HLA Class II Antibodies in TRALI

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TRALI - Case Study

• 69 year old female
• hospitalized with 2 week history of vaginal bleeding and recent near syncope
• Labs
  – Hgb 13.1 g/dL
  – platelets 156,000/µL
  – INR 4.0, was 5.8 two days prior
TRALI - Case Study

- Past medical history
  - prior hospitalization for syncope secondary to an arrhythmia
  - coumadin therapy
- Patient was transfused with 1 unit (200 mL) of FFP and experienced a severe TRALI reaction
- Intubated and transferred to ICU

S M F BLOOD CENTERS
TRALI CASE WORK UP

- FFP donor negative for HLA class I (AHG-CDC) and granulocyte antibodies
- PMN “priming” activity has never been shown in FFP
- Recipient received no other blood products
Can HLA Class II Antibodies Cause TRALI?

- Flow cytometry showed that donor serum contained class II HLA antibodies, to DR53 and DR51.

- The recipient’s HLA DR phenotype was DR-1, -4, -53.
Single Donor TRALI Cases

- 17 cases
  - granulocyte Abs in donor (2)
  - granulocyte Abs in recipient (1)
  - HLA I Abs in donor (1)
  - HLA II Abs in donor (4)
Single Donor TRALI Cases

- 17 cases
  - HLA I and II Abs in donor (5)
  - HLA I and II Abs in recipient (1)
  - HLA II in donor; HLA I and II in recipient (1)
  - no HLA or granulocyte Abs (2)
TRALI Prevention

• 10 of 17 cases would not have been prevented by screening blood donors for granulocyte Abs and HLA class I Abs by AHG-CDC

• FlowPRA™ used to detect HLA class I and II Abs is a research test which is extremely labor intensive
Cases not detected by Ab screening

- No Ab detected (2)
- HLA class II Ab only (4)
- Granulocyte Ab in recipient (1)
- HLA Abs in recipient (1)
- HLA class I Ab detected on flow (1)
- HLA class II in donor, class I and II in recipient (1)
Single Donor TRALI Cases

Components Implicated

- PLTS: 36%
- RBCs: 35%
- FFP: 29%
Do antigen-antibody reactions cause TRALI?
Do Antibodies Cause TRALI?

- The presence of Abs in donors implicated in TRALI is too high to be coincidence.
- The presence of antibodies in donors implicated in TRALI does not prove a causal relationship.
- Do the Abs found in the donor correspond to the recipients white blood cell antigens?
DO Antibodies Cause TRALI

- 11 cases with recipient wbc typing
- 4 cases donor Ab corresponds to recipient antigen
- Ab specificity can be hard to determine if multiple antibodies are present
<table>
<thead>
<tr>
<th></th>
<th>Ab in donor</th>
<th>Ag in recipient</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>HLA A24</td>
<td>HLA A24</td>
</tr>
<tr>
<td>2</td>
<td>Gran 5b</td>
<td>Gran 5b</td>
</tr>
<tr>
<td>3</td>
<td>HLA DR51</td>
<td>HLA DR51</td>
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<tr>
<td>4</td>
<td>HLA B62, DQ3</td>
<td>HLA B62, DQ3(?)</td>
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TRALI Look Back
TRALI Look Back

• 54 y/o G3P2A1 female implicated in a TRALI reaction
• Work up revealed a strong granulocyte 5b antibody in her plasma
• First time donor had been implicated in TRALI
• Frequent donor of more than 15 years
TRALI Look Back

• FDA requested look back for evidence of TRALI in prior recipients of this donor’s plasma
TRALI Look Back

- Transfusion service medical directors asked to review recipient’s charts to look for evidence of TRALI
TRALI Look Back

- Donor made 28 plasma donations that were transfused in the previous 12 months

- The recipient’s clinical condition precluded evaluation of TRALI in 4 cases
TRALI Look Back

- 9 of 24 (37.5%) transfusions were associated with a transfusion reaction
- Mild to moderate reactions (fever, chills, dyspnea or O₂ desaturation) were reported in 4 (16.7%) transfusions
- Severe reactions (acute pulmonary edema or mechanical ventilation) were reported in 5 (20.8%) transfusions
TRALI Look Back

• Only 4 of 9 (44%) reactions (3 mild, 1 severe) were reported to the hospital transfusion service

• Only 2 of 9 (22%) reactions were reported to the blood supplier
TRALI Summary

- HLA Class II antibodies are associated with TRALI
- Screening blood donors for white cell antibodies will not prevent numerous cases of TRALI
- TRALI is under recognized
- TRALI is under reported