**Evaluation of IH-1000 on automated ABO-Rh typing and irregular antibody screening**

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### Background

- **IH-1000** (Bio-Rad Laboratories, Hercules, CA, USA),
  - a fully automated system for blood typing
  - uses gel technology
  - very high throughput and the largest load capacity

### Aim of this study

- to evaluate the ABO/D grouping and antibody screening test of the IH-1000 compared to standard manual methods

### Materials & Methods

- **Sample:** EDTA blood samples from patients drawn within 24 hours were collected. 373 samples for ABO/D grouping and 303 samples for irregular antibody screening were tested.

#### IH-1000 system

- **ABO/D grouping**
  -DiaMed ID-DiaCell and DiaClon ABO/D + Reverse Grouping Card was use for ABO-RhD typing
  - 5% preparation of blood sample with diluent 1(0.8% LISS)
  - **Cell typing:** dispense 25µl of red cell suspension to micro tubes(A,B,D,Ctl)
  - **Serum typing:** dispense 50µl of “ID-DiaCell A1” and “ID-DiaCell B” to micro tube A and B, System dispense 50µl of the patient serum or plasma to both micro tubes A1 and B of the ID-Card.
  - **Incubated:** for 10 minutes and RT in the system → Centrifugated for 10 minutes in the system → reactions read by the integrated camera of the system → interpreted with software.

#### Antibody screening:

- DiaMed LISS/Coombs and DiaMed ID-DiaCell I and II was used for antibody screening
- System dispense 50µl of ID-DiaCell I, II to Micro tubes of ID-Card, and dispense 25µl of the donor plasma or serum to micro tubes of the ID-Card → incubate for 15 min 37°C → centrifuged for 10 min → read by integrated camera → interpreted with software.

#### Comparative method

- Manual tube methods for the ABO/D grouping
- Micro-column agglutination methods (DiaMed-ID system, DiaMed Ltd, Switzerland) for antibody screening
- Antibody identification : kits from DiaMed and BioRad

### Result

1. **ABO-Rh typing**

Total of 373 blood samples for ABO-RhD typing (O+:107, A+:140, B+:93, AB+:32, O-:1) were compared, and there was complete concordance between the QWALYS-3 and the manual methods for determining the ABO and RhD grouping.

2. **Irregular antibody screening & identification**

- 303 cases were compared, and both positive results were 10 cases
  - (anti-E and c : 4 cases, anti-E : 3 case, anti-D : 1 case, anti-M: 1 case, and anti-Xg : 1 case) and both negative results were 289 cases.
- 3 samples showed positive in IH-1000 and negative in manual method.
- 1 anti-E Ab was identified and revealed false negative of manual method
- 2 cases were false-positive reactions of IH-1000 system.

### Table 1. The comparison of results of ABO/D typing

<table>
<thead>
<tr>
<th>Blood groups</th>
<th>Manual method</th>
<th>IH-1000</th>
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</thead>
<tbody>
<tr>
<td>A+</td>
<td>140</td>
<td>140</td>
</tr>
<tr>
<td>B+</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>O+</td>
<td>107</td>
<td>107</td>
</tr>
<tr>
<td>AB+</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>O-</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table 2. The results of irregular antibody screening

<table>
<thead>
<tr>
<th></th>
<th>Manual</th>
<th>Discordance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IH-1000</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive(n=11)</td>
<td>10</td>
<td>3*</td>
</tr>
<tr>
<td>Negative(n=292)</td>
<td>1</td>
<td>289</td>
</tr>
</tbody>
</table>

* : 1 discordant result, which Anti-E Ab was identified in Ab identification.

### Conclusion

- The IH-1000 system had a good concordance rate compared to the manual method for ABO/D typing (100%) and the micro-column agglutination methods for antibody screening (98.7%).
- The possibility of false positive reactions for antibody screening in colored plasma (hemolytic or hyperglycemic) and false negative reactions (post transfusion dilution) was remained.
- IH-1000 showed high sensitivity and specificity, and can give accurate and reliable results, therefore can be used for routine pretransfusion testing in blood bank.