Immunohematology Case Studies
2018 - #1

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Clinical History

A 31 year old female
33 weeks pregnant
Diagnosed with myxedema
Presented with anemia & low platelet count
Referred from a rural hospital of North Karnataka, for solving of blood group discrepancy
SeroLogic History

Patient blood group was recorded as O positive at the Primary Health center
Patient had history of one abortion and received 6 units of platelet (RDP) transfusion for thrombocytopenia
Current Sample Presentation Data

ABO/Rh:
Red cell typing: O RhD Positive
Serum typing: A
DAT: Negative
Antibody Screen Method: Column Agglutination & Tube
Antibody Screen Results: Negative
### Current Sample Presentation Data

**Blood typing by Column Agglutination**

<table>
<thead>
<tr>
<th>Anti-A</th>
<th>Anti-B</th>
<th>Anti-D</th>
<th>A₁ cell</th>
<th>B cell</th>
<th>O cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>+4</td>
<td>0</td>
<td>+3</td>
<td>0</td>
</tr>
</tbody>
</table>

A, B, D antisera: Ortho Clinical Diagnostics  
Reagent red cells: In house prepared pooled cells  
A₁ & H lectin: Tulip diagnostics  
  - Anti-A₁ lectin: Negative  
  - Anti-H lectin: Negative  
  - Anti-H (plasma from Bombay group): Negative  
Autocontrol: Negative  
DAT: Negative
Further Work-up to Determine if A Antigen Present

1. If patient is weak A phenotype, then why is H lectin negative
2. If patient is Bombay phenotype, why is 3 cell panel & O cells negative
3. Blood group reporting of the patient was a challenge
Patient is Bombay phenotype since lacks H antigen. But possibility of weaker variant of A has to be ruled out. Need explanation of absence of anti-H in the patient.
Further Work up

Cold Adsorption & Heat Elution

• Patient’s Packed cells + “B” group plasma: adsorption at 4C
• Elution at 56C waterbath
  • Patient’s eluate + A1 cell – Negative
  • Pos Control Eluate + A1 cell – Positive
  • Neg Control Eluate + A1 cell – Negative

• No signs of weak A antigen on red cells
Further Work up

Compatibility Testing

1. Compatible with O donor cells
2. Compatible with A1 donor cells
Further Work up

Saliva testing (a type of ABH neutralization test)

<table>
<thead>
<tr>
<th></th>
<th>For A</th>
<th>For B</th>
<th>For H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>0</td>
<td>2+</td>
<td>0</td>
</tr>
<tr>
<td>Neg Control</td>
<td>2+</td>
<td>0</td>
<td>2+</td>
</tr>
<tr>
<td>Pos Control</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Further Work

Interpretation from saliva test results:
Patient is
• Secretor of A
• Non secretor of B
• Secretor of H
Updated Clinical Information

• Patient was reported as Para Bombay Phenotype, i.e. a patient with an inactive \textit{FUT1} gene but of the Secretor type

• Having weak or absent anti-H activity, that should mostly be considered as anti-HI

• Patient received one unit of red cell transfusion during child birth from Bombay blood group donor & transfusion was uneventful
Further Testing Results and Interpretations

Saliva testing suggested the patient is secretor of A & H
Cold adsorption & heat elution results ruled out possibility of weak A subgroup
Further work up confirmed Para Bombay phenotype
Conclusions

Classical Bombay group is \( hh/sese \), i.e., lacking both H and Secretor gene function, whereas persons with \( hh/Sese \) or \( hh/SeSe \), lack H antigen on RBCs but possess it in secretions and are referred to as para-Bombay or RBC H negative secretors.
Summary of Case Challenges

During blood typing forward & reverse were not matching
Bombay phenotype could not be concluded due to absence of anti-H
Older serological techniques like cold adsorption & heat elution as well as saliva testing for secretor status helped in confirming Para Bombay Phenotype
Molecular investigation of the FUT1 and FUT2 genes available in some IRLs are also useful tools to confirm those rare phenotypes
Lessons Learned by the Case

- Blood group forward & reverse interpretation needs careful interpretation
- The reported prevalence of Bombay and para-Bombay phenotypes in Indians is reportedly 1/10,000 in different studies.
- However, since anti-H is not routinely used in blood grouping, many cases may remain undetected.
References


