the level of RBC contamination.

Question 9

As patients who need platelet transfusion are usually on chronic RBC support, any alloimmunization would be detected in pretransfusion testing. We do not purposely search for platelet transfusion-induced RhD alloimmunization.

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NEW ZEALAND

Dhana Gounder, Peter Flanagan & Sarah Morley

Question 1

We supply both apheresis and manually processed whole blood derived pooled buffy coat platelets in a proportion of approximately 30%–70%. The pooled platelets are derived from four donations. A small percentage of the apheresis platelets are collected in plasma which is for transfusion in neonates and infants (2.60%). The rest of the apheresis and pooled components are suspended in a mixture of plasma (30%–40%) and SSP+ platelet additive solution (60%–70%). We are currently in the process of seeking regulatory approval to move to PAS platelets for neonates and infants as well.

Question 2

All hospital blood banks in New Zealand follow a common protocol that encourages use of ABO identical platelets whenever possible. In New Zealand we predominantly collect Group A and O platelets so a majority of B and AB patients will receive out of group transfusions. From June 2019 to May 2020 22.52% non-identical platelets were issued. Where ABO identical platelets are not available our policy gives priority to avoiding major incompatibility.

Question 3

The use of PAS has been shown to significantly reduce IgM and IgG titres [1]. While it is not clear whether this will actually reduce the risk of haemolysis due to ABO isoagglutinins our haemovigilance reporting which began in 2005 has not had any reports since 2012. We started manufacturing PAS platelets in 2010 (pooled) and 2011 (apheresis).

Haemolysin screening is done on every donation. Ours is a semi-automated micro titre plate method using A_1B cells. The test detects IgM and IgG with the wells being visually checked for haemolysis and a >50% reduction of the cell button to call it haemolysin positive. Similar testing is done on donors for all donated components. While our policy requires that plasma and cryoprecipitate are compatible with the patient's red cells, we have guidelines in place for appropriate selection of incompatible plasma and cryoprecipitate.

Question 4

Since commencement of haemovigilance reporting in 2005 we have had six reports of acute intravascular haemolysis all due to group O platelets. We have not had any reports since 2012.

Question 5

There is a national policy that prioritizes the transfusion of RhD-negative platelets to:

- RhD-negative females of less than 55 years (including female children) who require platelet support for trauma or surgery, that is, where the requirement for support is short lived.
- RhD-negative females less than 55 years (including female children) requiring repeated platelet support for non-malignant conditions where future pregnancies are possible.
- Patients with haematological malignancies and other patients requiring long-term platelet support and RhD-negative children depending on availability.
- Other RhD-negative patients who require short-term platelet support depending on availability.

Question 6

For female patients less than 55 years and young male children who receive RhD-positive platelets RhD immunoglobulin (250 IU) is administered as standard treatment. Female patients of less than 55 years with haematological malignancies and other conditions requiring long term platelet support the risk of sensitisation to anti-D is lessened due to immunosuppressive effects of treatment and/or the underlying condition. In these patients RhD immunoglobulin is considered with decision made by the patient treating clinician.

Question 7

We do not routinely assess the level of red cell contamination of platelets. Our blood service did a recent analysis of red cell contamination indicating levels of 0.078 and 0.012 ml for PAS pooled and PAS apheresis platelets, respectively.

Question 8

The level of red cell contamination is not taken into consideration when transfusing RhD-positive platelets.

Question 9

We do not capture cases of alloimmunization to RhD due to platelet transfusions in our haemovigilance reporting. However, a 2-year (1 May 2010–29 April 2012) analysis done where RhD-positive platelets were transfused to RhD-negative recipients and anti-D prophylaxis was not used the frequency of D alloimmunization was 1.4%. This is very similar to a more recent large study reflecting the experience of 11 centres around the world which showed a frequency of 1.44% [2].

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CANADA

Gwen Clarke & Dana Devine

Question 1

Platelets products:

- Whole blood-derived platelets are prepared by the buffy coat method using a pool of four donors. Platelet pool production is performed using semi-automated extractors to isolate buffy coats and to extract after the second spin. Buffy coat pooling is done manually using the train method. Plateletpheresis is used to collect HLA-matched platelets and to supplement whole blood-derived platelet inventory.
- Approximately 75% of platelet doses are derived from whole blood donations and the remainder from plateletpheresis.
- Both buffy coat and apheresis platelets are presently suspended in plasma although implementation of PAS (SSP+) initially for buffy coat platelets is anticipated in the next months.
- Platelets for neonates/infants have the same specifications as those produced for adults.

Question 2

Canadian national standards (CSA Z902-20) state 'The donor plasma in platelets should be ABO compatible with the recipient's red cells. A policy shall be in place concerning group substitution when compatible platelets are not available'. Local polices vary but most try to provide group specific or group compatible with titration of anti-A and -B or plasma reduction used to mitigate risk of haemolysis when/if the plasma suspending the platelets is incompatible with recipient red cells.

The percentage is variable across locations/provinces; overall approximately 20% of platelet transfusions are to a non-ABO identical recipient.

For non-identical platelet transfusion, the priority is the compatibility of the donor plasma with recipient red cells.

Question 3

Strategies to mitigate the risk of haemolytic transfusion reactions due to ABO incompatibility:

- Some hospitals will volume reduce when transfusions of non-identical/ABO incompatible platelets are required and the isohaemagglutinin titre is greater than their acceptable cut off or is unknown. This is especially true if a non-identical/incompatible platelet will be used in a paediatric or neonatal patient. For neonates at one reporting site 50 ml of a buffy coat pooled platelet component is concentrated to 20 ml. At another site the whole pooled platelet unit is concentrated to 20–30 ml with 100 ml of saline added back.
- PAS is not currently used in Canada, although its implementation is planned.
- This is done by most large hospital transfusion sites.
  a. Currently the product is tested by the transfusing hospital upon receipt from the blood supplier. There is a project underway at Canadian Blood Services to begin testing all donors on each donation (planned implementation in 2022).
  b. Hospital sites use a tube technique—supernatant plasma is diluted in saline to 1:100 or 1:50 then tested versus A1 and/or B reagent cells (depending on the group of the platelet). Sites variously use a titre of >50 or >100 as the cut off above which they would not use the platelet unit for non-ABO identical recipients.
  c. As the product is tested, not the donor, the testing is repeated each time a product is received at the transfusing facility.
  d. Units are not labelled with the specific titre; instead a tag or label is applied indicating that the unit is positive or negative for high titre anti-A or -B and suitable for patients of all groups (low titre) or only for ABO group-specific recipients (high titre).
  e. Isohemagglutinin titres are not tested in plasma; whole blood for transfusion is not currently available in Canada.
  f. Some sites have local policies advocating use of group A plasma (with anti-B titres generally not known) for patients of unknown blood groups in a massive haemorrhage setting. For plasma transfusion, apart from this circumstance, group-specific plasma is typically provided.
- Cryoprecipitate transfusion does not require blood group specificity.
- CSA Z902-20 requirements are as follows:
  - Standard 10.7.6 states 'Plasma selected for transfusion shall be ABO compatible with the recipient's red blood cells but does not require compatibility testing. A policy shall be in place concerning group substitution when compatible plasma is not available'.
  - Standard 10.7.7 states 'A policy shall be in place concerning ABO compatibility of cryoprecipitate components'. Note: All recipients may be transfused with any ABO group of cryoprecipitate.

Question 4

Since 2017, there have been two reports of ABO hemolytic transfusion reactions related to ABO-incompatible platelet transfusion. One was a group B patient who received a group A platelet pool; the second was a group AB patient who received a group O platelet.

Question 5

Platelets are matched for RhD as routine practice in most institutions if ABO/Rh compatible platelets are available. There is no national clinical policy concerning transfusion of RhD-negative platelets. Canadian National Standards (CSA Z902-20) state only that there must be a policy regarding management of RhD-negative recipients of RhD-positive

blood components. Specifically, standard 11.9.7 states 'Each transfusion service shall have a policy for the management of RhD negative recipients who receive blood components containing RhD positive red cells'.

Hospitals would endeavour to provide only platelet components from RhD-negative donors to female patients <45 years old who are RhD negative. In some transfusion services this allocation of only RhD-negative platelets to RhD-negative recipients would extend to all paediatric patients (male and female).

Question 6

Use of anti-D may be considered if RhD-positive platelets are transfused to RhD-negative female children or women of child-bearing age. Anti-D treatment should be performed within 72 h of transfusion of RhD-positive platelets to an RhD-negative recipient. While local practices vary, RhIG (anti D) is given prophylactically by most transfusion services to female patients who are <45 years old, known to be RhD negative and who have received one or more platelet pools or apheresis platelets obtained from RhD-positive donors. For some transfusion services RhIG would also be given to paediatric patients, male or female who have received platelet pools from RhD-positive donors.

Question 7

There is currently no standard in Canada for the allowable amount of RBC contamination in platelet products. All products are subjected to visual assessment prior to release. Red cell contamination is assessed against a visual assessment guide and platelets are not released if marked in red. This visual assessment guide is also available to hospital customers. The level of RBCs is formally assessed whenever production practices are changed; assessments are made using flow cytometry-based residual RBC assays. Residual RBC levels are not routinely measured in production.

Question 8

Use of anti-D prophylaxis is used at the discretion of the treating physicians and in accordance with local policy but generally applies to all types of platelets, regardless of whether visible red cell contamination is present.

Question 9

Alloimmunization to RhD arising from platelet transfusions may be reported to the blood supplier or to the Canadian hemovigilance system, the Transfusion Transmitted Injuries Surveillance System, operated by the Public Health Agency of Canada. The reporting is voluntary and under reporting is likely.

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SAUDI ARABIA

Salwa Hindawi & Aqeel Al Otaibi

INTRODUCTION

The blood transfusion services in Saudi Arabia are fragmented hospital-based blood banks. National standards for hospitals including blood banks are available and obligatory to be followed by all hospitals (Central Board of Accreditation and Healthcare Institutions, CBAHI), and international standards (American Association of Blood Banks, AABB) are voluntarily followed as an international accreditation body for blood banks [1,2].

Although compliance of the National wide standard is expected, the policy and practice may differ from facility to facility with the reference of national and international accreditation bodies to make sure of not deviating from the national standards. Information is collected through two different facilities, which have both accreditations national and international (AABB), as an example of blood banks in Saudi Arabia.

Question 1

At both facilities, we are in practice of collecting both apheresis and whole blood-derived platelets (PRP only) Whole blood donation processing is through Reveos with the pool of 4–6 units to reach not less than 300 yield (one therapeutic dose 3×10^{11}) and Apheresis platelet with the single dose as an adult dose. All platelets concentrates are leucodepleted. Other hospitals in the country also may do Apheresis and Manual PRP or Automated PRP. Proportion of Apheresis and WBDP is 10%–20%/90%–80%, respectively (it could be more in certain hospitals). Storage media of both the procedures are 100% Plasma.

For neonates/infant transfusions we have volume reduced and not like adults, neonatal patients must receive ABO-compatible plasma.

Question 2

There is a local policy regarding platelet transfusion; Platelet transfusions should be ABO identical, if it is unavailable should be ABO

compatible for adults. Always issue Rh-negative platelets to Rh-negative patients especially to females of childbearing age. If none is available and there is urgent need to transfuse Rh-positive platelets, inform physician or nurse of the situation and suggest the administration RH immunoglobulin as per hospital policy. For neonates, they must receive ABO-compatible plasma or volume reduced in case of compatible group use. In case of emergency transfusions or for platelet refractoriness and when ABO identical or compatible units are not available, we may issue other blood groups as per the selection priorities [1,3,4].

The percentage of ABO non-identical Platelet transfusions is around 20%.

As a policy of the blood transfusion services, the use of Rh-positive red cell-containing components such as platelets concentrate and platelets apheresis to Rh-negative recipients will required a written approval from the physician in-charge and the medical director or delegate should be informed.

Question 3

The strategies/policies are as follows:

- If any patient requires a platelet transfusion and only non-group specific or non-group compatible is available an approval from the physician in charge or haematologist on call (or BTS medical director) should be obtained.
- Volume reduction of platelets prior to transfusion is in practice and the final plasma volume will be reduced to 30% from the actual volume of the initial units.
- Volume reduction is used for neonatal and for patients suffering ill effects if the whole volume is infused.
- There is no routine testing of donor or final products for anti-A/-B.

Question 4

There are no reported cases noted of haemolytic transfusion reactions due to platelets transfusion, we do have system in place to report and follow up for any transfusion reactions. All adverse reactions are reported on yearly basis to MOH (national body).

Question 5

There is local policy available on transfusions of RhD-negative platelets.

Rh-negative platelet should be issued to Rh-negative patients especially females of childbearing age [1]. If none is available and there is urgent need to transfuse Rh-positive platelets, inform physician or nurse of the situation and suggest the administration of RH immunoglobulin as per local policy.

Question 6

As per local policy to minimize the risk of alloimmunization if RhD-positive platelets are transfused to Rh negative as:

- Anti-D is given to any RhD women of childbearing age receiving RhD-positive platelets.
- The following criteria are considered to be the candidate for Rh Immune Globulin:
  - Pregnant women found to be Rh negative, and no evidence of anti-D is found.
  - Potentially sensitizing episodes during pregnancy as ectopic pregnancies, abortions, ante-partum haemorrhages, foetal deaths, closed abdominal injury and amniocentesis patients etc. Kleihauer test or flowcytometry test should be done within 2 h following any sensitizing episode. Give additional anti-D IgG as required (125 IU per ml of feto maternal haemorrhage).
  - Women who have received antenatal Rh Immune Globulin are still considered candidates for postpartum Rh Immune Globulin therapy.
  - Any Rh-negative patient (with no evidence of anti-D is found) receiving Rh-positive platelets transfusion.

Question 7

As per policy the assessment of level of red cell contamination of platelets done through visual comparison chart by AABB.

- Apparently red cell-contaminated platelets should be <2 ml. If it is more than 2 ml platelets are discarded except if needed due to emergency situation, routine cross match will be performed. Information is shared with the treating physician or hospital receiving the platelets but the product label will not be specified.

Question 8

Same policy will be applied to all types of platelets.

Question 9

There is a local haemovigilance system in place to report any adverse events including any case of alloimmunization to RhD due to platelets transfusion as follows:

Investigation and Management of Adverse Reaction:

- All type of reactions must be reported to the Blood Transfusion Services and all reactions received must be investigated as per our local policy, King Abdulaziz University Hospital, Blood Transfusion Services Local Policies.

Incident Reports:

- All events that fall outside of the existing policies and procedures of the Blood Transfusion Services (Vein to Vein) must be reported to the Blood Transfusion Services in order to ensure that these are captured and investigated and corrective actions are undertaken. These procedures will provide a mechanism to track and trend all events, which will enable the process of continuous quality improvement and patient safety [4].
- There are other hospitals, which do not have systems for reporting such cases.

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BRAZIL

Carolina Bonnet Bub & Jose Mauro Kutner

Question 1

Our Hospital supplies both products: apheresis and whole blood products (PRP).

Each pool is typically derived from six donors and our whole blood donations processing is manual. Our proportion of supply is 5% from whole blood (PRP) and 95% from apheresis. Plasma is the storage media in which platelets are suspended.

Neonate and infant transfusions have the same specifications as those for adults; we do not manage different platelet storages.

Question 2

In Brazil there is a national federal policy recommendation to perform haemolysin test for ABO non-identical platelets transfusion. Therefore, platelets with results of total or partial haemolysis should be avoided in non-isogroup transfusions.

Our institution policy requires the performance of isohemaglutinin titre for all platelet units. Only platelets with isohemaglutinin titres bellow 64, should be used for ABO non-identical platelet transfusions. During the year of 2019, our platelets transfusion records indicate that 64% were ABO identical and 36% were ABO non-identical.

Question 3

In order to mitigate the risk of haemolytic transfusion reactions due to ABO incompatibility, we tested all platelets donor for anti-A and/or -B by gel card at room temperature (IgM). We use a cut-off titre of 64. The donor/donation is tested for every new product donated. The product is not labelled with the titre, but the inventory report identifies the titre of each platelet unit. We are not a blood centre, just a transfusion service which collects its' own products, so labelling was not considered necessary.

We do not test plasma/whole blood for transfusion.

In our institution we only perform identical ABO plasma and cryoprecipitate transfusions.

Question 4

We have not observed any haemolytic transfusion reactions associated with platelet transfusion in our service in the last many years. Our internal routine requires follow-up of every reported reaction. The Brazilian Ministry of Health has a haemovigilance tool, which is filled and reported by every transfusion service once a month.

Question 5

There is a national policy recommendation referring that RhD-negative female recipients under 45 years of age should preferably transfused with RhD-negative platelets.

Question 6

In our institution anti-D immunoglobulin is given prophylactically to the patients within 48 h after a RhD-positive transfusion, if RhD-negative platelets are not available.

Question 7

We do not use any laboratory test to assess the level of red cell contamination of platelet concentrates. However, a visual inspection is performed to analyse red cell contamination of platelet concentrates. This information is not described on the label because all the platelets units with red cell contamination by visual inspection are discarded.

Question 8

The answers to Questions 5 and 6 apply to all types of platelets.

Question 9

Yes, we have a haemovigilance workflow in our institution that when an immunohaematology altered result is detected, previous results from the patient are rechecked and clinical history is obtained. If it is identified as a case of RhD alloimmunization, a report to the national surveillance tool is made monthly.

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JAPAN

Toshiyuki Ikeda, Naoko Goto & Hitoshi Okazaki

Question 1

Japanese Red Cross Blood Centers (JRCBC) supply only apheresis platelet concentrates (PC) which are suspended in plasma. The JRCBC do not produce PAS-suspended PC but supply 'washed PC' on demand that is washed and suspended in bi-carbonate/ACD solution. For neonates/infants or children, small sized bags are available. The JRCBC provides six different sized bags containing at least 0.2, 0.4, 1.0, 2.0, 3.0, 4.0 $\times$ 10^{11} platelets in 20-, 40-, 100-, 200-, 250-, 250-ml plasma, corresponding to 1, 2, 5, 10, 15, and 20 units PC, respectively.

Question 2

The Japanese guidelines for the appropriate use of blood products recommend the use of ABO-identical platelet transfusion. Except for HLA-matched PC, almost 100% PC that are issued by JRCBC are ABO-identical. In the case of HLA-matched PC, HLA matching can be prioritized to ABO matching, when ABO-identical platelet is not available.

If minor incompatibility is unavoidable for HLA-matched PC, ABO antibody titres are measured and in case of high antibody titres (≥128×), the use of washed PC is recommended. Washed PC is recommended for any children regardless of donor anti-A/-B titre, when ABO minor incompatible platelet is used. The proportion of non-ABO-identical HLA-matched PC issued in Japan was approximately 30%, and the distribution of O-type minor incompatible HLA-matched PC was less than 1.0% in 2017–2018, In the University of Tokyo hospital, a total number of platelets used in 2019 fiscal year was 4183. The number of random donor platelets (always ABO identical as described above) and HLA matched or compatible donor platelets (HLA-PC) was 4072 (97.3%) and 111 (2.7%), respectively. In 111 HLA PCs, 43 platelets were ABO identical, 33 were ABO major mismatched, and 35 were ABO minor mismatched. Consequently, the frequency of ABO no-identical platelet transfusions was 1.6% (68 in 4183 platelets). The number of ABO major mismatch platelet transfusions to the patients after ABO-incompatible haematopoietic stem cell transplantation and type AB non-identical platelets used before the ABO blood types were determined in urgent massive bleeding cases was eliminated from the totalization.

Question 3

Although the transfusion of ABO identical PC is recommended by the Japanese guidelines, non-ABO-identical PC can be selected only in case there is need to prioritize HLA-matching for patients with platelet transfusion refractoriness. Recently, washed PC is also supplied by the JRCBC, for the reduction of allergic reactions or hemolytic reactions.

Presently, neither volume-reduced PC nor PAS-suspended PC are supplied by the JRCBC. These products can be prepared in the hospitals.

When supplying ABO-minor incompatible HLA-matched PC, anti-A/-B titres, measured by the saline test, are confirmed and in case of high antibody titres (≥128×), the hospital is informed by the JRCBC and the use of the product is left to the physician's discretion. Antibody titres are not indicated in the PC label. The titration is performed on every donation for non-ABO-identical HLA-matched PC.

The Japanese guidelines also recommend the use of ABO identical plasma/whole blood, and antibody titration is not performed for these products. The JRCBC do not supply cryoprecipitate, but hospital transfusion department can prepare it from fresh frozen plasma, which is covered by the Japanese medical insurance.

Quite a few hospitals including the University of Tokyo hospital are using type AB cryoprecipitate to facilitate the inventory management, since cryoprecipitate is not available from the JRCBC but must be prepared at an in-hospital transfusion service department. In the Japanese population, the frequency of type AB donor is approximately 10% and more popular compared to the Caucasian population. Some institutes that have a large medical emergency centre and many opportunities for massive transfusion prepare and administrate ABO identical cryoprecipitate.

Question 4

Yes, four cases of haemolytic reaction as a result of the transfusion of non-ABO-identical HLA-matched PC were reported via Japanese Red

Cross Society haemovigilance system between 2010 and 2019. In this decade, 8,198,560 platelets including 76,433 HLA-matched PC were issued. The estimated incidence of haemolytic transfusion reactions to platelet transfusion by the Japanese Red Cross haemovigilance data was one in 2 million platelets and one in 19,108 HLA-matched platelets.

Question 5

We have no national/regional clinical policies on this matter since the frequency of RhD-negative blood type in the Japanese population is only 0.5%. In fact, in all hospitals, RhD-negative platelets are given routinely to RhD-negative patients regardless of their clinical backgrounds.

Question 6

Japanese Red Cross haemovigilance has received no report of this situation. Tokyo University hospital also has no experience of this at least in the last decade. If the patient transfused with RhD-incompatible platelets is fertile or younger female, we will prophylactically use anti-D for her. However, in Japan, this use is off label, since the only available anti-D antibody-drug in Japan is indicated only for RhD-incompatible pregnancy. This off-label use of anti-D is incompletely described in the national clinical policy.

Question 7

Red cell contamination test of platelets is conducted as a quality control at the JRCBC processing lab with the frequency of 10 PCs a year, which is required by the guideline Minimum Requirements for Biological Products. However, the contamination of RBC in PC is so low that it is unenumerable.

Question 8

We apply above described policies to all types of platelets.

Question 9

In case alloimmunization to RhD due to platelet is reported by the hospitals, it will be captured in the Japanese Red Cross hemovigilance system. However, since RhD negative is not common (about 0.5% [1 in 200]) in Japan and RhD-negative PC is always availabe, there were no reported cases of alloimmunization to RhD by platelet components in the last decades.

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UNITED STATES

Magali J. Fontaine, Jeremiah Pasion & Linda Song

Question 1

Our Hospital-based Transfusion Service is supplied with apheresis platelet (AP) only products and supports tertiary medical care, a Level 1 trauma centre, adult and paediatric haematopoietic cell and solid organ transplants, as well as adult and paediatric cardiovascular medical and surgical services, and high-risk obstetric and neonatal care. The AP inventory consists primarily of pathogen reduction technology (PRT) treated AP stored in platelet additive solution (PAS) (80%), AP stored in PAS non-PRT (10%), and conventional AP stored in plasma (10%). APs for neonates/infant transfusion have the same specification as those for adults.

Question 2

In order to optimize AP inventory and to prevent AP outdating, our process does not require AP transfusions to be ABO identical. About 42% of platelet transfusions are ABO non-identical. Our Institutional standard operation procedure meets the national AABB Standards for Blood Banks and Transfusion Services with a process in place to regulate the transfusion of ABO-incompatible plasma containing platelets.

Question 3

AP products containing ABO-incompatible plasma are approved, provided AP is suspended in PAS. If ABO-compatible plasma containing AP product or if PAS AP product is not available, AP product would be volume reduced down to 50 ml if time allows (volume reduction requirement is waived if AP transfusion is needed emergently) [1]. Blood products containing ABO-incompatible plasma are not currently tested for anti-A/-B titres. Policies for ABO-incompatible plasma for

cryoprecipitate and conventional plasma are to primarily use ABO-compatible plasma first if available.

Question 4

Despite the steps taken to reduce the risk of haemolytic transfusion reactions to platelet transfusion, such as default to AP in PAS or volume reduced if containing ABO-incompatible plasma, our centre has observed haemolytic reactions to AP in PAS and is now considering testing for antiA/B titres in all APs using an automated gel method [2,3].

Question 5

There is no national or regional policy with respect to transfusion of RhD-negative platelets. Platelets are issued primarily based on expiration date.

Question 6

Patient's physician is contacted and anti-D is proposed to be given prophylactically.

Question 7

The level of red cell contamination of platelets is evaluated by simple visual inspection of the AP product.

Question 8

These measures are applied to all platelet products.

Question 9

We do not have a system in place to capture cases of alloimmunization to RhD due to platelet transfusion.

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UNITED KINGDOM

Tom Latham & Rebecca Cardigan

Question 1

Platelets products:

- We supply both apheresis platelets collected by Trima, and buffy coat pools made from four donations (manually).
- About 50% of each.
- Apheresis are currently stored in plasma, buffy coat platelets in 65% PAS (SSP+). We are looking to move our apheresis platelet to PAS in future.
- Platelets for neonates and infants are a different product. The main difference is that these are produced by splitting an adult dose into four and stored in smaller packs. Additionally, donors must have donated within the past 2 years and tested negative for mandatory markers of infection, and they must be CMV seronegative and free from clinically significant irregular blood group antibodies including high titre anti-A and -B as defined below.

Question 2

National guidelines state 'It is acceptable to use ABO incompatible platelets to reduce wastage'. Units tested and negative for high titre haemagglutinins and non-group O platelets are associated with a lower risk of haemolysis. Pooled platelets suspended in PAS would also be expected to reduce this risk. Priority is given to minor incompatibility, that is, that of plasma with recipients red cells [1].

We do not have accurate figures for the number of ABO non-identical transfusions. The preference is to give ABO identical where possible. Recent local audit at one large hospital suggests this is about 25%, but nationally this is probably lower at 10%–15% as many smaller hospitals are less likely to give ABO non-identical platelets. The percentage of transfusions which are ABO non-identical may be higher for neonates as only a limited

range of blood groups are routinely stocked for neonatal platelets.

Question 3

Strategies to mitigate the risk of haemolytic transfusion reactions due to ABO incompatibility:

- No, but ABO identical is given by preference.
- No.
- Yes, but only for pools, not apheresis.
- Testing of donor/product for anti-A/-B.
  a. Every donation is tested for high titre antibodies.
  b. We test for IgM only using a microtitre method on an Olympus PK7300 analyser using A2B cells. Samples are diluted 1/32, we have shown this is equivalent to 1/128 by either manual saline method or gel card.
  c. Each time, that is, every donation.
  d. No, if all donations in the pool test as negative then the product is labelled as HT negative. All other units are regarded as not being 'low titre'.
  e. We test every donation. Plasma is labelled as HT negative if it tests as such. Hospitals can select HT negative units is transfusing out of group. We do not provide whole blood routinely, but that being produced by us for trials is tested and only issued if HT negative.
  f. Yes, although AB plasma products are more commonly given in an unknown group situation in contrast to A platelets and group O plasma is always avoided for non-Group O recipients [2].

Question 4

These are reported to our national hemovigilance scheme (SHOT) and the MHRA our regulators. Prior to 2008 a number of HTR to platelets were reported, mainly group O platelets to non-O recipients. As a result in 2008 the methodology for testing high-titre anti-A/-B in donations was standardized in the UK. Between 2009 and 2019 there have been:

- Six possible HTR from ABO-incompatible platelets
- None fatal
- Two cases were difficult to identify causality as the recipient also received red cells or IvIG
- Of the other four, three were from group O to non-O recipient, one was A to AB. In all four elutions, the relevant antibody from red cells was noted.
- In three of the four the platelet were tested as HT negative, two in paedi patients and one in adult (the latter had a IgM around the level of the HT cut-off, but an IgG which is not routinely tested of around 1/2000)
- If we assume 250,000 platelets issued per year and four cases over 10 years then the frequency is 1:625,000

No cases since 2016 when PAS for pooled PC introduced (only 50% of supply) given the low number of cases per year before that, this could be due to chance.

Question 5

BSH guidelines [1]: RhD-negative girls or women of childbearing potential should receive RhD-negative platelets. If unavailable, RhD-positive platelets can be given with anti-D prophylaxis (1B).

For RhD-negative boys under 18 years of age, those who already have anti-D antibodies, and transfusion-dependant adults, the platelets of choice are RhD negative. RhD-positive platelets should be given if RhD-negative platelets are unavailable or to prevent wastage of RhD-positive components. Anti-D prophylaxis is not required (1B).

Question 6

Anti-D is recommended for females of childbearing potential.

Question 7

Assessing red cell contamination of platelets:

- We do not test platelets routinely, we do a visual inspection based on the use of a visual colour chart. The upper limit is 4×10^9 rbc/L, units above this are discarded.
- This information is not on the label.

Question 8

All types of platelets.

Question 9

Not routinely. Development of anti D in a female of childbearing potential is however reportable to the SHOT haemovigilance scheme and an association with platelets might be uncovered. There have been no reports where platelets have been implicated in this group for at least 10 years.

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THE NETHERLANDS

Jean-Louis Kerkhoffs, Masja de Haas & Jaap Jan Zwaginga

Question 1

In the Netherlands buffy coat platelet concentrates derived from five donors are used as well as apheresis platelets. More than 90% of the used platelet products are buffy coat platelet concentrates. Whole blood donations as well as pooled buffy coats are processed using a semi-automated method (Compomat). All platelet concentrates are suspended in 65% PAS-E/35% plasma. For neonates and infants smaller units are used.

Question 2

In the Dutch transfusion guideline it is advised to select platelets that are compatible for the ABO blood group to avoid major incompatibility. However major ABO-incompatible platelet transfusions are used in less than 5% of the transfusions (mostly patients with blood group O receiving group A platelets due to stock/logistical issues).

Question 3

ABO identical platelet transfusions are generally advised when possible. But this is not always possible. In this respect major incompatible platelets can have less increment and can induce anti-A and -B titres and have additional side effects in this regards. Minor ABO-incompatible platelets can result in positive DATs and donors with high titres also some but also sometimes severe haemolysis. In neonates this is considered critical and lower than 1/128 anti-A or -B titres needed. The use of PAS mitigates these minor incompatible side effects but this is not complete.

- In volume-reduced platelet concentrates, the final volume is 30 ml and for neonates 11 ml, at average, respectively. The use of these so-called hyperconcentrated platelets does not change the ABO compatibility recommendations for product selection. Hyperconcentraties are not frequently used: approximately 200 products per year prepared for adults and 100 per year for newborns.
- We use PAS-E as storage medium, this did not yet change the recommendations regarding ABO compatibility of products.
- Testing of donor/product for anti-A/-B.
  a. We are testing the final product for anti-A/-B, and only for products that are used for transfusion to neonates.
     We are performing direct agglutination in tube testing (saline). The cut-off is 64 (not higher than 1+ agglutination) and 128 should be negative.
  b. All final products used for platelet products for newborns are tested, so every time the donation is tested, at this moment.
  c. No, the product is not labelled with the titre.
  d. We are using solvent-detergent plasma as standard plasma product. If FFPs are transfused, those are not routinely tested for antibody titres. Plasma is always given ABO compatible so never (minor) ABO incompatible.
  e. Minor incompatible plasma is not/never given. (Minor) ABO-incompatible platelets in this respect are sometimes given (see above). In the Netherlands, we are not using cryoprecipitate.

Question 4

RhD haemolytic reactions upon platelet transfusions do sometimes happen, although guidelines advise to give RhD-compatible platelets; for females in the reproductive age (<45 years) RhD-compatible blood platelets are advised or RhIg D prophylaxis (375 IU) should be given in addition to an RhD-incompatible product in this age group. This kind of adverse reactions are reported to our national haemovigilance bureau (TRIP) and in 2018 one platelet product was RhD-incompatible transfused: no anti D developed; in that year no AHTR or delayed HTR by platelets were reported.

Question 5

For RhD-negative females aged <45 years RhD-negative platelets need to be selected (see below).

In product packages prepared in case of massive bleeding; the red blood cell and platelet products are all group O, RhD-negative and units of solvent detergent plasma are group AB.

Question 6

The Dutch transfusion guideline it is advised to select RhD-compatible platelets for transfusion. If you cannot select RhD-negative units for RhD-negative recipients, only in case it concerns women aged below 45 years you need to consider to administer RhIg (375 IU). If it concerns a newborn girl (<3 months of age), one

may choose to omit the RhIg administration because of the low risk of RhD alloimmunization.

Question 7

For every product at processing and release department, there is a visual check on 'red appearance' with for comparison a set of calibrated photographs of platelet concentrates spiked with various levels of red blood cells. The maximum level of red blood cells is 6×10^9/L. This information is not shared on the label. On the label there is a link to the online information on product requirements.

Question 8

The level of red blood cell contamination does not change any of the above-mentioned policies.

Question 9

Alloimmunization caused by transfusion needs to be reported to our national institute of haemovigilance. In most causes a root cause is performed if anti-D is developed after transfusion in RhD-negative recipients (see above).

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GERMANY

Birgit S. Gathof & Katharina Ommer

Question 1

- We supply Apheresis (APC) and whole blood-derived (buffy coat PPC) PLT, pools are from presently five in future four donors, processing is manually.
- The mix is about 70% APC, 30% PPC. APC are the preferred choice for haemato-oncologic patients.
- APC in plasma (in future PAS III), PPC in InterSol.
- PLT for neonates have the same specifications.

Question 2

The national policy [1] recommends ABO-identical PLT transfusion; if not available, major incompatible PLT is preferred, but minor incompatible PLT may be used too according to availability.

Question 3

- In PLT production we target a minimum of residual red cells. PPC are stored in PAS, in near future storage of APC-platelets.

Question 4

In our national haemovigilance system haemolytic reactions would be reported, if they occur. Between 2000 and 2017 a total of 13 cases with fatal haemolytic reaction in 7,726,822 PLT transfusion (about 1:600,000) were reported in our national hemovigilance system at PEI [2]. In over 100,000 PLT transfusions at our institute in the past 20 years no haemolytic reaction was observed.

Question 5

According to the National Guidelines [3] for women in childbearing age and children/juveniles under 14 years RhD-negative PLT are indicated.

Question 6

In case of transfusion RhD-positive PLT to RhD-negative patients anti-D prophylaxis is recommended.

Question 7

Red cell contamination is generally low and routinely determined in each PLT product by automated blood count (Sysmex) and in quality control on a specific amount the monthly production (Facs-Scan); according to the National Guidelines it should be $<3 \times 10^9$/product (in our PLT red cells are normally $<1 \times 10^9$). It is not required to report this is on the label.

Question 8

We do not specify for the different products.

Question 9

As anti-D prophylaxis is in use after D-positive PLT transfusion to RhD-negative patients, formation of anti-D after PLT transfusion has not been considered to be a major problem up to now. It is not routinely reported in the national haemovigilance system. While antibody screening is performed regularly on each patient before transfusion of red cells, it is not required before PLT transfusion.

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FRANCE

France Pirenne, Michel Raba & Anne Francois

Question 1

- In France we supply both apheresis and blood derived platelets (buffy coat) obtained through 5 to 8 donors, via automated methods (TACSI). All platelets products are then treated for pathogen inactivation (INTERCEPT).
- Apheresis represents about 30% of the French production of platelets. The other 70% are obtained through whole blood.
- The storage media depends upon the technique used. All platelet production is suspended in PASIII (with 30% of plasma and 70% of storage solution). This ratio is mandatory for pathogen inactivation, which is performed on all PC.
- For neonate and infants, we used the most concentrated products in order to obtain at least 0.5 10^{11} platelets in a volume of 30–40 ml. All patients are transfused with apheresis platelets.

Question 2

In France, we do not have national policy regarding ABO compatibility. However, plasma incompatibility is ignored unless the product has hemolysins. In this case, the computer system blocks the delivery to a patient whose ABO group is incompatible with the hemolysins of the product. Regarding cell compatibility, about 84% of the platelets are transfused in a situation of cell compatibility. Cell incompatibility is avoided when the patient is known to produce immune anti-A or -B.

Question 3

- For non-identical platelets, only those without hemolysins are allowed (computer blocking).
- We do not reduce the volume before transfusion in case of ABO incompatibility. In fact, it does not really happen that we cannot apply ABO compatibility for platelets, because we have a resource at the region level that allow to find the right product for the right patient. It is a very rare situation, but this may be the case if the only HLA compatible platelet have hemolysins
- Yes, platelets are stored in PAS.
- We test the donor for anti-A/-B.
- The plasma of the donor is evaluated with a direct agglutination method (microplate technique on OLYMPUS automate). When a donor as a titre > 64, the derived product is labelled. For example O PC with anti-A hemolysins, PC are identified as 'to be reserved exclusively for a group O or B recipient', those with anti-A and -B are identified as 'to be reserved for a group O recipient'.
  a. Yes, it is tested at every donation.
  b. No, the product is not labelled with the titer
  c. All donations are tested for anti A/B, but the result is not used for red blood cell concentrate as the residual volume of plasma is low.
  d. No, we do not transfuse Plasma O to A or B patient, even without antiA/B hemolysins in the plasma.

Question 4

This reaction has been reported for 8 years now, but is very rare. Positive DAT can be observed.

Question 5

There is no policy for RH compatibility of platelets in France. However, when possible, we try to take it into account RHD, especially in women up to the age of 50.

Question 6

We deliver anti-D prophylaxis in women up to the age of 50, when they are not immunosuppressed.

Question 7

- The RBC contamination of platelets is assessed by the visual appearance of the product
- When delivered, the products with a visual appearance of RBC contamination are preferentially delivered to patients who do not rely on RH and KEL compatible protocols

Question 8

Yes.

Question 9

The screening test is recommended between 1 and 4 months after the transfusion. Unfortunately, it is not always realized. However, for the polytransfused patients, in the same region (The French territory is divided in 13 regions), the unique information system allows to detect those cases of immunization, as the screening test is performed before each transfusion. These cases remained rare, and are collected in the haemovigilance system. The rate of anti-D immunization following incompatible transfusion is about 1%.

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AUSTRALIA

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Question 1

- Lifeblood provides both Apheresis platelets in PAS and Pooled whole blood-derived platelets in PAS (pool of four donations). SSP+ is the additive solution used for both. All platelets are irradiated and considered leucodepleted. Centrifugation and a Semi Automated Macopress is used for separating whole blood donations but the pooling is a manual process.
- Nationally across the year approximately 36% of platelets are apheresis platelets and the remainder are pooled platelets. However, this split varies between jurisdiction based on clinical and cost considerations.
- Both apheresis and pooled platelets are suspended in SSP+
- Apheresis platelets for paediatrics/neonates are made from splitting a standard apheresis donation, so they have reduced volume and platelet content but otherwise the same specifications

Question 2

There are National guidelines from the ANZSBT and advice from Lifeblood:

- Guidelines for Transfusion and Immunohaematology Laboratory Practice (anzsbt.org.au)
- https://transfusion.com.au/blood_basics/compatibility

These guidelines recommend using ABO identical platelets where possible. However they do acknowledge that this is not always possible and the preferential group selection generally prioritizes the compatibility of the residual plasma in the component and avoidance of minor incompatibility (with the acceptance that group AB platelets are rarely available, and the recommendations that group A2 platelets could be selected for group O or B recipients). They advise that low-titre anti-A/-B apheresis platelets or pooled platelets should be selected for ABO minor incompatible transfusions.

A small unpublished audit done in Queensland for 1 month in 2011 showed that 81% of platelet transfusions were ABO identical. This may not represent current practice.

Question 3

- Only ABO identical transfusions are allowed
- ABO identical platelet transfusions are recommended but due to inventory issues this is not always possible. Few group B and very few group AB platelets are collected, and some hospitals with limited platelet inventory are many hours from our distribution centres so crossing ABO groups for platelet transfusions commonly occurs by necessity.
- Apheresis platelets and pooled platelets are both plasma reduced and suspended in SSP+.
- Apheresis platelet volume specification is 100–400 ml with mean 209 ml. The residual plasma content is approximately 40%
- Pooled platelets volume specification is >160 ml with mean 367 ml. The residual plasma content is approximately 30%
- Yes both apheresis and pooled whole blood-derived platelets are plasma reduced and suspended in PAS (SSP+)

a. Each donation for Clinical plasma or platelets is tested for anti-A/-B. The testing is performed on the donor sample.
b. The anti-A/-B is automated on the PK7300 analyser using the PK7300 plasma dilution ratio 32 and 64, detecting IgM. Validation suggests that the plasma dilution ration 32 in this test system approximates to 1:128 using conventional tube method. If positive for anti-A and/or -B at dilution ratio 32 it is not labelled low titre anti-A/-B. Approximately 60% of donations are negative and labelled as low-titre anti-A/-B. If positive at dilution ratio 64, and the donation is an apheresis platelet donation, manual testing at a titre of 1:8000 is performed and if positive the donation is recalled and the donor deferred – this is to exclude the risk of extremely high titre anti-A/-B apheresis platelet donations being used in incompatible transfusions. This is limited to this donation type because pooled platelets will be lower risk due to dilution with other donations, and clinical plasma is unlikely to be used for incompatible transfusion, and when necessary (e.g., group A plasma instead of group AB for emergency transfusion) low-titre anti-A/-B units are preferentially selected.
c. The donor is tested each time they make a donation for clinical plasma or platelets
d. The titre is not included on the label but the modifier 'low titre anti-A/-B' is printed on relevant labels.
   The apheresis platelets and clinical plasma are labelled as low-titre anti-A/-B if they have tested negative with the PK7300 plasma dilution ratio 32 (and dilution ratio 64). Pooled platelets are labelled low-titre anti-A/-B if all four donors used in the pool tested negative at PK plasma dilution ratio 32. Group AB products are not labelled and red cells are not labelled with 'low anti-A/-B'
e. We do not issue whole blood for transfusion. But yes, we test all donors of donations for clinical components – so all plasma donations are tested.
f. National policies from ANZSBT and advice from Lifeblood for group compatibility for selection of plasma products are available. They are similar but not identical to platelet compatibility, with a stronger avoidance of minor ABO incompatibility for a unit of FFP and no requirement for RhD matching. Cryoprecipitate tends to be grouped with FFP for these policies.

Question 4

Previously anti-A/-B titre was manually performed only on donors making group O apheresis platelet donations. At this time apheresis platelets were suspended in plasma. A very severe case of intravascular haemolysis due to high titre anti-B in a group A donor reported through National Haemovigilance systems, led to the adoption of automated anti-A/B testing for all clinical donations [1]. This testing has continued despite the subsequent move to suspending apheresis platelets in PAS. It would be difficult to determine how common this type of event is from current National Haemovigilance data, However, we are not aware of any subsequent haemolytic reactions due to anti-A/-B in platelet components since the introduction of automated anti-A/-B testing.

Question 5

Yes - There are National guidelines from the ANZSBT and advice from Lifeblood that recommend that particularly RhD-negative females of childbearing potential should receive RhD-negative platelets where possible, and if not possible they should be offered RhD-Ig propylaxis.

- Guidelines for Transfusion and Immunohaematology Laboratory Practice (anzsbt.org.au)
  - 3.3.6 RhD negative patients, especially females of childbearing potential (including female children), should receive RhD negative platelets wherever possible.
  - 3.3.7 If an RhD negative patient receives RhD positive platelets, RhD-Ig should be offered in accordance with institutional policy; this will be at the discretion of the patient's clinician and will depend on the patient's gender, age and diagnosis.
  - 3.3.8 It is not normally necessary to offer RhD-Ig to RhD negative males, postmenopausal women or those (male or female) who are heavily immunosuppressed (e.g., due to haematological malignancy).
  - 3.3.9 If a thrombocytopenic patient requires RhD-Ig, an intravenous (IV) preparation should be considered.

Question 6

Yes anti-D prophylaxis is advised for RhD-negative females of childbearing potential that receive RhD-positive platelet transfusions.

Question 7

We do not routinely test platelets for red cell contamination. Visual inspection against a reference guide is performed with an acceptable limit equivalent to 1.0 ml red cells per pack.

Question 8

Yes – these policies and advice apply to all types of platelets.

Question 9

There is no consistent mechanism to detect and record cases of alloimmunization to RhD due to platelet transfusion … or any other cause at a National level.

One jurisdictional Haemovigilance system – the Serious Transfusion Incident Reporting (STIR) System, which covers several Australian

States and Territories captures incidents related to RhD-Ig request or administration including following mismatched red cell or platelet transfusion. STIR also captures cases of delayed serological transfusion reaction (alloimmunization) if detected 24 h to 3 months after transfusion.

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