

Discussion/Case Studies

Transfusion Associated Lung Injury

Presented by: Christy P. Beal, MT (ASCP)
Clinical Services Technical Specialist
American Red Cross Blood Services
Southern Region, Douglasville, GA

Definition

New acute lung injury occurring during or within six hours after a transfusion, with a clear temporal relationship to transfusion, in patients without or with risk factors for acute lung injury other than transfusion.

Clinical Recognition

- ❑ In 1999, TRALI was the third leading cause of transfusion-related mortality in the U.S.
- ❑ From 2001-2003, it was the *leading* cause of transfusion-related fatality reported to the FDA
- ❑ Look back studies have demonstrated that TRALI may be underreported because it lacks clinical recognition

Proposed Mechanisms

1. Immunologic

Granulocyte antibody-antigen model
(incompatibility between donor and recipient)

2. Non-immunologic

The two-event (neutrophil priming)
hypothesis

Diagnosis

- Clinical and radiographic
- Not dependent on laboratory test results

Clinical Presentation

- Bilateral fluffy infiltrates on chest x-ray
- Severe hypoxemia leading to shortness of breath and dyspnea
- Tachycardia
- Fever
- Hypotension (sometimes hypertension)
- Cyanosis

Laboratory Work Up

- Why are laboratory work ups important?
 - Limited value in the acute setting
 - Critical for donor management

Laboratory Work Up

Complete case work up requires both donor and recipient specimens

- Donors-Test for HLA Class I and II antibodies and HNA-specific antibodies
- Recipient (patient)-HLA type, neutrophil type or a crossmatch between donor serum and patient cells

Donor Testing

- If initial HLA Class I or II reactivity is identified, testing for the specificity is required
- If HNA antibodies are detected, (ideally) their specificity should also be determined
- Laboratory capability for determining HNA antibody specificity is more limited than for HLA antibodies

Recipient Testing

A recipient (patient) blood specimen containing adequate cells for crossmatching and/or HLA and/or neutrophil typing should be obtained as soon as possible after the TRALI episode by the transfusing facility and sent to the blood center

Implicated Blood Products

- All blood products (including IVIG)
- Most implicated products are plasma-rich components such as plasma and apheresis platelets
- 71% of TRALI fatalities are associated with female donors with a history of pregnancy

Case Study #1

Case #1

The patient is an 82-year old male with squamous cell carcinoma of the larynx who came into the outpatient unit to receive packed red blood cells for symptomatic anemia following chemotherapy. The patient had no past transfusion history at this facility.

Case #1

At the end of the second transfusion, he developed chills and shortness of breath. The patient was transferred to the ER for treatment, where it was noted that he had developed a fever of 102 F and bilateral diffuse patchy infiltrates on chest x-ray. The work up was negative for hemolytic transfusion reaction and laboratory findings by the blood bank are as follows:

Case #1-Laboratory Findings

	Pre-Transfusion	Post-Transfusion
DAT	Negative	Negative
Antibody Screen	Negative	Negative
Crossmatch	Compatible	
Plasma/Serum Hgb	Moderate	Moderate
Plasma/Serum Color		

Case #1

Upon receipt of these findings, the donors implicated in the case were placed in temporary deferral status until WBC antibody screenings could be performed. Each donor was screened for the presence of HLA and platelet specific antibodies.

Case #1

A neutrophil study was also performed. HLA antibody screening detected no presence of HLA antibodies in any of the three donors tested. No platelet-specific antibody (i.e. HPA1) was detected. Neutrophil antibody screenings were found negative. There was no patient specimen submitted for study.

Is this a TRALI? Why or why not?



Case Study #2

Case #2

The patient is a 76 year old female who had been admitted to the hospital with thrombocytopenia and bleeding. Her platelet count was 2,000. She was given one unit of platelet pheresis at which time she developed increased blood pressure, increased heart rate, rigors and lumbar pain. No fever or shortness of breath was noted.

Case #2

Crossmatch of the unit was negative. A patient specimen was sent to ARC for platelet and HLA antibody screen. It was reported that the patient tested positive for HLA antibody presence with a 95% PRA (anti-HPA-1 was also detected). Further history revealed the patient had received red cell transfusions 10 days prior to this event.

Case #2

The donor implicated in this case was placed in temporary deferral until screened for HLA, platelet-specific and neutrophil antibody presence. The donor was reported as negative for all the aforementioned screenings.

Is this TRALI? Why or why not?

Case Study #3

Case #3

The patient is a 49-year old female who developed severe respiratory distress after receiving a single unit of FFP prior to elective surgery. The patient has no history of transfusion at this facility.

Case #3

Approximately 45 minutes into the transfusion, the patient developed chills, fever of 102 F and shortness of breath which progressed to complete respiratory failure that required intubation, O2 and mechanical ventilation. Blood pressure also decreased. There was no myocardial injury.

Case #3

Patient specimens were collected and forwarded to ARC Carolinas HLA laboratory for studies. Improvement was observed 96 hours after onset, but the patient was observed as still having pulmonary infiltrates at seven days.

Case #3

The patient was screened and found to be negative for HLA, neutrophil and platelet-specific antibody presence.

The donor was found to be negative for platelet specific and neutrophil antibodies, but HLA Class I antibody was detected with a 24% PRA.

Case #3

Further testing revealed the donor's antibody specificity as anti-HLA-A2, A23, A24. The donor is a 54-year old female with 290 previous donations with no transfusion reactions reported. She has a history of three pregnancies more than 30 years ago.

Is this TRALI? Why or why not?

Questions?