Transfusion and Apheresis Science 55 (2016) 164–168

Contents lists available at ScienceDirect

Transfusion and Apheresis Science

journal homepage: www.elsevier.com/locate/transci

Review

Scotblood 2015: Improving and delivering blood products, novel cellular therapies, and celebrating patients and donor engagement within transfusion services

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ARTICLE INFO

Keywords:
Blood bank technology
Transfusion safety/efficacy
Cellular therapy/products
Service/products improvement
Blood substitutes

ABSTRACT

Blood Transfusion Services are striving to continually improve the efficacy and quality of their blood products whilst also simultaneously diversifying into novel cellular products. For this to be successful the relationships between the various arms of the organisation must be strong and interlinked. As new technologies impact on the products that blood transfusion services supply it should be noted that the interaction between the service and its donor base is also affected by advancing technologies. Social media has fundamentally altered the way in which the public can access information and news, as such blood services must engage and interact appropriately with these new forms of media. As a reflection of these challenges the Scotblood 2015 programme was focussed on service and product improvement, donor engagement and people centred transfusion. This commentary comprises summaries of the presentations, based in part on the abstracts provided by the speakers.

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1. Introduction

1.1. Plenary I – Red Cells

The Conference began with the welcoming introduction by Mr Ian Crichton, Chief Executive NSS, during which he reflected on the successes of SNBTS over the past year. He highlighted the successful introduction of new working practices and novel new treatments that would have benefits to the Scottish Patients and blood donors.

Mr Crichton began Plenary I by introducing Dr Stephen Thomas, NHSBT, who gave a lecture entitled "**New Processing and RBC Technologies**". Dr Thomas explained that the changes and updates to manufacturing processes are driven by a number of factors including safety, efficiency or efficacy. He noted that over the last few decades, safety has been the biggest instigator for altering RBC production methods. This is highlighted in the successful implementation of

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http://dx.doi.org/10.1016/j.transci.2016.07.005
1473-0502/

universal leucodepletion, introduced in 1999, which has reduced the risk of transmission of vCJD. No transmission of vCJD has been seen from RBC since this intervention.

Dr Thomas also noted that to use the donor gift effectively there must also be a drive for increased efficiency. An example of such efficiency has led the NHSBT to introduce ambient hold of whole blood prior to its separation into components. This reduces the core hours for staffing but still enables the manufacture of red cell, platelet and plasma components from each bag of whole blood on the day after donation. Such changes have led to some slight compromises regarding the level of quality of the components, notably a reduction in quality of the red cells being produced.

Continuing with the theme of balancing efficacy, efficiency and safety Dr Thomas discussed the development of automated components production, including the solutions such as "double red cell donations". These double red cell donations are being collected by apheresis which greatly reduce patient exposure to potential pathogens such as vCJD, but are not currently cost effective. A further key point that Dr Thomas discussed was the drive to implement changes in the additive solutions used for red cell products. He explained that whilst there is a probable benefit with increases in safety and efficacy this outweighed by the high cost of trialling and obtaining regulatory approval. This may result in manufacturers being deterred from pursuing what is a low-cost and low-return product. However, safety concern over the plasticiser used in some blood bags, which leaches into the red cell membranes, may drive the need for better storage solutions to counterbalance a change to the plastic.

The expectation of a completely safe blood supply has driven the development of pathogen inactivation systems for red cells or whole blood. This has been more challenging for plasma and platelet components. Dr Thomas finished by highlighting that the successful implementation of any pathogen inactivation technologies could have additional benefits, logistically and financially, for blood services such as the removal of irradiators, relaxation of some travel deferrals and removal of some discretionary testing. This may be the next major change in the provision of all blood components.

Mr Paul Milne, SNBTS, Associate Director of Logistics, presented the second talk in this session which was entitled "**Logistics of RBC Provision**". Mr Milne began by explaining that the term logistics in regard to Blood Transfusion Services has its own unique definition namely "the provision of the right components in the right quantity, at the right time, to the right place". Mr Milne then succinctly explained the intricacies of ensuring that these three elements are met within the SNBTS at all times. He explained the levers and tools that ensure the SNBTS has the required RBC components available within the supply chain across the various Blood Groups and Rhesus systems and the main antigens. He noted the planning and forecasting of collections at SNBTS using internally developed programmes that track blood usage, distribution and collection such as "Account for Donation" and "Account for Blood" have greatly enhanced their ability in this regard.

Mr Milne also noted that to ensure RBCs were available at the right time, the required components must be delivered by SNBTS to hospitals in an appropriate and timely manner. Mr Milne explained that despite careful planning and scheduled deliveries to hospital blood banks, there is still a requirement for ad hoc or emergency delivery of blood. This can be achieved by a variety of transport methods from preferred dedicated SNBTS vehicles to outside agencies. Mr Milne explained the fine balance of maintaining stock levels at sites, preserving the donor gift and using it effectively and also reducing the risk to logistic staff. Despite being a small country Mr Milne explained the geography of Scotland can make the final area "Right Place" more tricky than at first glance, but with a finite stock and the drive to minimise non-transfused RBC components, the right place is actually where the patient demand is, both geographically and location within a facility. During an engaging talk Mr Milne highlighted the vast interdependency of each area of a blood transfusion service in supplying efficacious and timely products.

Finally in this session, Prof Chris Cooper, University of Essex, gave a presentation entitled "**Developing the Next Generation of Blood Substitutes**". In this talk Professor Cooper described the history of blood substitutes and the potential of novel oxygen carrying molecules, particularly haemoglobin based oxygen carriers (HBOC), as alternatives to traditional red blood cell transfusions. He detailed the work of his group in designing novel HBOC with new tyrosine electron pathways designed to make it possible to utilise endogenous and exogenous antioxidants to reduce potential harmful haemoglobin oxidative species. Professor Cooper continued by detailing a variety of haemoglobin mutants which have altered reduction states that may make them suitable candidates for use as alternative oxygen carriers, without the toxicity associated with naturally occurring haemoglobin. Prof Cooper finished his entertaining talk by noting that if these novel mutated HBOC can be produced by recombinant protein technology, then they may become a useful tool in the safe delivery of blood transfusion in the future.

1.2. Plenary II – People Centred

A focus of Scotblood 2015 was the linking of Blood Transfusion staff with the patients and donors who their work directly impacts on. Plenary session II consisted of presentations that focused on the impact that the blood transfusion services can have on patients and donors lives.

The first of these was entitled "**Rachel Bouncing Back**" and was presented by Miss Rachel Robyns Laird and Dr Peter Johnson, Western Infirmary Edinburgh. The lecture was split between the two presenters, Rachel the patient and Dr Johnson her Consultant. Miss Laird began by explaining that in 2012 when she was only 17 years old, she began feeling unwell and was later diagnosed with Acute Myeloid Leukaemia (AML). Rachel explained that she was admitted to the Western Infirmary, and spent five months in an isolation unit receiving treatment in the form of three cycles of a trial chemotherapy called AML 17. Rachel explained the struggle of undergoing the treatment and how she bravely managed her isolation. Whilst being in hospital as an immunocompromised patient, Rachel required and relied heavily on a significant amount of red cell and platelet blood transfusions. By November 2012 Rachel was in remission.