

P001

The Effect of the Introduction of the Criteria for the Use of Intravenous Immunoglobulin (IVIg) in Australia on the Supply of IVIg in Western Australia

David Lynn Aston, Julianne Lefante, Annie McNae
Transfusion Medicine Services (TMS), Australian Red Cross Blood Service (ARCBS), Perth

Aim

To review the use of IVIg in Western Australia since the introduction of "The Criteria".

Method

Review of IVIg requests and dosing information for WA patients using the ARCBS national STARS database and according to "The Criteria", which identify conditions for which IVIg is funded under the National Blood Agreement.

Results

Extensive communications between ARCBS and treating clinicians by letter, e-mail, facsimile and telephone were necessary to discuss eligibility and dose. 150 patients from the initial 363 were non-conforming and of these 92 ceased treatment as they no longer qualified; 54 of these were "IgG subclass deficiencies" and none has needed to restart IVIg. 265 new patients commenced IVIg. 343 patients (280 long-term) are on treatment. 30 over-weight patients had lean-body weight dose adjustment using a formula with individual clinician agreement.

A total of 2132 Kg of IVIG were supplied nationally in 2007/8 and 2364 Kg in 2008/9 an increase of 11%. In WA 187 Kg were supplied in each year an increase of 0%

IVIg Supplied (grams per 1000 population)

	2004/ 05	Var.	2005/ 06	Var.	2006/ 07	Var.	2007/ 08	Var.	2008/ 09	Var.
National	72.1	7%	81.5	13%	91.5	12%	100.6	10%	109.1	8%
WA	74.2	17%	78.8	6%	85.2	8%	87.8	3%	84.6	-4%

Variance compared with previous year actual supply

Source: ARCBS STARS database/Trend and Analysis report.

Conclusion

"The Criteria" and introduction of lean body weight-based dosing have proved invaluable tools in enabling eligible patients to receive IVIg in the lowest effective doses. These measures have aided the ARCBS WA TMS team in working closely with local clinicians to minimise the inexorable increase in use of this scarce resource.

No conflict of interest to disclose

P002**Review of Massive Transfusion at a Regional Australian Hospital**

Fiona Miller, **Gerald Bates**, Alhossain Khalafallah
*Northern Tasmanian Pathology Service (NTPS), Launceston General Hospital
Launceston, Tasmania, Australia*

Aim

To undertake a retrospective critical review of massive transfusion practice at the LGH with a view to compliance with the massive transfusion protocol.

Methods

The main objective of the massive transfusion protocol is to provide appropriate early blood component therapy in an effort to prevent exsanguination, coagulopathy and thrombocytopenia.

The application of the protocol is guided by the results of the diagnostic testing (FBC; Coagulation profile etc) together with the clinical parameters. The protocol is applied for the duration of the massive transfusion episode and is monitored and adjusted by the clinical haematologist in collaboration with the treating physicians as required.

A review of patient and laboratory records was undertaken to establish the compliance, utility and efficacy of the massive transfusion protocol.

Results

In a 6 month period 12 cases of massive transfusion were treated at the LGH. The majority of the patients treated were male (10 of 12) and the average age was 64 years. A total of 185 units of packed cells and 85 units of FFP were transfused. The overall ratio of packed cells transfused to FFP was 1.0 to 1.1 and was consistent through the episodes examined.

Conclusions

Our review showed that of the 12 cases in question the intervention was performed in an appropriate time frame with the appropriate product support and complied closely with the massive transfusion protocol.

The aim of the massive transfusion protocol was achieved and patient outcomes were improved as a result.

No conflict of interest to disclose

P003

Idiopathic Thrombocytopenia Purpura (ITP) and Intravenous Immunoglobulin (IVIg) –What We Have Found in Victoria

Linley Bielby, Marija Borosak, Hayden McDonald, Erica Wood
Australian Red Cross Blood Service (ARCBS), Melbourne, Victoria, Australia

Introduction

ITP is an established condition for which IVIg can be used under the '*Criteria for the clinical use of intravenous immunoglobulin in Australia*'. The Criteria permit a dosage range of 1-2g/kg. IVIg is a precious resource made from volunteer plasma donations. ARCBS Transfusion Nurses (TN) play an important role in IVIg management.

Aim

- Review the number of ITP patients treated in Victoria, the dose/patient for each ITP classification and response to therapy
- Establish the resources required for review of IVIg use in this condition.

Method

The qualifying and review criteria for ITP require pre-treatment platelet count, and response to therapy; including platelet increment. TNs undertake telephone follow-up with treating clinical and laboratory staff to confirm platelet increment, and response to bleeding at or after 48hours. Platelet counts are recorded in the ARCBS national database (STARS). TNs keep a log of all calls and time taken.

Results

Data for December 2008 – June 2009 indicate a total of 182 patients treated for ITP in Victoria, most commonly for refractory ITP (51%, 91patients). Sixty two (34%) patients received multiple doses. The average IVIg dose was 0.9g/kg, for both adults and children. Follow-up platelet counts were available in 68% treated patients and of these 86.3% showed response and 13.7% showed no response. For this period, 195 follow-up telephone calls were made for follow-up of this indication alone.

Conclusions

The data available from Victoria suggest that a dose of around 1g/kg IVIg is effective in most patients with ITP. Close working relationships and good communication between ARCBS TNs and local clinicians facilitate individual patient management to support minimum effective IVIg dosing and careful review. These data may help inform clinical practice changes and review of *Criteria* dosing recommendations in ITP.

No conflict of interest to disclose

P004**The Use of Intravenous Immunoglobulin (IVIg) in Renal Transplantation – The Victorian Experience****Linley Bielby**¹, Solomon Cohny², John Kanellis³, William Mulley³, Erica Wood¹¹ *Australian Red Cross Blood Service (ARCBS), Melbourne, Victoria, Australia.*² *The Royal Melbourne Hospital & University of Melbourne, Parkville, Victoria, Australia.* ³ *Monash Medical Centre, Clayton, Victoria, Australia***Introduction**

IVIg is a precious blood product made from human plasma. IVIg is used in renal transplantation (tx) to (1) overcome sensitisation to HLA antigens, (2) support ABO-incompatible tx, and (3) manage rejection. These have been considered “emerging” indications and included in the national ‘*Criteria for clinical use of intravenous immunoglobulin in Australia*’.

Aim

Review IVIg use in renal tx in Victoria, from March 2007 - March 2009, including growth in use, to inform treatment decisions and planning.

Method

Data extracted from the ARCBS Supply Tracking and Reporting System (STARS) for March 2007-08 were compared to March 2008-09 (after introduction of the Criteria) and analysed to determine total grams used, average age/ weight/ dose/ treatment episodes, and available clinical & laboratory information.

Results

103 patients in 2007-08 and 138 in 2008-09 received IVIg for renal tx indications at 6 co-ordinating centres (some infusions given at regional centres), an increase of 25% (some patients treated more than once). Average dose increased from 54g to 112g (increase 52%). Average weight (74kg) remained constant. The average number of treatments/patient increased from 1.9 to 2.26 (16%). Average age was ~46 years, approx 60% male. Total IVIg used in renal tx was 21,268g in 2007-08, and 33,290g in 2008-09 (increase 36%). Overall outcomes have been promising. A template IVIg request/review form is being revised with treating centres to capture more comprehensive clinical review data.

Conclusion

IVIg use in renal transplantation in Victoria has increased by 34% between 2007 and 2009, due to increased clinical experience and number of complex transplants undertaken. The impact of this growth should be considered in future IVIg demand planning. Close clinical liaison and communication is critical to managing patient needs. Documents are being revised to be more user friendly and comprehensive.

No conflict of interest to disclose

A239

P005
Update on Provision of Low Titre Anti-A and Anti-B Group O Apheresis Platelets
Jo-anne Blewett, Rachel Sachse

Australian Red Cross Blood Service, Adelaide, SA, Australia
Aim and Background

In December 2008, ARCBS commenced national testing of group O apheresis platelets for high titre anti-A and anti-B. The absence of high anti-A and anti-B titres has been used to identify components with a lower risk of causing clinically-significant haemolysis due to anti-A or anti-B if transfused to a non-group O recipient. We review progress of provision of components which can preferentially be considered for use in circumstances where ABO-identical apheresis platelets are unavailable.

Method and Results

Since testing commenced, in SA 1203 units and 164 Tasmanian units have been tested. ARCBS red cell phenotyping laboratories perform this manual testing, with significant additional workload. As these components are often distributed as part of the overall supply of group O platelets held at major hospitals, transfusion services have ready availability of these products without having to specifically request them. This has been welcomed by our end users.

MONTH	SA			TAS		
	TOTAL TESTED	LOW ANTI-A/B (NEG FOR HIGH TITRE)	%	TOTAL TESTED	LOW ANTI-A/B (NEG FOR HIGH TITRE)	%
DEC	162	87	53.7	22	10	45.5
JAN	193	120	62.2	35	16	45.7
FEB	188	116	61.7	15	8	53.3
MARCH	162	103	63.6	29	14	48.3
APRIL	159	106	66.6	16	9	56.3
MAY	174	118	67.9	22	13	59.1
JUNE	165	115	69.7	25	17	68
TOTAL	1203	765	63.6	164	87	53

Conclusion

Availability of low-titre group O apheresis platelets is supported by routine testing at ARCBS SA laboratories (and nationally) and gives greater flexibility where ABO-identical platelets are not available.

No conflict of interest to disclose

P006

Preoperative Haematological Abnormalities Relating to Perioperative Transfusion Requirements

Anmarie Bosco, Susan Maccallum

South Eastern Area Laboratory Services, Prince of Wales Hospital, Randwick, NSW

Aim

To determine the rates of preoperative haematology testing and abnormalities within a local surgical population, and their relationship to rates of perioperative transfusion.

Method

A retrospective analysis was conducted on a cohort of local surgical cases excluding minor cases which would not have routine preoperative testing. Preoperative haematology parameters and perioperative transfusion profiles were obtained where available. Pearson's chi-square test was performed to determine parameters that were significantly associated with transfusion.

Results

548 surgical cases were performed at our institution in the month of September 2008. 333/548 (61 %) of all procedures had at least one haematology parameter tested preoperatively. There were no transfusions in the cases that did not have preoperative blood tests. Within available results, 88/330 (27%) cases were anaemic, 27/328 (8%) of cases were thrombocytopenic and 42/183 (23%) cases had at least one abnormality of PT, INR or APTT. Only 14 out of 88 anaemic patients (15.9%) had iron studies performed and 3 (21.4%) were iron deficient. Overall, 57/548 (10%) cases received a transfusion, 19/57 (33%) of these were anaemic. 10/38 (26%) of anaemic females were transfused and 9/50 (22%) of anaemic males were transfused. Preoperative anaemia was significantly associated with increased allogeneic transfusions in the female population ($p = 0.043$) but not in the male population ($p = 0.772$). Thrombocytopenia ($p = 0.06$) or coagulation abnormalities ($p = 0.272$) were not significantly associated with transfusion.

Conclusion

Preoperative anaemia is associated with an increased risk of perioperative allogeneic blood transfusions, especially in the female population. Few patients have their anaemia investigated with tests such as iron studies. This reinforces the need for thorough preoperative haematological assessment.

No conflict of interest to disclose

A241

P007

Prothrombinex Usage Canberra Hospital

Maria Burgess¹, Philip Crispin²

¹ ACT Health & ² Canberra Hospital and Australian National University Medical School, Canberra, ACT

Aims

To determine if Prothrombinex (Prothrombin complex concentrate, *CSL*) use within a tertiary hospital is aligned to clinical practice guidelines and identify potential for practice improvement.

Method

Forty consecutive patients issued Prothrombinex were identified from the transfusion database at a 500 bed tertiary hospital between 01/01/2007 and 20/04/2009. Clinical records were examined for diagnoses, clinical indications, concurrent therapies and responses to therapy. Findings were compared to warfarin reversal guidelines. Patients with Haemophilia B were excluded.

Results

Of the 40 Prothrombinex issues, 7 were excluded: 5 due to insufficient clinical documentation and 2 where the Prothrombinex was not administered and returned to stock. (n=33). In 30 cases Prothrombinex was used for warfarin reversal, in 2 cases for coagulopathy of liver disease and one for massive transfusion. The majority of episodes (28) aligned with guidelines, although five did not. Reasons for Prothrombinex use outside recommendations included coagulopathy of liver disease (2), massive transfusion (1) and near-normal INR results (2). Consultation with a haematologist or haematology registrar ensured alignment to guidelines, although consultation was not always undertaken prior to other interventions for warfarin reversal. Where haematology consultation did not occur (n=16) 37% did not align with guidelines. Fresh frozen plasma (FFP) usage ranged between 1 and 6 units. More than 2 units of FFP were given during 15 episodes, indicating that Prothrombinex is being used in addition to, rather than in place of, large volume plasma replacement.

Conclusions and Recommendations

Prothrombinex was used for inappropriate indications, including coagulopathy unrelated to warfarin and for trivial elevations in INR. Transfusion laboratory scientists should recommend consultation with haematologist if patient is not on warfarin, rather than issue Prothrombinex and for warfarin reversal where excessive FFP has been requested.

No conflict of interest to disclose

P008**Potential Effectiveness of Blood Transfusion Demand Control Strategies****Philip Crispin**¹, Maria Burgess², Therese Crispin³

¹ Haematology Department, Canberra Hospital and Australian National University Medical School. ² ACT Health, Blood Transfusion CNC. ³ Intensive Care Unit, Canberra Hospital

Aim

To determine the potential reduction in blood utilization during blood supply limitation in the ACT with different contingency plan strategies.

Method

The ACT Haemovigilance and ACT Pathology transfusion databases were reviewed from March to September 2003. All transfusion episodes were prioritised in accordance with the Australian National Blood Supply Contingency Plan. The number of red cell transfusions related to elective surgery was determined. The strategies were compared for their potential to reduce red cell transfusion demand.

Results

There were 894 transfusion episodes, accounting for 2008 units of red cells, in the haemovigilance database. A further 14 episodes of massive transfusion were identified from the pathology database. This accounted for an estimated 70% of all red cell transfusions in the ACT. After correcting for the number of red cells transfused at each hospital, red cells were prioritised as category 1 in 59%, 2 in 27% and 3 in 13%. The remainder had insufficient data for classification. Transfusion for elective surgery accounted for 14.7% of red cells used, with 9.0% rated category 3 under the contingency plan.

There were 17.3% of red cells transfused for inappropriate indications, when reviewed against NHMRC Guidelines. After excluding inappropriate transfusions, cancelling elective surgery could potentially save a further 5.5% and 4.3% of blood utilisation for category 3 and 2 patients respectively. Significant differences were found between hospitals.

Conclusion

Targeting inappropriate transfusions by vetting prior to issue not only re-directs blood away from those unlikely to benefit, but may also conserve more blood than cancelling or postponing elective surgery during times of supply limitation. Contingency planning needs to accommodate the variable case-mix in hospitals, and may be better coordinated at a jurisdictional level.

No conflicts of interest to disclose

A243

P009

Anti-In(b) Highlights Australia's New Repertoire of Challenging Red Cell Polymorphisms

Adam Dichiera¹, Sophia Hague¹, Gabriella Lucchesi¹, Tom Traino², Colin Story²

¹ SA Pathology, Transfusion Medicine Unit Royal Adelaide Hospital

² SA Pathology, Haematology Department, Women's and Children's Hospital, Adelaide, South Australia, Australia

Objectives

This case of a clinically significant red cell antibody to a high incidence antigen new to South Australia emphasises the importance of developing strategies for supply of newly appearing blood types. With increasing ethnic diversity in Australia it emphasises the need for increased surveillance of rare polymorphisms and the development of recommendations for management.

Background

A newly arrived 29 year old Indian migrant, slightly anaemic in early pregnancy, presented at the Women's and Children's Hospital early 2009. Routine screening detected an antibody strongly reactive with all red cell panel members using Diamed and tube methods. On referral Anti-In(b) was detected by Melbourne Red Cross Reference Laboratory.

The Indian (In) blood group system consists of low incidence In(a) and high incidence In(b). The frequency of In(b) antigen within the Australian Caucasian population is approximately 99%. Hence Anti-In(b) is rare in Australia. The literature indicates that Anti-In(b) rarely causes severe HDN. However, because of reports of it causing haemolytic transfusion reactions, this case was closely monitored.

Results and Discussion

South Australia's first case of Anti-In(b) was found on routine antenatal screening. Confirming the unavailability of emergency blood Australia-wide suitable for this patient the laboratory found that of 12 random red cell units matched, all were incompatible (score 3). Hence the case presented significant clinical risk. To mitigate this risk the treating obstetricians devised emergency strategies to treat significant perinatal anaemia.

Key issues for discussion emerge:

- need for clear clinical strategy to manage pregnancies with rare red cell antibodies;
- difficulty of sourcing compatible antigen negative blood for the mother in the case of maternal or, less likely, neonatal complications / haemolysis;
- expansion of the repertoire of stored rare blood types at ARCBS;
- responsibility of manufacturers to provide access by reference laboratories to red cells representative of Australia's current population.

There is no conflict of interest to declare

P010**Rhesus and Kell Phenotype Matched Units for Young Women****Emily Hinds, Gina Aitken***Transfusion Medicine, Royal Hobart Hospital, Tasmania, Australia***Introduction**

Whilst performing a previous study on Duffy typing of Refugee and Humanitarian Arrival Clinic (RAHAC) patients it was noted that a large number had a Rhesus (Rh) phenotype of cDe. In order to minimise the formation of antibodies it would be preferable to give these patients Rh phenotype matched units. There are difficulties encountered in selectively phenotyping this refugee population. It is also ethically questionable whether one section of the community should receive a service that is not offered to all.

Aim

To determine the feasibility of issuing Rh and Kell phenotype specific units to women of childbearing age.

Method

The Rh and Kell (K) phenotype of all potentially transfused women of childbearing age (under 50) was determined over a 6 month period. These were determined using the Ortho Biovue® System. For the month of June, the Rh and K phenotypes of our red blood cell (RBC) stock were recorded as stated on each unit. K positive RBCs were excluded from the investigation. The Rh and K phenotypes of the patients were compared to the phenotypes of the RBCs in stock to determine the probability that phenotype matched RBCs could be issued.

Results

Of the Rh(D) negative blood groups all patients were true negatives, as were at least 94% of RBCs in stock. Of the O Positive patients 5 of 56 (9%) had a cDe phenotype, however only 1 of 50 (2%) of O Positive RBCs in stock on any given day were a match. For the remaining Rh(D) positive blood groups the frequency of patient phenotypes matched that of the RBC phenotypes.

Conclusion

It would be feasible to issue Rh and K phenotype matched RBCs with minimal effort. However there maybe logistical difficulties with implementation that include compliance issues depending on the laboratory information system (LIS) used.

No conflict of interest to disclose

A245

P012

Pathogen Reduction Technology: An Alternative to Leukodepletion?

Lacey Johnson¹, Kelly Winter¹, Ray Goodrich², Denese Marks¹

¹*Australian Red Cross Blood Service, Sydney, NSW, Australia*

²*CaridianBCT Biotechnologies LLC, Lakewood, CO, USA*

Background

Blood products are leukodepleted and/or gamma irradiated prior to transfusion to reduce the incidence of severe leukocyte-mediated immune responses in the recipient. Pathogen reduction technologies (PRT) such as the Mirasol® system produce irreparable nucleic acid modifications following exposure to UV light in the presence of riboflavin, and thus have the ability to inactivate contaminating leukocytes through DNA damage in addition to a pathogen reduction function.

Aim

This study aimed to evaluate the ability of Mirasol Generation III, which can accommodate platelet additive solutions, to inactivate leukocytes.

Method

PBMC and granulocyte populations were isolated from the disposable cassette of a plateletpheresis set, followed by Mirasol illumination in plasma/SSP+. The viability and function of PRT treated cells were compared to untreated cells. The assays used include immunophenotyping, T cell activation by PMA, proliferation in response to mitogens, cytokine production, phagocytosis, oxidative (respiratory burst) and chemotactic activity.

Results

The results indicate that Mirasol treatment does not significantly alter the distribution of leukocyte sub-populations. However, Mirasol treatment does greatly reduce leukocyte viability and the ability of lymphocytes to become activated and proliferate in response to standard stimuli, such as CD3/CD28 and PHA-M. Further, granulocyte migration also appears to be reduced by Mirasol treatment.

Conclusion

Mirasol PRT technology is capable of functionally inactivating leukocytes in platelet additive solution. Therefore, this technology may offer an alternative to current leukodepletion for reducing immunologic consequences of platelet transfusions.

This research was, in part, supported by Caridian BCT. This abstract was reviewed by a company representative prior to submission.

P013**Safe Handling of Blood Products in Theatre...A Single Institution Retrospective Audit****Janelle Jolly**¹, Kylie Rushford¹, Kate Macdermid², Hang Quach¹1. *Department of Haematology, Southern Health, Dandenong Hospital, Melbourne*2. *Southern Health Transfusion Nurse, Melbourne***Aim**

Appropriate storage and handling of blood products is essential for safe transfusion practice. National guidelines are stringently adhered to in the hospital blood bank, but upon leaving blood products may reach temperatures outside specification prior to patient infusion. We retrospectively audited the compliance of blood storage and the correct tracking of blood units in the theatre fridge at our institution.

Method

Dandenong Hospital is an acute care tertiary hospital that supports traumas and major surgeries. A blood product fridge is located in theatre and a comprehensive documentation system is in place to ensure safe storage and traceability of blood components. The records of units issued to the Operating Theatre from 16th January 2009 to 28th March 2009 were audited to establish compliance to national guidelines.

Results

Of the 151 units issued over this time period, the audit trail was incomplete in 111 cases. Multiple documentation errors occurred including –

- non entry of the products into the theatre record book
- discrepancy in the time that the blood was issued from the laboratory and entered in the theatre record book
- missing data on removal from the theatre fridge
- missing data for returns to the theatre fridge

In some cases despite an unrecorded time interval of over 30 minutes, unused blood was still returned to the Blood Bank stock. An incomplete audit trail was seen with 31 donor units which were returned to stock and subsequently transfused to other patients. There were no reported adverse events.

Conclusion

Despite having a documentation system that ensures full traceability, there was very poor compliance by the theatre staff. Our audit demonstrates that ongoing education for theatre staff, including the risks of bacterial contamination in non-storage compliant units, is crucial to ensure guideline compliance.

No conflict of interest to disclose

A247

P014

The ARCBS STARS Database: Improving the Collection and Reporting of Data on the Use of Intravenous Immunoglobulin in Australia

David Jones¹, Marija.Borosak², Erica Wood² for the national ARCBS Transfusion Medicine Team

Australian Red Cross Blood Service, ¹ Adelaide and ² Melbourne

Background and Aim

ARCBS developed and introduced a national intranet web-based database (Supply Tracking Analysis Reporting System, STARS) to collect data on the clinical use of intravenous immunoglobulin (IVIg) in Australia. Aims included replacement of state-based Microsoft Access™ databases, ability to follow 'nomad' patients, inclusion of rules to ensure issue of appropriate IVIg product, consistent and comprehensive data collection and reporting.

Method and Results

Following a normalisation of required data the database was set up using Oracle™. Process flow was mapped and input/output screens were designed and built using HTML, AJAX and Java. The system operates on a client/server basis and rules are run on the client. The password protected database sits securely behind the ARCBS firewall. Data collected include patient demographics, clinical history, order and usage.

Reporting is available using a versatile report matrix that automatically constructs SQL (query) statements. STARS provides data for reporting to ARCBS, the National Blood Authority and state IVIg user groups. Reports currently available include use by disease, product, average dose, population, sex and age.

As an example, analysis of STARS data reveals the sex and age cohort differences in the amount of IVIg issued for haematological conditions. Females aged 20 to 39 years have a higher volume of IVIg issued than men in the same range, while this is reversed in the older age range (45 to 84 years). Further analysis reveals reasons for the difference, which include support for indications in pregnancy, and reflect weight-based differences for the older cohorts, reflecting IVIg dosing according to patient weight.

Conclusion

STARS has facilitated the collection of nationally consistent data and improved the ability to report IVIg use to end user groups and governments. Further analysis of IVIg data will continue to provide information that can shape future use of this valuable resource.

No conflict of interest to disclose

P015**Expiry Rates in Context: Comparing Red Cell Losses in Four States Using the Electronic Returns Information Capture (ERIC) System****David Jones**¹, Kathryn Liu¹, Neil Waters², J Flynn³*Australian Red Cross Blood Service (ARCBS), Adelaide¹, Victoria², Queensland³***Aim**

To determine whether transfusion laboratory red cell expiry is influenced by the number of red cell units issued and distance from ARCBS distribution point.

Background

The ARCBS Electronic Returns Information Capture (ERIC) system collects data on component loss in transfusion laboratories and has been widely used for more than two years. Four states (South Australia, Tasmania, Queensland and Victoria) have >95% participation.

Method

Data were analysed for July 2008 to June 2009 from 135 participating laboratories from the above four states were analysed.

Laboratories were placed into cohorts according to the time to deliver from ARCBS (<60; >60 <120; >120 minutes) and number of red cells received small (<200); medium (201 to 400); large (>400) units/month. Expiry, as a percentage of red cell issues, was calculated for each cohort.

Results

The overall expiry rate was 4.4%. Expiry in small laboratories was 11.4%, medium 4.7% and large 2.9%. Small, distant (>120 minutes) laboratories had the highest expiry rate of 12.6%. The lowest expiry (2.8%) was at large, laboratories close to ARCBS depots. Group O Rh(D) negative red cells expired at the greatest rate (22.1%) in small distant laboratories.

Conclusion

Analysis of expiry rates by distance and volume shows that distance from ARCBS and the number of red cells issued is associated with expiry rate. Group O negative expiry rates appear to reflect the increasing requirement for multiple small inventory holdings, especially but not limited to, outer metropolitan, regional and remote areas. ERIC reports are provided for institutional review. These data will contribute to better understanding of reasons for red cell expiry and inform discussion on expiry reduction strategies.

No conflict of interest to disclose

P016

Clinical Appropriateness of Fresh Frozen Plasma Transfusion in Critically Ill Patients in a Liver Transplant Tertiary Medical Centre

Teresa Leung, Cameron Knott, Slav Curcic, Carole Smith

Department of Haematology and Department of Intensive Care Medicine, Austin Health, Heidelberg, Victoria, 3084

Aim

To assess clinical appropriateness of fresh frozen plasma (FFP) transfusion within an intensive care unit (ICU) of a liver transplant centre. Review of patient demographics, frequency, volume transfused, and an independent review of prescribed clinical indications by two experts were included.

Method

A retrospective audit of all episodes of FFP transfusions within ICU between August and October 2007 was performed based on ICU admission records and transfusion records from the laboratory information system, followed by reviewing individual inpatient clinical records. Appropriateness of transfusion was assessed by a consultant haematologist and transfusion nurse independently, based on National Health and Medical Research Council/ Australian and New Zealand Society for Blood Transfusion (NHMRC/ASBT) Clinical Practice Guidelines and documented clinical circumstances.

Results

33 patients with a total of 68 transfusion episodes were recorded within the designated period. The majority of patients were either post cardiac surgery (n= 13) or have chronic liver disease (n=6). The median volume of FFP transfused per patient was 600mls (2 units), with a standard deviation of 1879mls (7 units), likely reflecting the proactive approach taken for treating liver disease patients with coagulopathy. For each transfusion episode, the median amount transfused was 8.8ml/kg., which is lower than the recommended dosage of 10-15ml/kg by Australian Red Cross Blood Service (ARCBS). Independent assessment of clinical appropriateness reveals 60% of FFP transfusions are congruent with guidelines and clinically appropriate; 24% are incongruent with guidelines but clinically appropriate. Of the 16% incongruent and inappropriate transfusions, over 50% involved post cardiac surgery patients.

Conclusions

The study demonstrates that critically ill patients with liver disease and coagulopathy often require large volume FFP transfusions, which mostly has been appropriately prescribed. It also highlights the controversy of prophylactic FFP transfusions post cardiac surgery, and the tendency to underestimate the amount of FFP required for each transfusion. Ongoing education will help to modify future ordering practice.

No conflict of interest to disclose

P017**Bloodhound Revisited. A Transfusion Service Sub-analysis of Red Cell Usage Patterns****Modisha Peiris¹**, Marija Borosak^{1,2}, Mary Comande², Ellen Maxwell¹¹ Melbourne Pathology, Collingwood; ² Australian Red Cross Blood Service, South Melbourne, both in Victoria, Australia**Aim**

To inform contingency planning for red cell shortage or demand surge with information from use in the private sector, we studied inventory management and clinical indication for red cell transfusion in a large private pathology provider in Victoria.

Method

Retrospective data collection with tracking of all interim movement and final destination of tagged red cell units from the ARCBS Bloodhound audit issued to Melbourne Pathology Service (MPS) in 2007.

Results

Tagged red cell units (424, 8.2% of all Bloodhound units) were sequentially allocated to a total of 551 patients. The majority (73%) had 1 allocation, but almost 7% had 3 or more allocations. Seven units expired without allocation and 29 units were discarded due to cold chain interruption. Mean duration within the inventory (accessible) or reserved for a patient (inaccessible) was calculated. Mean cumulative duration in inventory was 10 days. Mean individual allocation time was 4.6 days. The largest clinical areas of use were haemato-oncology (41%) and orthopaedics (18.9%). Red cells were required urgently (within 24 hours) 71.5% of the time in haemato-oncology but only 29.5% of the time for orthopaedics. Probability of transfusion was high (94.7%) in haemato-oncology, but low (31.4%) in orthopaedics. Probability of transfusion in orthopaedics was correlated with the haemoglobin at the time of crossmatch. Potentially deferrable units accounted for 20.5% (113/551) compared to 10% overall in Bloodhound.

Conclusion

The documented pattern of movement and use of red cells reflects the demographic and geographic profile of the institutions serviced by MPS. Mean allocation time significantly exceeds crossmatch validity due to off site storage regardless of the likelihood of transfusion. This information could be used to model the impact of practice change in the private sector on blood availability and assist contingency planning for blood shortages.

No conflict of interest to disclose

A251

P018

Providing On-line Transfusion Education to Nurses and Doctors: Experience and Learnings

David Peterson¹, Kathryn Robinson², Trudi Verrall¹, Bev Quested², Sue Ireland³, Rachel Whitford³

1. BloodSafe Collaborative, Children, Youth and Women’s Health Service

2. BloodSafe Collaborative, Australian Red Cross Blood Service, Adelaide

3. Blood, Organ and Tissue Programs, SA Department of Health

Introduction

In late 2007 BloodSafe released an on-line education program for general nursing and medical professionals, to improve the safety and quality of clinical transfusion practice in Australia and to assist hospitals with accreditation requirements for transfusion training and credentialing.

Uptake

This resource has been widely accepted with 24,485 users registered to June 30, 2009 from all states and territories of Australia (Table 1). A significant number of organisations including health services, health regions, universities and other organisations have promoted or made completion of this mandatory. User testing and unsolicited feedback has been extremely positive particularly around the instructional design, use of video and interactivity, and case studies.

Learnings

Problems encountered have included completion certificates not being received by users due to classification by internet service providers as spam, email addresses not provided to all staff by hospitals and a perception that personal email addresses cannot be used, and typographic errors by users during the registration process. Solutions and support have been/are being developed to address these challenges.

Conclusion and Future Directions

Submissions are currently underway to provide long term funding and strategic direction. This will provide staffing for support and further development including additional content, promotional strategy and tools, and a comprehensive evaluation of the effectiveness of this tool.

Table 1: Registrations by Jurisdiction

South Australia	6,541
NSW	7,569
Queensland	5,747
Victoria	2,008
Western Australia	1,219
ACT	684
Tasmania	672
Northern Territory	45
Total Australia	24,485
Total International	500

No conflict of interest to disclose

P019**Comparison of Antenatal Antibody Titres by Automated Analyser and Manual Tube Technique**

Antonella Putrino, Jean Allwright, Michael Wheeler
Haematology Department, Monash Medical Centre Clayton, Victoria Australia

Aim

Antenatal testing is essential to minimise the incidence and severity of Haemolytic Disease of the Newborn (HDN) by identifying females with clinically significant alloantibodies to red cell antigens. Titration is used to determine this. It involves a series of doubling dilutions of plasma, whereby the volume of each dilution is tested against selected red cell suspensions. This monitors the antibody level, thereby providing clinicians with appropriate information for the management of their patients. Titration by tube (NICE) has been the recommended technique by ANZSBT. However, with the introduction of automated column agglutination techniques this may provide more standardised results.

Methods

Master dilutions ranging from 1- 2048 were prepared using 1mL of 5% bovine albumin and 1mL of patient plasma for the Autovue. For the NICE method, aliquots from the master dilution were transferred to test tubes. Both methods were then tested against test cells for the antibody under investigation.

Results

The end points from the Autovue were slightly elevated by 2 or 3 serial dilutions compared to those of the tube method. Of the 16 anti-D titres processed on the Autovue 7 (44%) were > 32 (above clinical range), whereas when tested by tube 9 (56%) were < 32. Other antibodies (anti-CD, anti-Ec, anti-c, anti-s, anti-S, anti-Fya, anti-E, anti-Jka, anti-M and anti-K) were also tested of which 21% were > 32.

Discussion

The NICE method set out in the ANZSBT guidelines interprets the endpoint of the reaction as being a score of 5, whereas the endpoint for automated titres is a grade 1. When assigning numerical values to reactions a difference in antibody level between the two methods can be seen.

Conclusion

The automated titre is effective in producing standardised results because it is not predisposed to bias and results are easily reproduced.

No conflict of interest to disclose

P021

Evaluation and Further Management of Acquired Type of Thrombotic Thrombocytopenic Purpura Which Has Responded to Plasma Exchange Poorly

Hansa Ramanayake

National Blood Center, Sri Lanka

Background

Observations of the presenting features and clinical course of TTP suggested a pentad of clinical features for diagnosis and now only thrombocytopenia and microangiopathic hemolytic anemia are sufficient criteria to establish a clinical diagnosis and begin treatment with Plasma Exchange. A severe deficiency of ADAMTS13 (a disintegrin-like and metalloprotease with thrombospondin type 1 repeats) less than 5% of normal activity, may be specific for TTP. ADAMTS13 deficiency caused by an autoantibody provides a possible explanation for the effectiveness of plasma exchange and a role for ADAMTS13 activity measurements to guide treatment decisions has been suggested. However, the sensitivity of severe ADAMTS13 deficiency in patients with idiopathic / sporadic or acquired TTP can be clinically suspected as they respond poorly to plasma exchange with persistent high LDH level and very low platelet count and acute relapses during plasma exchange.

Aims

To evaluate and further follow up and management of TTP patients with poorly responds to Plasma exchange.

Method

A total number of Two patients (who had responded poorly and had longest TPE cycles) out of ten patients with provisional diagnosis of TTP were selected and referred to Specialized unit in London University Hospital to detect the ADAMTS 13 activity levels and further management.

Results

Total No of two patients responded poorly and had 24 and 40 Plasma Exchange cycles respectively. ADAMTS 13 activity of these two patients were less than 5 % and those two patients were started with Rituximab 375 mg/m² slow iv infusion quarter weekly for 4 weeks until the ADAMTS 13 activity reaches more than 80 % .

Conclusion

A severe ADAMTS13 deficiency can be clinically suspected as they respond poorly to plasma exchange and a role for ADAMTS13 activity measurements to guide the treatment decisions has been suggested and long term follow up for complete remission is essential.

No conflict of interest to disclose

P022**Evaluation of Positive Direct Antiglobulin Test in Patients with Auto-Immune Hemolytic Anaemia and Provision of Transfusion Support****Hansa Ramanayake***National Blood Center, Sri Lanka***Background**

Auto-Immune Hemolytic Anemia (AIHA) are characterized by decreased red cell survival and presence of auto antibodies directed against red cell antigens. The Direct Antiglobulin Test (DAT) with other serological investigations carried out in blood bank will help to determine the type of haemolysis .And this study has been conducted to evaluate of positive DAT and to select blood product for transfusion support of patients with AIHA.

Study Design and Methods

Total number of 99 consecutive patients diagnosed as AIHA with a referral to reference immune haematology Laboratory In National Blood Center for serological investigation with DAT and for red cell products were retrospectively analyzed.

Results

86 adult Patients and 13 pediatric patients were included in this study. Warm Auto-immune Hemolytic Anemia (WAIHA) was the most common type auto immune hemolytic anaemia with both C3d and IgG specificities. Cold Agglutinin Syndrome (CAS) is the second common type and only C3d specificity could be found. Paroxysmal cold Hemoglobin Urea (PCH) which was found only in pediatric population in this study consisted only C3d specificity in positive DAT .Mixed type of AIHA and drug induced AIHA could be the minor categories of this study.

Discussion

The DAT will be helpful to determine the type of AIHA and to select blood products for transfusion support and to avoid unnecessary transfusions.

No conflict of interest to disclose

P023

Implementation of a Novel Statewide Ordering and Receipting Blood System (ORBS)

Geoff Simon

Queensland Blood Management Program, Queensland Health, Brisbane, Queensland, Australia

Background

ORBS is a web based ordering and receipting system that was designed, developed and implemented by the Queensland Blood Management Program (QBMP) in conjunction with key stakeholders including the Australian Red Cross Blood Service, National Blood Authority, and private and public pathology organisations. It facilitates electronic ordering and receipting of blood and blood products in both public and private sectors, and has replaced manual fax based systems.

Method

ORBS was implemented across the private and public sectors in Queensland over a thirteen week period from 1 September to 3 December 2008. Training and on-site 'go-live' support was provided by two staff members of the QBMP.

Result

ORBS is now operational in sixty-six laboratories spanning five organisations. In addition to process enhancements, the system has led to quality improvements in the distribution process and provides valuable data for understanding and managing the blood supply. Work is underway to further enhance the system through the development of interfaces to laboratory and other computer systems.

Conclusion

Lessons learned during implementation of the novel State-wide "Ordering and receipting Blood System" system will be outlined. Results of a 'User Satisfaction Survey' conducted six months post-implementation will be presented. Data sets and information now available to support the management of the blood supply, including 'real life' examples of interest to transfusion laboratory personnel and users of transfusion services, will support discussion on the merits of the system.

No conflict of interest to disclose

P025**Autologous Fibrin Glue – Successful TGA Licensure****Rick Tocchetti, Pam Dyson***Therapeutic Products Facility, Haematology, SA Pathology, Adelaide, South Australia*

Autologous fibrin glue also known as autologous fibrin or tissue sealant has been provided to patients by the Haematology Department of the SA Pathology – Royal Adelaide Hospital (formally the IMVS) since 1989. Nearly 2000 patients have been treated with product manufactured by this department.

Provision of this product includes autologous blood collection and subsequent manufacture and storage prior to dispatch to surgical theatre. This product consists of two components which when mixed form an adhesive coagulum that assists surgical procedures.

Initial manufacturing methods were based on those described by Siedentop KH et al utilising ammonium sulphate protein precipitation for the isolation of fibrinogen and pharmaceutical bovine-source thrombin. To achieve regulatory compliance, we currently utilise an in-house developed method based upon Cohn's protein fractionation for fibrinogen isolation and a proprietary method developed by our department for isolation of autologous thrombin. None of these steps involve use or incorporation of any animal products or reagents thereby rendering the product completely autologous.

Our method for the manufacture of autologous fibrin glue has been developed under cGMP principles and as such all related steps and procedures are compliant to the current Code of GMP – Human Blood and Tissues. This procedure has also undergone successful TGA audit and as such our facility is licensed to manufacture and supply this product nationally. To our knowledge this is the first facility worldwide that has successfully passed regulatory licensure for the manufacture of autologous fibrin glue.

This paper will detail the experiences leading up to successful licensure.

No conflict of interest to disclose

A257

P026

Transfusion Data Collection in Australia – A National Approach

A Turner¹, A Woodhouse¹, J Isbister², L Phillips³, E Wood⁴, C Hogan¹

¹ National Blood Authority, Canberra, Australian Capital Territory, Australia; ²University of Sydney, Sydney New South Wales, Australia; ³ Monash University Melbourne Victoria Australia; ⁴Australian Red Cross Blood Service Melbourne Victoria Australia

Introduction

In Australia, there is no national, systematic collection of information around the clinical use of fresh blood components.

The Blood Measures Project is a collaborative between the National Blood Authority (NBA) and the Australian Red Cross Blood Service (ARCBS). It aims to develop a national set of standard data definitions and parameters, which would allow results from independent studies/audits/projects to be compared meaningfully.

Methods

Phase One involved desktop research, with a review of the range of indicators of blood and blood product use in Australia and internationally. An extensive literature review was undertaken, along with review of Australian and international Clinical Practice Guidelines in transfusion.

A National Working Group was formed, consisting of clinical experts, transfusion scientists, transfusion nurses, epidemiologists, government representatives and other relevant stakeholders. The *Blood Measures Guide* was then developed through a series of workshops and consultations.

Results

The *Blood Measures Guide* consists of six chapters which describe data measures and definitions, recommended in relation to demographic and pre-transfusion patient information, the fresh blood components transfused (red blood cells, platelets, fresh frozen plasma and cryoprecipitate), and the outcomes of transfusion. Primary measures are a menu of data elements ideally collected in all studies of blood component usage, whilst the supplementary measures could be also be collected, in addition to the primary measures, where more information is needed.

A consultative draft *Blood Measures Guide* was then placed on the NBA website for public use and comment and is currently available. The *Guide* has been designed to be an easy reference for clinicians, transfusion practitioners, auditors and researchers. It is anticipated that the set of standard measures within the *Guide* will be used in audits, quality assurance activities, clinical registries, research projects, clinical trials, and surveys of usage and practice.

Conclusion

The Blood Measures Project facilitates the collection of consistent and standardised data on the clinical usage of fresh blood components. The *Guide* is the set of these nationally endorsed measures and data definitions, arising from the Project. This *Guide* can now serve as a resource for those conducting investigations, trials and reviews of transfusion medicine practice. It is anticipated that, following an initial period of use, review and comment by the clinical and scientific community, the *Guide* will be revised and a final version published.

Acknowledgements

We would to acknowledge the members of the National Working group and thank them for their significant time and efforts.

No conflict of interest to disclose

P027

A Case of Drug Induced Haemolytic Anaemia with Blood Grouping Problem**Shaba Vakalia**, David Roxby*Blood Transfusion Service, Flinders Medical Centre, Bedford Park, South Australia***Introduction**

Drug-induced haemolytic anaemia (DIHA) is an acquired form of haemolytic anaemia due to the interaction of certain drugs with the immune system resulting in antibodies directed against red cells. We describe a case of a 62-year old male with a history of gout, autoimmune haemolytic anaemia and a blood group anomaly.

Case Report

On presentation he was found to have severe anaemia, dark urine, jaundice, lumbar and abdominal pain with no history of transfusion. Three days prior to admission the patient commenced Diclofenac (Voltaren) 50mg. Presenting laboratory features included haemoglobin 32g/L (N: 130-175g/L), CRP 143mg/L (N: < 6 mg/L), lactate dehydrogenase 2259U/L (N: 115-200 U/L) and bilirubin 140umol/L (NV < 20 umol/L). A crossmatch for four units of red blood cells was requested. Using column agglutination and tube technique the patient's forward cell group was AB Positive. However strong agglutination was present in the reverse group against A1 and B cells. The indirect antiglobulin antibody screen (IAT) and direct antiglobulin test (DAT) were positive with anti-IgG/anti-C3d. Four O negative red cells were transfused. Antibody investigation and elution studies showed the presence of a non-specific autoagglutinin. Therapeutic plasma exchange was performed on three consecutive days. Following the second plasma exchange the group and screen was repeated and the patient's blood group was confirmed as AB Positive. The IAT and DAT remained positive. DIHA to Diclofenac was suspected. The presence of antibodies to Diclofenac was confirmed using alloabsorbed plasma. Diclofenac was discontinued and the patient's condition improved. In a sample collected 6 months after discharge, no drug related antibodies or other red cell related autoimmune antibodies were detected by IAT. The DAT was also negative.

Discussion

Although the clinical and the serological findings were variable and suggested idiopathic auto immune haemolytic anaemia, as a part of the differential diagnosis DIHA should be considered when investigating haemolytic anaemia. The above case report demonstrates the possible side effects of this drug and emphasizes the need for an increased awareness of drug induced haemolytic anaemia and complications of drug therapy.

No conflict of interest to disclose

A259

P028

Comparison of Antibody-Absorbing Columns in Relation to Incompatible Kidney Transplants

Ofira Waldispuhl, Susan Finch

PathWest Laboratory Medicine, Royal Perth Hospital, Western Australia

Background

Shortage of cadaveric organs, especially renal transplants is a global problem. One solution to the increased discrepancy between the number of end-stage renal disease patients on waiting lists and the number of available deceased donor kidneys is to expand the donor pool. This can be achieved by expanding the criteria for accepting living donors and by overcoming the immunological barriers of ABO incompatibility. Blood groups antigens are expressed on the endothelium of solid organs and transplantation across a blood barrier can result in hyperacute or acute antibody-mediated rejection. Humoral rejection seems to correlate closely with pre-transplant antibody titre. This calls for exact measurements of ABO antibodies in recipient's serum and is critical for a successful ABO incompatible kidney transplant.

Aim

To study the effectiveness of two different antibody-absorbing columns, the Glycosorb® column, which specifically depletes Anti-A or Anti-B immunoglobulins, and the Evaflux™ plasma filter, which depletes a range of immunoglobulins based on their molecular weight. A titre of 8 or less immediately pre-transplant was required for the transplant to proceed.

Method

Isohaemagglutinin titre levels were determined by serological tube technique using the National Immunohaematology Continuing Education (NICE) method. Revercells™ (CSL) were suspended in PBS as a source of blood group antigens. Tests were incubated for 30 minutes at 37° C and then converted to the anti-human globulin (AHG) test phase.

Result

Both filters effectively reduced the anti-A titre. While only five patients have been studied to date, the limited data indicates that there may be a difference in the efficacy of the filters. The patient's ability to replenish depleted antibody also appeared to be dependent on the type of filter used.

Conclusion

The Glycosorb® filter appeared to be more efficient at reducing antibody titre compared to the Evaflux™ filter, however the Evaflux™ filter appeared to be more effective at limiting antibody replenishment post filtration.

No conflict of interest to disclose

P029

Identification of Proteins that Accumulate in the Supernatant of Platelet Concentrates During Storage

Anna Zhou¹, Kristen Glenister¹, Robert Flower²

¹ Australian Red Cross Blood Service, Melbourne, Victoria, Australia

² Australian Red Cross Blood Service, Kelvin Grove, Queensland, Australia

Platelet transfusion has been implicated in adverse reactions. During platelet storage, soluble factors such as plasma proteins and bioactive molecules released from platelets are likely to play a critical role in transfusion associated adverse reactions.

Aim

The purpose of this study was to identify the soluble proteins that accumulate in the supernatant of platelet concentrates (PCs) during storage by using a comprehensive proteomics approach.

Method

Prestorage leucocyte depleted pooled buffy-coat PCs in SSP+ platelet additive solution (PAS, MacoPharma) were prepared and stored in accordance to standard blood bank procedures. Platelet samples were collected at days 1, 3, 5, and 7 days of storage. Proteins in the supernatant of PCs were identified by two dimensional (2D) gel electrophoresis and cytokine antibody microarrays. Cytokines and bioactive molecules were quantitated by ELISAs.

Results

A number of proteins appeared to accumulate in the PC supernatant over storage as assessed by 2D gels. Interestingly, the proteins that accumulated over storage in PCs in SSP+ PAS were different to those identified in our previous study of PCs in T-sol PAS. Microarray analysis suggested that the platelet derived proteins BDNF, ENA-78, GRO, PDGF, and EGF accumulated in the supernatant of PCs over storage and this was verified by ELISA. BDNF, ENA-78, GRO and EGF showed significant accumulation between days 1 and 5 of PC storage and PDGF by day 7 ($p < 0.05$). In addition, the levels of RANTES and sCD40L (two proteins reportedly associated with adverse transfusion reactions) showed significant accumulation over storage. Encouragingly, the concentrations of these proteins were significantly lower in PCs in SSP+ than PCs in the previous generation PAS, T-sol.

Conclusion

Further investigations is required to ascertain the biological and clinical significant of the accumulation of these bioactive proteins during storage of PCs. These results provide an expanded view of storage associated changes and may lead to a greater understanding of the factors that contribute to adverse transfusion reactions.

No conflict of interest to disclose

A261