

## A Case History: Too Much of a Good Thing?

Questions to ponder:

### 1. Are there patient safety risks in transfusing stable patients at night, weekends and off shifts? Why/why not?

Hospitals are not fully staffed on “off shifts” including evening and night shifts and weekends. Additionally, staff members with transfusion expertise are more readily available from Monday to Friday during business hours, rather than on non-business hours.

Transfusing during non-business hours has been recognized by the Blood and Transplant division of UK’s National Health System (NHS) as a risk in their 2007/2008 Annual Report on National Comparative Audit of Blood Transfusion: “*The premise of the audit was that transfusion at night is inherently unsafe, based on a Serious Hazards of Transfusion recommendation (SHOT 2005) that transfusions out of core hours should be avoided unless clinically essential*”.<sup>1</sup> Another UK organization expressed concerns about off-hour transfusion practices for non-urgent patients. In Hitchingbrooke Health Care NHS Trust’s audit report from 2007: “*43% of the total number of red cells were given to 40% of the transfused patients’ overnight. A sequential audit that followed deemed 80% of these transfusions inappropriate at night either because they were outside of the transfusion trigger, or because there was no documentation surrounding the requirement for the transfusion. Our study demonstrated that overnight transfusions are usually clinically inappropriate and expose the patient to unnecessary risk and seldom facilitate next day discharge*”.<sup>2</sup>

Closer to home, Bloody Easy 3 also discourages transfusion to non-urgent patients.<sup>3</sup>

Therefore, unless the patient requires a transfusion urgently, it is best practice to initiate a transfusion in the day time, preferably Monday to Friday if at all possible. Non-urgent transfusions should not be performed at night.

### 2. What should be contained in policies about monitoring the transfused patient? By whom?

Qualified personnel such as trained nurses and physicians administer blood products. These individuals would be defined in your own organization’s policies. Patient monitoring protocols, transfusion reaction identification information and notification of other staff members of an adverse transfusion event must be explained in the organization’s policies and procedures.

Minimum standards for monitoring patients for a transfusion are before the transfusion, 15 minutes after the transfusion has begun, at the end of the transfusion and at any time a transfusion reaction is suspected.<sup>4</sup> Staff members responsible for transfusion must be trained on what to look for in identifying a transfusion reaction, how to care for their patient and who to notify in the event of a reaction. For example, at minimum the treating physician and the transfusion medicine laboratory should be immediately notified.

In its 2011 annual report, SHOT (UK) notes that transfusion-related circulatory overload (TACO), and inappropriate, unnecessary or under/delayed (I&U) transfusions are critical causes of avoidable major

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<sup>1</sup> “National Comparative Audit of Blood Transfusion” from the NHS Blood and Transplant Annual Report 2007/2008, retrieved November 12, 2012

[http://hospital.blood.co.uk/library/pdf/National\\_Comparative\\_Audit\\_of\\_BloodTransfusion\\_Annual\\_Report\\_2007\\_2008.pdf](http://hospital.blood.co.uk/library/pdf/National_Comparative_Audit_of_BloodTransfusion_Annual_Report_2007_2008.pdf)

<sup>2</sup> Hitchingbrooke Health Care NHS, *Audit of Appropriateness of Overnight Blood Transfusion*. Hitchingbrooke UK, April 2, 2007.

<sup>3</sup> Jeannie Callum et al., *Bloody Easy 3 A Guide to Transfusion Medicine*, ORBCoN (Toronto ON, 2011) p. 17.

<sup>4</sup> Jeannie Callum et al., *Blood Easy 3 A Guide to Transfusion Medicine*, ORBCoN (Toronto ON, 2011) p. 16.



morbidity and mortality<sup>5</sup>. Therefore, it is vital that TACO is quickly recognized, treated and reported, and that the supporting policies, procedures and training are in place for this to occur.

### **3. Should there be explicit instruction about large volume transfusions?**

Absolutely! All patients can experience a TACO-Transfusion Associated Circulatory Overload-reaction if the transfusion rate and volume transfused is too high. Those particularly at risk for TACO reactions are patients:<sup>6</sup>

- With impaired cardiac function
- Over the age of 60
- Who are infants
- With severe euvolemic anemia

Transfusion rates, the use of diuretics and careful patient monitoring should be defined. For the elderly, very young and those patients with TACO risk factors, up to 20% of TACO cases occurred after only one unit of red blood cells (RBCs) was transfused.<sup>7</sup>

### **4. What is the role of your transfusion committee to educate clinical staff about the indications for transfusion and its monitoring?**

The Canadian Society for Transfusion Medicine (CSTM) is explicit about the role of transfusion committees with regard to education, blood utilization and monitoring in their standards:<sup>8</sup>

- Identify transfusion policies
- Identify criteria for transfusion/blood utilization
- Audit practices and ensure corrective action is taken
- Transfusion medicine education

Therefore, your transfusion committee has quite a significant role in the areas of education for clinical staff.

### **5. Where would your staff look for information on adverse transfusion events and how to investigate them?**

All staff involved with adverse event management must be trained on what to do in the event of a transfusion reaction. This training ought to be documented and will assess theoretical and practical knowledge, be performed at regular intervals (for laboratory staff on an annual basis) and additional training will be provided where required.<sup>9</sup>

Staff members and the training program are supported by policies, processes and procedures. There is a defined process for their development, review, distribution, retrieval, destruction and archival. These documents form the backbone of the training program and shall be available to all staff members involved with the safety and care of the recipient.<sup>10</sup>

Additionally, the individuals involved in the administration of the blood products need to notify the treating physician and the transfusion laboratory in the event of a transfusion reaction. They can also provide guidance about reporting and managing a transfusion reaction.

### **6. What is the role of BNP\* and possibly NT-proBNP\*\* in investigating TACO and TRALI?**

<sup>5</sup> Hannah Cohen et al., *Annual SHOT Report 2011 Summary*, UK Blood Services, (Plymouth Grove Manchester, UK 2012) p 2.

<sup>6</sup> Jeannie Callum et al., *Blood Easy 3 A Guide to Transfusion Medicine*, ORBCoN (Toronto ON, 2011) p 52.

<sup>7</sup> Bux J, Sachs U J H, Pulmonary Transfusion Reactions, *Transfus Med Hemother*. 2008 Oct;35(5): pp 337-345

<sup>8</sup> Canadian Society for Transfusion Medicine, *Standards for Hospital Transfusion Services Version 3*, CSTM (Ottawa ON, February 2011) p. 11.

<sup>9</sup> Canadian Society for Transfusion Medicine, *Standards for Hospital Transfusion Services Version 3*, CSTM (Ottawa, ON, February 2011) p. 14

<sup>10</sup> Canadian Society for Transfusion Medicine, *Standards for Hospital Transfusion Services Version 3*, CSTM (Ottawa ON, February 2011) p. 11.



\*BNP = B-natriuretic peptide, a polypeptide secreted from cardiac ventricles in response to cardiac muscle stretch and pressure overload

\*\*NT-proBNP = an inactive N-terminal complementary fragment cleaved off during the production of BNP

For BNP testing, a post-transfusion to pre-transfusion BNP ratio greater than 1.5, a significant change in systolic BP (greater than 30 mmHg), and acute dyspnea indicates a high probability that the patient is experiencing a TACO reaction rather than TRALI.<sup>11</sup> Patients experiencing TRALI exhibit hypotension rather than hypertension.

For NT-proBNP testing, it was found that the posttransfusion NT-proBNP level is a good marker for TACO, rather than the posttransfusion-to-pretransfusion NT-proBNP ratio.<sup>12</sup> The TACO studies for this test demonstrated that an elevated posttransfusion NT-proBNP level is sensitive, specific, and accurate for diagnosing TACO.

### **7. What is the frequency of TACO and TRALI reactions?**

TACO reactions occur in approximately 1 in 700 transfusions. TRALI is a rarer occurrence at a rate of about 1 in 10,000 units transfused.<sup>13</sup>

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<sup>11</sup>University of Pittsburg, Department of Pathology: <http://path.upmc.edu/cases/case509/dx.html> ; accessed October 2, 2012.

<sup>12</sup>University of Pittsburg, Department of Pathology: <http://path.upmc.edu/cases/case575/dx.html> ; accessed October 2, 2012.

<sup>13</sup> Jeannie Callum et al., *Blood Easy 3 A Guide to Transfusion Medicine*, ORBCoN (Toronto ON, 2011) p 52.

