The demand ratio and effective agents in blood transfusion in patients undergoing prostate surgery

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Abstract

Introduction:
Benign prostatic hyperplasia is a common disease in men for which surgery is a method of treatment. In some cases, due to bleeding transfusion is required during the surgery. In this study, the need for blood transfusion and its effective factors in the candidates of surgical intervention were investigated because of benign prostatic hyperplasia.

Materials and Method:
In this descriptive cross-sectional study, the ratio of transfusion and effective factors was analyzed in 700 referred patients undergoing prostatic surgery in Imam Reza hospital during 1386-1389.

Results:
Of total 700 patients, only 14 received blood (2%). As to the type of surgery, 64.3% in the transfused group, and 28.8% in the group without transfusion underwent suprapubic surgery; the difference between them was significant statistically (p=0.01). 50% of the patients in the transfused group, and 86.4% in the group with no transfusion had HCT<35; this difference was also significant (p=0.002). Other factors such as age or basic disease were not significantly different in the two groups.

Conclusion:
Due to the low percentage of transfusion (2%), its relationship with the type of surgery, HCT, and the costs of blood storage and crossmatching, it is suggested that only for cases with HCT less than 35 and candidates of suprapubic surgery packed cells should be reserved. For other patients, other tests such as antibody screening can be used. This test is less expensive and easier than the previous tests; in addition, in this type it is not necessary to prepare blood before surgery.

Keywords: Transfusion, Blood, Prostate, Surgery
of Imam Reza Hospital, at least two units of packed red blood cells are prepared for patients before every surgery. The present study was conducted because the amount of blood needed for transfusion was not known. Furthermore, cross-match method is used as a common method for blood preparation compared with transfusion. Besides, storage and preparation of blood units are costly for hospitals and most of the stored blood units may remain unused and be dismissed from the operation cycle. Thus, this study was conducted to determine the amount of blood needed for in prostate surgeries and factors that influence it, to establish the usual time needed for blood administration and to use valid blood preparation methods.

**Materials and Methods:**
In this descriptive-analytical study, 700 patients with benign prostatic hyperplasia who underwent surgical intervention between March 2007 and August 2010 were studied. Usually, prostate surgery candidates, either for open prostatectomy or for transurethral surgery, are hospitalized the day before the surgery and blood test and other routine tests are requested for them. Additionally, 2 or 3 units of packed red blood cells are stored for each patient with no exception, which requires doing blood compatibility tests such as cross-match in blood bank and storing at least two units of blood.

In this study, first, the patients were divided into two groups of under 70 and over 70 years old. By studying patients’ files and information in the blood bank, it was revealed that few patients had received blood as a result of bleeding during their surgery. Considering that one of the objectives of this project was to investigate the possibility of no blood storage for all patients before surgery, which required determining the factors affecting transfusion increase in these patients, various variables including age, operation type, preoperative hematocrit, underlying disease and amount of received blood units were investigated.

**Statistical Analysis:** Data were collected, and analyzed in SPSS software. Tables and figures were used for data description and t-test and Chi-square test were used for data analysis.

**Results:**
Only 14 out of 700 patients (2%) had received blood. In terms of the operation type, 64.3% in those who received blood and 28.8% in those who did not receive blood had open suprapubic operation. Also, 35.7% of those who received blood and 71.2% of those who did not receive blood had transurethral surgery, which had a statistically significant difference (p=0.01). Age and underlying disease variables did not show statistically significant differences in terms of blood transfusion (p>0.05). Half of 700 patients of those who received blood had hematocrit more than 35% and 86.4% of those who did not receive blood had hematocrit below 35%, which was statistically significant (p=0.002).

<table>
<thead>
<tr>
<th>Blood receiving</th>
<th>Yes</th>
<th>No</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>number</td>
<td>percent</td>
<td>number</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 70</td>
<td>9*</td>
<td>64.3</td>
<td>467</td>
</tr>
<tr>
<td>Under 70</td>
<td>5</td>
<td>35.7</td>
<td>219</td>
</tr>
<tr>
<td>Operation type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suprapubic</td>
<td>9</td>
<td>64.3</td>
<td>487</td>
</tr>
<tr>
<td>175 people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transurethral</td>
<td>5</td>
<td>35.7</td>
<td>199</td>
</tr>
<tr>
<td>525 people</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 53.8% (8 people) of them received blood after surgery, 23.1% (3 people) during surgery and 23.1% (3 people) before surgery.
Table 2: Frequency distribution of blood receiving in terms of operation type and hematocrit

<table>
<thead>
<tr>
<th>Blood receiving Operation Type</th>
<th>Yes hematocrit &lt; 35</th>
<th>Hematocrit &gt;35</th>
<th>No hematocrit &lt; 35</th>
<th>Hematocrit &gt;35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suprapubic</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>33.3</td>
<td>66.6</td>
<td>17.6</td>
<td>82.4</td>
</tr>
<tr>
<td>Transurethral</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>20</td>
<td>11.9</td>
<td>88.1</td>
</tr>
</tbody>
</table>

* Other variables like age and underlying disease did not show statistically significant difference (p<0.05).

Discussion:
In the present study, only 14 out of 700 people had received blood during the surgery. In terms of prostate resection surgery type, 64.3% of those who received blood and 28.8% of the other group had open suprapubic operation, which had a significant difference. Half of those who received blood and 86.4% of the other group had hematocrit under 35%, which was significantly different. For other variables like age and underlying disease, no significant difference was observed in blood transfusion. In the study conducted by Fujitaka on 417 patients under transurethral surgery in Tokyo, Japan, it was reported that the most effective factor on bleeding was prostate weight (3). Levine et al. expressed that in case the surgeon is experienced and prostate weight is less than 30 g, preoperative cross-match is not needed at all (4). In some papers also, no need for preoperative blood storage has been emphasized. For example, in the study in Dendrites Hospital, it was expressed that transfusion was performed in 13% of prostate surgeries. Therefore, there was no need for the conventional preoperative blood storage (7-5). In a research by Gratzek et al. in a hospital in Germany, only 7.5% of patients needed blood transfusion after prostatectomy (8). Moreover, Robertson at al. showed that increasing demand for blood during selective surgeries could lead to preoperative cross-match. The results of a questionnaire filled by 86% of urology wards of British hospitals demonstrated that 41% of these wards still cross-matched two stored blood units before transurethral prostatectomy while only 11% of the patients needed blood transfusion. Also, the factors which affect blood transfusion included prostate weight and proper homeostasis (9).
However, based on the variables of this study, blood storage can be performed considering operation type and hematocrit; in other cases, it is not needed. For example, in patients with high blood hematocrit, there is no need for blood storage. Since even one patient may need urgent blood transfusion during a surgery and the absence of blood and its cross-match may lead to his/her death, more research is required to be conducted on cheaper and easier methods for blood transfusion. Antibody screening is one of the methods, commonly done for every blood bag and its information is sent along with the blood bag. Thus, while hospitalizing each patient, a couple of blood drops should be sent to blood banks for screening in order to properly determine unexpected antibodies in the blood serum of patients and record it in the medical record. Therefore, without the need for blood storage, every time a patient needs blood transfusion, compatible blood can be transfused based on the information recorded in the file.

Conclusion: Considering the few blood transfusion cases during surgery (2%), its relationship with operation type and hematocrit, costs of storage and cross-matching, not using stored blood bags and their dismissal due to frequent cross-matching, it is recommended to store blood only for the two mentioned groups.
For the rest, only antibody screening can be applied, which is much cheaper and does not need blood storing.

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References: