Platelet Antibodies in Infertility Patients

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SUMMARY

Background: Platelet antigens can stimulate the body to produce platelet alloimmune antibodies through blood transfusion, pregnancy, and autoimmunity. In the blood of pregnant women, anti-platelet antibodies can cause embryo implantation failure, abortion, etc. if they are present.

Methods: The platelet antibody was screened in 326 infertile patients (282 primary infertility and 44 secondary infertility) and 522 healthy controls in the physical examination center of our hospital by solid phase agglutination of red blood cells.

Results: The positive rate of anti-platelet antibody was 9.51% in the infertility group and 2.30% in the healthy control group. There was a significant difference between them ($\chi^2 = 4.51, p < 0.05$). The positive rate of anti-platelet antibody in the infertility group was significantly higher than that in the control group. The positive rate of anti-platelet antibody in the secondary infertility patients was significantly higher than that in the primary infertility patients ($\chi^2 = 1.62, p < 0.05$), and the positive rate of serum anti-platelet antibody increased gradually with the increase of infertility years.

Conclusions: The positive rate of anti-platelet antibody is closely related to infertility and gradually increases with the age of infertility.


KEY WORDS

infertility, platelet, antibody

INTRODUCTION

Human platelets have complex blood group antigens on their surface. Platelet antigens can stimulate the body to produce platelet alloimmune antibodies through blood transfusion, pregnancy and autoimmunity. In the blood of pregnant women, anti-platelet antibodies can cause embryo implantation failure, abortion, etc. if they are present. In this study, the solid phase agglutination method (simplified sensitized RBC platelet serology assay SEPSA) was adopted to screen platelet antibodies in infertile patients in this center to understand the correlation between infertility and platelet antibodies [1].
MATERIALS AND METHODS

General information
Three hundred twenty-six infertile women (including 282 primary infertile patients and 44 secondary infertile patients) admitted to the reproductive medicine center of our hospital from August 2018 to May 2019 received platelet antibody screening. They were 29 - 50 years old, with an average age of 35.3 ± 11.6 years. In addition, 522 healthy women aged 21 - 50 years old (35.6 ± 12.9 years old on average) were selected from the physical examination center of our hospital during the same period to be included in the observation group. There was no history of blood transfusion in the two groups, irregular antibody screening negative, and no significant difference in age and other aspects between the two groups (p > 0.05) with clinical comparability.

Instruments and reagents
Platelet antibody detection kit (solid phase agglutination method), and flat centrifuge were provided by Changchun Bode Biotechnology Co., Ltd.

Method of specimen preparation
Each blood sample was 3 mL, EDTA-K2 anticoagulated, centrifuged at 3,000 r/min for 5 minutes, and supernatant plasma was taken. The test procedure is strictly according to the reagent instruction. Results: the positive results showed that the red blood cells were spread flat at the bottom of the reaction hole, on the surface or only bound to part of the bottom. Negative: Red blood cells form an aggregation at the bottom center of the reaction hole.

Statistical analysis
Chi-square test was performed, and p < 0.05 showed statistical significance.

RESULTS

Infertility group and healthy control group anti-platelet antibody screening results
As shown in Table 1, there were 31 patients in the infertility group with positive serum anti-platelet antibody, with a positive rate of 9.51%. The positive rate was 2.30%, χ² = 4.51, p < 0.05, there was a statistically significant difference between the two.

Comparison of serum anti-platelet antibody examination results between primary infertility group and secondary infertility group
As shown in Table 2, the positive rate of the secondary infertility serum anti-platelet antibody was significantly higher than that of the primary infertility group (χ² = 1.62, p < 0.05), and the difference was statistically significant.

Relationship between serum antiplatelet antibodies and infertility years in the primary infertility group
As shown in Table 3, the positive rate of serum anti-platelet antibody increases gradually with the increase of age.

DISCUSSION

During normal pregnancy, the mother exhibits a pregnancy-immune tolerance to the embryonic semi-allogenic antigen. Abortion is closely related to maternal-fetal immune rejection caused by imbalance of maternal-fetal interface immune tolerance. The fetal platelets, white blood cells, etc. enter the mother’s blood, and the mother produces anti-platelet antibodies (including HLA antibodies and HPA antibodies) due to the incompatibility between the fetal and maternal HLA-1 antigens and HPA antigens [2].

The reagent used in this experiment can simultaneously detect HLA antibodies and HPA antibodies [1]. It has been reported in China that anti-platelet antibody test was conducted on female blood donors with pregnancy history, and the positive rate was as high as 6.2% [3]. In this study, the positive rate of anti-platelet antibody in 326 infertile patients was 9.51%, slightly higher than that of patients with parturient women or repeated abortions reported in the literature, which may be related to the fact that infertile patients themselves are comprehensive immune function defects (elderly patients with primary infertility are often accompanied by immune endocrine dysfunction). In the infertility group, the positive rate of anti-platelet antibody in the secondary infertility group was significantly higher than that in the primary infertility group, which may be related to the exchange of placental or fetal platelet components with the mother during pregnancy. This study also found that the longer the infertility age, the higher the possibility of producing anti-platelet antibodies. The specific reason is unknown. Studies have shown that platelet antibodies have a significant correlation with the incidence of early abortion, and those with positive platelet antibodies have a higher risk of early abortion than those without platelet antibodies [4]. Therefore, platelet antibody screening for infertility patients, especially those with multiple years of primary infertility, provides support for clinical immune regulation. At the same time, this study also suggested that patients with infertility or a history of pregnancy should not be involved in machine platelet collection, because the positive rate of anti-platelet antibodies is higher, so as to avoid that when it is applied to clinical patients, the anti-platelet antibodies in it will cause ineffective platelet infusion.

Availability of data and materials
All data and materials generated during and/or analysed during the current study are available from the corre-
Table 1. Correlation of antiplatelet antibodies between the infertility and healthy control groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Negative</th>
<th>Positive</th>
<th>Sum</th>
<th>Positive rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infertility</td>
<td>295</td>
<td>31</td>
<td>326</td>
<td>9.51%</td>
</tr>
<tr>
<td>Control</td>
<td>510</td>
<td>12</td>
<td>522</td>
<td>2.30%</td>
</tr>
<tr>
<td>Sum</td>
<td>805</td>
<td>43</td>
<td>848</td>
<td>5.07%</td>
</tr>
</tbody>
</table>

Table 2. Correlation of serum antiplatelet antibodies between the primary infertility and secondary infertility groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Negative</th>
<th>Positive</th>
<th>Sum</th>
<th>Positive rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>257</td>
<td>25</td>
<td>282</td>
<td>8.77%</td>
</tr>
<tr>
<td>Secondary</td>
<td>38</td>
<td>6</td>
<td>44</td>
<td>13.64%</td>
</tr>
<tr>
<td>Sum</td>
<td>295</td>
<td>31</td>
<td>326</td>
<td>9.51%</td>
</tr>
</tbody>
</table>

Table 3. Correlation between the number of years and the detection of anti-platelet antibodies in the primary infertility group.

<table>
<thead>
<tr>
<th>Group</th>
<th>Negative</th>
<th>Positive</th>
<th>Sum</th>
<th>Positive rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 years</td>
<td>80</td>
<td>4</td>
<td>84</td>
<td>4.76%</td>
</tr>
<tr>
<td>3 years</td>
<td>62</td>
<td>6</td>
<td>68</td>
<td>8.82%</td>
</tr>
<tr>
<td>&gt; 3 years</td>
<td>115</td>
<td>15</td>
<td>130</td>
<td>11.54%</td>
</tr>
<tr>
<td>Sum</td>
<td>257</td>
<td>25</td>
<td>282</td>
<td>8.86%</td>
</tr>
</tbody>
</table>

Corresponding author on reasonable request.

Ethics Approval:
The authors sincerely thank the participants for their help and willingness to take part in this study. This study was carried out in accordance with the recommendations of Medical ethics committee of the First Affiliated Hospital of Fujian Medical University.

Acknowledgment:
This work was supported by Medical innovation in Fujian Province (2020CXA030), Youth Fund of Fujian Provincial Department of Health (2019-1-41 and 2019-1-46), and Key Research and Development projects of JiangXi Province, China (No. 20171BBG70010). These funding sources played key supportive role for sample collection, molecular analysis of patient samples, bioinformatics analysis.

Declaration of Interest:
There is no conflict of interest to be declared.

References: