

Case Report:

Transfusion related acute lung injury in a perinatal woman

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ABSTRACT

We report the case of a 26-year-old female who underwent emergency caesarean section at a private hospital and was referred to the Government Maternity Hospital (GMH), Tirupati for bleeding per vaginum 4 hours after delivery. She had received one unit of whole blood transfusion outside. Later, whole blood, platelets (n= 1 unit) and fresh frozen plasma (n= 2 units) were transfused over a period of 6 hours at GMH, Tirupati. Two hours there after, she complained of sudden breathlessness with cough. On examination, bilateral basal crepitations and wheezing were noted. Fall in oxygen saturation by pulse oximetry, hypotension, tachypnoea and mild fever were also noted. Chest radiograph showed bilateral frontal opacities. Possibility of transfusion-related acute lung injury (TRALI) was considered. Supportive treatment included supplemental oxygen through oxygen mask followed by assisted mechanical ventilation and the patient improved. The present case highlights the importance of transfusion related adverse events so as to facilitate prompt recognition and appropriate treatment at the right time.

Key words: TRALI, Blood transfusions, Multiparous female, HLA antibodies

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INTRODUCTION

Homologous blood transfusions cause transfusion reactions such as allergic reactions, infectious disease transmission, acute or delayed haemolytic reactions, and non haemolytic immune reactions.¹ Popovsky et al. in 1980s coined the term transfusion-related acute lung injury (TRALI).² The condition was earlier referred to as severe pulmonary hypersensitivity reaction.² TRALI is a condition associated with hypoxia and non-cardiogenic pulmonary oedema occurring during or within 6 hours of a transfusion of plasma containing blood products such as platelets and fresh frozen plasma in the packed cells, in the absence of cardiac failure or intravascular volume overload.³ Rarely TRALI has been reported with transfusion of packed red cells.³

These products contain antibodies towards human leucocyte antigen (HLA) found on white blood cells. Leucoagglutination and pooling of granulocytes in the recipient's lungs may occur, with release of the contents of leucocyte granules, and resulting injury to cellular membranes, endothelial surfaces, and potentially to lung parenchyma. TRALI is one of the leading causes of transfusion related morbidity and mortality that is frequently under diagnosed and under-reported.^{4,5} The incidence of TRALI has been estimated to be 1 in 5,000 for every transfusion, and current mortality rate ranges from 6% to 9%. However, it is thought to be an underestimate of true incidence because of under diagnosing and under reporting.⁶ Here we report the occurrence of TRALI following blood transfusion.

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CASE REPORT

A 26-year-old female, para 1, delivery 1, underwent emergency caesarean section at a private nursing home and was referred to Government Maternity Hospital (GMH), Tirupati in view of bleeding per vaginum 4 hours after delivery. She was diagnosed to have primary postpartum haemorrhage because of uterine atony associated with clots weighing approximately 500 g. Her blood group was O Positive. She was given one unit of compatible whole blood and supportive treatment in the outside hospital and later referred to GMH, Tirupati. Two units of platelet rich concentrate, two units fresh frozen plasma were transfused immediately along with one unit of whole blood over a period of 6 hours. Two hours there after, the patient complained of sudden breathlessness with cough. On auscultation bilateral basal crepitations and wheezing were evident. Rapid clinical deterioration was noted with oxygen saturation measured with pulse oximetry (SpO_2) falling to 80%, hypotension (systolic Blood Pressure 60 mm Hg; tachypnoea (respirations 36/min), and fever (100 °F).

She was propped up and given supplemental oxygen (8L /min) through oxygen mask. Chest radiograph (Figure 1) showed bilateral frontal opacities. She was diagnosed to have TRALI. She did not improve with administration of



Figure 1: Chest radiograph (postero-anterior view) showing bilateral frontal opacities

intravenous furosemide. Her oxygen saturation gradually improved to 95% with supplemental oxygen. Blood was submitted for culture and sensitivity which was negative.

The patient eventually recovered completely with supplemental oxygen through oxygen mask followed by assisted mechanical ventilation and was discharged from hospital care by the 10th day.

DISCUSSION

TRALI has often been discussed in the literature as being related to transfusions. It is the third most leading cause of transfusion related mortality.⁷ It is defined as non-cardiogenic pulmonary oedema temporally related to blood transfusions. Its fulminant presentation is similar to acute respiratory distress syndrome (ARDS), but, unlike ARDS, is not fatal, and often resolves within 96 hours with no permanent respiratory sequelae.⁸

According to American European Consensus Conference and Canadian Consensus conference^{9,10} TRALI was classified into “suspected TRALI” and “possible TRALI”. “Suspected TRALI” was defined as occurrence of bilateral diffuse infiltrates on frontal chest radiograph during or within 6 hours after transfusion with a arterial oxygen tension (paO_2) to fraction of inspired oxygen (FIO_2) ratio less than 300 hypoxaemia SpO_2 less than 90% while breathing room air, or clinical evidence of hypoxaemia in a patient who has not showed any evidence of left atrial hypertension. “Possible TRALI” was defined by the same diagnostic criteria as those of the suspected TRALI, but it refers to the case in which the patient has other acute pulmonary risk factors such as sepsis, aspiration, near-drowning, disseminated intravascular coagulation, trauma, pneumonia, drug overdose, fracture, burns, and cardiopulmonary bypass in addition to a transfusion.

“Possible TRALI” should be kept in mind primarily when respiratory symptoms are

accompanied by fever or hypotension within two hours following transfusion as in this case.¹¹

Experimental and clinical evidence suggests that TRALI results from the reaction of donor antibodies with recipient leucocytes. HLA class II and class I antibodies, especially anti-HLA A2, are the most common culprits.¹²

Usually the donors implicated in TRALI cases are multiparous females because of previous alloimmunisation. There are no specific tests to confirm TRALI. However, laboratory testing is required to rule out other possibilities of a transfusion-related reaction. Haemolytic transfusion reaction cannot be ascertained as there is no clinical and laboratory evidence of transfusing incompatible blood like falling haemoglobin and increase in serum bilirubin. Transfusion associated circulatory overload (TACO) can be ruled out as the patient had hypotension (in contrast to hypertension in TACO) and there was no response to diuretic therapy (rapid response will be seen in TACO). Bacterial contamination of transfused blood products is less likely in view of a sterile blood culture. Thus, TRALI is a diagnosis of exclusion. Confirmatory and definitive evidence for the diagnosis of TRALI requires investigating the donor and recipient for passively transfused antibodies but due to lack of availability of the tests, they cannot be done in this patient.

In a majority of cases, TRALI is a self limiting condition. The therapeutic approaches reported are based on general principles and intuitive reasoning. First, transfusions should be stopped; supplemental oxygen should be administered, and auxiliary treatment should be done. Moreover, blood should be transfused to patients based on strict strategies so that transfusion-related complications including TRALI can be reduced.

Recurrent TRALI has been reported in a few cases, so the indications for future transfusions

should be scrutinized.^{7,13} TRALI can be avoided by strictly adhering to evidence based transfusion guidelines such as avoiding donations from high risk donors especially multiparous females and minimizing unnecessary usage of plasma. Another strategy to prevent TRALI is antibody testing of the donors for HLA and human neutrophil antibodies. Using pooled or solvent detergent treated plasma can also prevent most of the cases of TRALI.

TRALI is emerging as one of the most common causes of self-limiting, yet potentially life-threatening, transfusion associated morbidity, and diagnosis requires a high degree of suspicion. Correct diagnosis is important as diuretics are contraindicated and hypovolaemia needs to be corrected. Treatment is mainly supportive, with a significantly better prognosis compared to other causes of acute lung injury. Appropriate usage of blood and blood components in clinical settings may reduce transfusion related adverse events like TRALI. Suspicion of TRALI should be reported to the blood transfusion service so that appropriate action can be taken to prevent future morbidity and mortality in other patients.

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