Investigation Panel Report on Transfusion Reaction Event
Summary and Recommendations

Report summary

The Investigation Panel investigated into the events starting from the donation to transfusion of the contaminated blood unit to patient and the subsequent management. The Panel then made recommendations on how to minimize similar incidents. No culture documented red cell transfusion related bacteraemia or death have been reported for the last 10 years in HK. The standards at our Blood Transfusion Service and clinical management at Tuen Mun Hospital are observed to be very good. This very rare incident is indeed a sporadic case of contamination of a red cell unit by a common environmental cold-loving bacteria *Pseudomonas fluorescens*. The DNA fingerprint of the bacterial strains isolated from the blood culture of the deceased, the transfused red cell unit and one of the many strains found in the condensate specimens in the foam box containers with coolant used for transporting blood bags are identical. It is not possible to prove retrospectively the sequence of events leading to the contamination which happened one month ago. The possibilities could be, firstly, the environmental bacteria from the foam box contaminated the surface of the blood bag which might then enter through rare but possible microscopic defect with the facilitation of condensate formed during transportation; secondly, bacteria from condensates inside the blood bin or other environmental sources might have contaminated the hands of the phlebotomist who then contaminated the venepuncture site which allowed the bacteria to gain access into the blood bag. Since the bacteria can multiply to a huge number in red cell units even stored at 4 degree Celsius after a long period, it is important to ensure good aseptic technique during venepuncture and dryness of bags during storage and transportation. Manipulation of the tubings of the blood bags should be minimized. The HA and individual hospital guidelines for transfusion should be clarified to ensure that transfusions are only given if it is indicated, and is administered appropriately and closely monitored. The logistics of investigations for transfusion reactions must be clarified to avoid miscommunication. In the event of unexplained shock during transfusion, the patient should be treated empirically with one dose of broad spectrum antibiotic which is not continued unless investigations prove otherwise. A programme on auditing the management of transfusion reaction should be launched to ensure that the guidelines are complied. The track record of only one transfusion related septic death after 3,429,000 units of blood products were issued in the past ten years clearly showed that our Blood Transfusion Service has exceeded the international (FDA) standard of one death per

million of blood transfusion. No individual should be held responsible for the occurrence of such a rare incident.

Recommendations

Despite the effort of the panel, it is not possible to find out exactly what happened one month ago. Nevertheless, for risk reduction purposes, the panel makes recommendations based on the risk analysis at critical control points of the processes including communication, the findings on retrospective microbiological testing and the information in existing literature. All professionals involved in this investigation have followed the international standard and guidelines in their service. No individual should be held responsible for the occurrence of such a rare incident.

Blood donation, storage and transportation

1. Segregated sinks for handwashing and instrument cleansing should be provided in mobile blood donation vehicles.

2. Phlebotomists and nurses performing blood collection must ensure that the stipulated skin disinfection timing is registered by the use of a timing device such as a timer or stop clock.

3. Ensure that all blood bags tubings are dry and free of visible surface condensation prior to thermal sealing and milking by strippers. These procedures should be minimized.

4. Measures must be taken to minimize the amount of condensate in the blood unit transport containers or any storage sites. These containers must be regularly disinfected to reduce the environmental bacterial density so as to minimize the risk of contamination through inconspicuous pin hole defects in blood bag tubings which, in theory, may rarely arise from time to time but are undetectable.

5. Institute surveillance of discarded blood products by culture in order to generate contamination prevalence data to assist in preventing future similar incidents.

Blood transfusion and management of reactions

6. The HA and TMH guidelines on transfusion in terms of the indication for red cell transfusion, the responsibility and logistics of sending of donor blood units

for microbiological investigation during transfusion reactions should be clarified and promulgated to frontline health care workers. The exact indication for transfusion should be well documented on the blood request form of the Clinical Management System (CMS).

7. An auditing programme for transfusion reactions and their management according to HA guidelines should be considered. This would alert all medical doctors and nurses to follow these guidelines.

8. It is important that elective transfusion should preferably be instituted during the morning or early afternoon hours of normal working days and the rate of infusion should be complied.

9. Unexplained cause of shock and fever should be treated by one dose of broad spectrum antibiotic(s) with anti-pseudomonas coverage after taking blood culture from the patient. The antibiotic should be stopped once the investigations prove otherwise. It is also important NOT to abuse antibiotics by giving them to every patient who develop fever after transfusion since most of them do not have a transfusion-related infection unless there are other clinical indications. Clinicians should be aware of the possibility of anaphylactic reaction and septic reaction occurring at the same time especially when the initial blood investigations after the onset of shock suggest acute severe sepsis and the clinical progress could not be fully explained by anaphylaxis alone.

10. All blood products returned from patients with shock related to transfusion (or suspected septic transfusion reaction) must be examined by a Gram stain as soon as possible and if positive, a phone report must be sent to the clinician immediately.

Hospital Authority
22 January 2008