Post-Transfusion Non-A, Non-B Hepatitis after Cardiac Surgery

Prospective Analysis of Donor Blood Anti-HBc Antibody as a Predictive Indicator of the Occurrence of Non-A, Non-B Hepatitis in Recipients

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Abstract. We prospectively studied the incidence of post-transfusion non-A, non-B hepatitis in 64 cardiac surgery patients: 4 (6.25\%) developed non-A, non-B hepatitis after an incubation period of 4–10 weeks. Units of blood products from donors seropositive for antibody to hepatitis B core antigen (anti-HBc) were not associated with a greater risk of non-A, non-B hepatitis in recipients than units from seronegative donors. Our data indicate that donor blood anti-HBc testing is of no value as a screening method to reduce the incidence of post-transfusion non-A, non-B hepatitis.

Introduction

Since blood donors were routinely tested for hepatitis B surface antigen (HBs Ag), the incidence rate of post-transfusion hepatitis B has dropped. Consequently, the prevalence rate of non-A, non-B (NANB) hepatitis among post-transfusion hepatitis raised to about 90\% [1]. Specific tests for NANB virus infection are still lacking, and antibody to hepatitis B core antigen (anti-HBc) has been proposed as an indirect marker predictive of the occurrence of NANB hepatitis in recipients [2–4]. In the present study, we aimed at defining the effectiveness of donor blood anti-HBc screening to predict the occurrence of NANB hepatitis in recipients.

Materials and Methods

Patients

64 patients undergoing cardiac surgery with extracorporeal circulation participated in this study: 46 (72\%) were men, 18 (28\%) were women. Their mean age (±1SD) was 52±13 years (range 19–72 years). Blood samples were taken from each patient just before operation and at 2-weekly intervals during 5 months after operation. All samples were tested for HBs Ag (Austri-II 125\%), Abbott Laboratories, North Chicago, USA), anti-HBs (Ausbab\textsuperscript{©}, Abbott), anti-HBc (Corab\textsuperscript{©}, Abbott), HBs Ag and anti-HBe (Abbott-HBe, Abbott), anti-hepatitis A virus IgM (anti-HAV, Havab\textsuperscript{®}, Abbott), anti-cytomegalovirus (anti-CMV; Enzymo-Cytomegalie\textsuperscript{®}, Behringwerke AG, Marburg, FRG), anti-Epstein Barr virus (anti-EBV; Institut Virion, Rüschlikon, Zürich, Switzerland), bilirubin, alanine aminotransferase (ALAT; UV test, Boehringer-Mannheim, FRG; upper normal limit 22IU/l at 25°C), aspartate aminotransferase (ASAT; UV test, Boehringer-Mannheim; upper normal limit: 18IU/l at 25°C), \gamma-glutamyltransferase (\gamma-GT; colorimetric method, Boehringer-Mannheim; upper normal limit 28IU/l at 25°C).

Patients were transfused during the preoperative and early postoperative periods only (none of them was transfused after a 1-week period following operation). A diagnosis of NANB hepatitis was made if, at least 30 days after operation, (a) there were elevated ALAT serum levels (>100IU/l in 2 consecutive samples or >40IU/l in 4 consecutive samples) without any serologic evidence of recent HBV, HAV, CMV or EBV infection, and (b) no obvious alternative diagnosis was found, such as alcoholic or drug-induced hepatitis.

Blood donors

All blood product units transfused to the 64 patients came from a group of 447 volunteer donors. All of them fulfilled the clinical qualification criteria commonly accepted in France and were seronegative for HBs Ag testing. All were tested for anti-HBc (Corab\textsuperscript{©}, Abbott): 427 (95.5\%) were seronegative for anti-HBc testing and 20 (4.5\%) were seropositive. Transfused blood products were red blood cells diluted in saline-adrenaline-glucose medium (RBC-SAG) and fresh frozen plasma (FFP) exclusively.
Table I. Numbers of blood product units received by the patients

<table>
<thead>
<tr>
<th>Blood product units</th>
<th>Patients without NANB hepatitis (n=64)</th>
<th>Patients with NANB hepatitis (n=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBC-SAG</td>
<td>269</td>
<td>10</td>
</tr>
<tr>
<td>Mean ±1 SD</td>
<td>4.2±3.1</td>
<td>2.5±1.3</td>
</tr>
<tr>
<td>Range</td>
<td>0–17</td>
<td>1–4</td>
</tr>
<tr>
<td>FFP</td>
<td>204</td>
<td>13</td>
</tr>
<tr>
<td>Mean ±1 SD</td>
<td>3.2±1.5</td>
<td>3.25±0.5</td>
</tr>
<tr>
<td>Range</td>
<td>0–10</td>
<td>3–4</td>
</tr>
</tbody>
</table>

NS = Not significant (p>0.05: Wilcoxon’s rank sum test).

Table II. Donor anti-HBc status and NANB hepatitis in recipients

<table>
<thead>
<tr>
<th>Donor anti-HBc status</th>
<th>Incriminated donors*</th>
<th>Recipients with NANB hepatitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>427 (95.5%)</td>
<td>23 (4/64 (6.25%))</td>
</tr>
<tr>
<td>Positive</td>
<td>20 (4.5%)</td>
<td>0 (0/64 (0%))</td>
</tr>
</tbody>
</table>

* Incriminated donors refers to donors of at least 1 blood product unit (RBC-SAG or FFP) transfused to a patient who developed NANB hepatitis.

Results

Post-Transfusion Hepatitis

During the 5-month follow-up period, 5 patients (7.8%) developed post-transfusion hepatitis: 1 patient had clinical and serological evidence of CMV hepatitis, while 4 patients, in whom no other causal agent could be incriminated, were considered as having NANB hepatitis. The incubation periods of the disease were 4 weeks (3 patients) and 10 weeks (1 patient). Among the 4 patients, jaundice was absent in 1 case and remained mild in 2 (maximum bilirubin levels: 25.6 and 32.5 μmol/l).

Amounts of Transfused Blood Product Units

Table I shows that patients who developed NANB hepatitis had not received significantly different numbers of RBC-SAG and FFP units as compared to those who did not.

Anti-HBc-Positive Donors and NANB Hepatitis in Recipients

25 blood product units (14 RBC-SAG and 11 FFP) from seropositive donors were transfused to 24 patients: none of them developed NANB hepatitis. As can be seen in table II, all blood products transfused to the patients who developed NANB hepatitis came from 23 anti-HBc seronegative donors.

Discussion

In our group of 64 patients, we found 4 cases of post-transfusion NANB hepatitis, giving an incidence rate of 6.25%. This figure is within the range of those found in other studies [5–8]. This incidence of 6.25% may be an underestimation, since follow-up was discontinued after 5 months. The prevalence rate of NANB hepatitis among post-transfusion hepatitis was 80% (4/5), similar to those found elsewhere [6, 7, 9].

Several data indicated that recipients of blood products from donors seropositive for anti-HBc testing were at greater risk to develop NANB hepatitis than recipients of blood products from seronegative donors [3, 4]. Therefore, anti-HBc could serve as an indirect screening test for donors who are likely to transmit NANB hepatitis. Our study failed to confirm the association between the donors’ anti-HBc seropositivity and enhanced risk of NANB hepatitis in recipients, since no case of NANB hepatitis developed among the 24 patients who received blood products from anti-HBc positive donors (the 4 patients with NANB hepatitis received blood product units from anti-HBc seronegative donors exclusively). Thus, 20 donors (4.5%) would have been discarded without any reduction of the incidence of NANB hepatitis in recipients. It appears from this study that the donors’ anti-HBc seropositivity has no predictive value for the
development of NANB hepatitis among recipients. Therefore, we cannot recommend anti-HBe testing as a screening method to reduce the incidence of post-transfusion NANB hepatitis. Larger studies, however, are needed to clearly assess this point.

References


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