How easy is it to identify common antibody mixtures using only one antibody screen and panel combination?

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Introduction

35/106 (33%) haemolytic transfusion reactions reported to SHOT (2012-2015) involved mixtures of antibodies.

In March 2017, UK NEQAS (BTLP) distributed a sample containing anti-c+K. 26/353 (7.5%) UK and Republic of Ireland laboratories were unable to complete antibody identification and submitted screen and panel antigens to support their conclusion; the suitability of these to fully identify anti-c+K varied by supplier. Whilst the antigens submitted in response to the March exercise were not representative of all suppliers (as submissions were only made by laboratories who could not complete their investigation), interesting differences were noted.

Subsequently, suppliers of reagent red cell panels to the UK were invited to submit antigens to allow a more representative comparison, and five out of six responded.

Methods

For each supplier, the three most recent antibody panels were paired with a 3-cell screen with the closest expiry. These combinations were used to determine whether some common antibody mixtures (anti-c+K, anti-E+Fya, and anti-E+K) could be positively identified by IAT (and enzyme where required), and all common clinically significant antibodies excluded without the requirement for further cells. An enzyme IAT panel was not considered part of a first line panel.

Positive identification and exclusion of antibodies was based on the 2012 BSH guideline on Compatibility Testing.3

Results

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Anti-c+K</th>
<th>Anti-E+Fya</th>
<th>Anti-E+K</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Identify</td>
<td>Identify = Both antibodies positively identified using BSH criteria</td>
<td>Exclude = All clinically significant antibodies excluded using BSH criteria</td>
</tr>
<tr>
<td>B</td>
<td>Identify</td>
<td>Exclude</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Identify</td>
<td>Exclude</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Identify</td>
<td>Exclude</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Identify</td>
<td>Exclude</td>
<td></td>
</tr>
</tbody>
</table>

Chart legend

No combination allowed positive identification of anti-K in the presence of anti-c, although all panels had one c-, K+ cell, which would indicate the presence of an additional antibody.

Only 2/15 combinations (both from Supplier B) allowed exclusion of clinically significant antibodies.

Conclusions

This limited study demonstrated variation in effectiveness of screening and ‘first-line’ panel cells from different suppliers in identifying common antibody mixtures. It may be useful to compare the antibody panel production specifications used by manufacturers, to determine the most suitable reagents for use locally to enable rapid antibody identification, and avoid unnecessary delays in blood issue. A full review of this nature may be beneficial to laboratories prior to selection of a supplier, especially where technology limits the choice of reagent red cells available.

The frequency of antibodies seen in clinical laboratories may be different, depending on patient type and local population. Manufacturers often have to satisfy the requirements of a global market and cannot always tailor their products to the Red Book Guidelines.3

The probability of completing antibody identification is improved with a well designed screen and primary panel combination, and with access to an enzyme panel and/or additional IAT panels; however, it is never possible to guarantee that antibodies will not be masked in some mixtures. The solve rate for anti-E+Fya was 9/15 combinations (both from Supplier B) allowed exclusion of clinically significant antibodies apart from one from Supplier A which did not allow exclusion of anti-S.

References

1 Milkins, C., personal communication by email. 28/04/2017.

(1) Milkins, C., personal communication by email. 28/04/2017.