The efficacy and equity of retransplantation: an experimental survey of public attitudes

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Abstract

Purpose: To measure the relative importance people place on prognosis and retransplantation status in allocating scarce transplantable livers. Methods: 138 subjects were asked to distribute scarce livers amongst transplant candidates with either a 70% chance or a 30% chance of surviving if transplanted. In one group of subjects, the prognostic difference was based on the presence or absence of a ‘blood marker.’ In the other group, the prognostic difference was based on whether candidates had been previously transplanted or not, with retransplant candidates having a 30% chance of surviving if transplanted. Results: Subjects answering the retransplantation survey gave a higher percentage of organs to the better prognostic group than subjects answering the blood marker survey, with a mean of 71.6% versus 65.0%, although this difference fell just short of statistical significance (P = 0.0581). Retransplantation survey respondents were significantly less likely to want to ignore prognostic information than were blood marker respondents (P = 0.026). Subjects in both survey groups were equally unwilling to abandon the poor prognostic group, with only 18% in each group choosing to give all the available organs to the better prognostic group. Conclusions: Respondents reacted more strongly to prognostic differences when they were due to retransplant status than to the results of a blood test. However, most people were not solely interested in the aggregate medical benefit brought by different allocation systems, but were also interested in the amount of benefit brought to the worst off.

Keywords: Transplantation; Equity; Prognosis; Ethics; Health policy

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The number of people who need liver transplants significantly exceeds the number of cadaver livers available for transplantation. This scarcity of organs has forced the transplant community to make difficult decisions about who should receive available organs. Should the transplant allocation system preferentially distribute organs based on candidates' age, race, income, prognosis, or other criteria [1]?

Recently, the first author has argued that the present allocation system should be changed in order to give primary transplant candidates a better chance of receiving available organs than retransplant candidates [2]. As the system stands now, recipients receive organs based on how far they live from an available organ, how well they match the available organ, how long they have been waiting for transplant, and how ill they are [3]. Once patients are listed for transplant, no attention is paid to whether they have previously been transplanted.

Some may argue that retransplant candidates are less deserving of transplantable organs than primary candidates. First, retransplant candidates are less likely than primary candidates to gain long-term survival from transplantation [2]. Second, apart from any difference in efficacy between primary and retransplant candidates, some may argue that it is not equitable to give some people a second transplant while others wait for their first. While few theories of justice would explicitly favor primary transplant candidates over retransplant candidates, such an allocation scheme might appeal to people's sense that 'we all deserve an equal share of the health care pie [2].'

On the other hand, some may argue that retransplant candidates are more deserving of transplantable organs than primary candidates. Transplant teams become attached to people they have transplanted, and may prefer a system that preferentially allocates organs to retransplant candidates. This view may be mirrored on a societal level; people may want to give preference to retransplant candidates because so many resources have been invested in their care, or because people feel it is wrong to abandon those who have already been transplanted.

To date, no one has examined the public's views on whether the transplant allocation system would give priority to primary or retransplant candidates. This oversight is unfortunate, because the success of transplantation depends, in large part, on public support. If we allocate organs amongst primary and retransplant candidates in ways that violate the public's values, it may damage the public's view of the whole transplantation process. Public support was crucial in Oregon's decision to reinstate funding of vital organ transplantation for its Medicaid recipients [4]. Willingness to donate cadaver organs may be tied to the public's acceptance of transplant policies [5]. The public's opinions on these issues may also provide broader insight into the values people consider relevant in distributing other medical resources. As we try to develop ways to ration health care, it will become increasingly important to find distribution schemes that do not conflict with widely held public values [6-8].

In this paper, we present findings from an experiment designed to measure the relative importance people place on prognosis and retransplantation status in distributing scarce transplantable livers. In addition, we examine whether people feel differently about making use of prognostic information when it is given to them versus ignoring the information altogether.
2. Methods

We surveyed people attending the annual flower show of the Pittsburgh Botanical Gardens. The subjects were recruited by posting a sign at a table announcing that those who filled out a survey would receive a free cactus. Those volunteering to fill out the survey were randomly assigned to receive one of two surveys. In both surveys (Appendix 1), subjects were asked to say how they would allocate 100 livers amongst 200 people who would otherwise die if not transplanted. In both surveys, the transplant candidates were divided into two groups, each consisting of 100 people. In the retransplantation survey, group 1 was made up of 100 people who had never before been transplanted and who were predicted to have a 70% chance of surviving if transplanted; group 2 was made up of 100 people who had previously been transplanted and who were predicted to have a 30% chance of surviving if transplanted. In the other survey, the candidates were also divided into groups of 100 people, with 70% and 30% chance of surviving if transplanted. However, no mention was made of whether any of the people had been transplanted before. Instead, they were divided into the two prognostic groups on the basis of a blood marker. Subjects were first asked to specify the percentage of organs that they wished to distribute to each group. Then they were asked whether, if given a choice, they would prefer to ignore the prognostic information.

3. Results

Seventy-one subjects completed the retransplantation survey and 67 completed the blood marker survey. The two groups did not differ significantly in either age or gender (Table 1).

Table 2 shows how subjects chose to distribute organs between the two groups of transplant candidates. Subjects answering the retransplantation survey gave a higher percentage of the organs to the better prognostic group than did subjects answering the blood marker survey, with a mean of 71.6% versus 65.0% ($t(136) = -1.91, p = 0.0581$ with two tailed t-test), although this difference fell slightly short of statistical significance. Table 3 shows that retransplantation respondents were significantly less likely to want to ignore prognostic information than were blood marker respondents ($\chi^2(1) = 4.93, p < 0.026$). Taken together, these findings show

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Male</th>
<th>Female</th>
<th>No information</th>
<th>Age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;20</td>
</tr>
<tr>
<td>No information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retransplant survey</td>
<td>17</td>
<td>48</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Blood marker survey</td>
<td>16</td>
<td>45</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 1
Characteristics of the respondents in the two survey groups
that respondents reacted more strongly to prognostic differences when they were due to retransplant status than to the results of a blood test.

Although the differences between the two survey groups are interesting, the similarities are also worth noting. Subjects in both survey groups were equally unwilling to abandon the poor prognostic group, with only 18% in each group choosing to give all the available organs to the better prognostic group. The remaining subjects chose to give some organs to the worse prognostic group. Both survey groups showed a cluster of responses in which respondents chose to give 70% of the organs to candidates with a 70% chance of survival (13 doing so in the blood marker group and 22 in the retransplant group). This distribution may have been common merely because the numbers 70 and 30 were placed in subjects heads by the prognostic figures. But an alternative explanation may also explain part of the frequency of this response. Work done by us (unpublished data) and others [10] suggests that some may have chosen this distribution thinking it would maximize the number of lives saved by transplant. In essence, people choosing this strategy may have thought that it might be possible to distribute 70% of the organs to those 70% likely to survive from the better prognostic group and distribute 30% to those 30% likely to survive from the worse prognostic group, a strategy which, if it succeeded, would indeed maximize the number of survivors.

A significant number of subjects in both experimental conditions chose to give equal numbers of organs to each group of candidates. Interestingly, when asked whether they would prefer to ignore the prognostic information and distribute the organs randomly (an action that is essentially equivalent to an egalitarian response

Table 2
Distribution of transplantable livers to the group with 70% chance of survival

<table>
<thead>
<tr>
<th>% of organs distributed to group #1 (with 70% chance of survival)</th>
<th>Blood marker survey respondents (n = 67)</th>
<th>Retransplant survey respondents (n = 71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50</td>
<td>4 (6)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>50</td>
<td>25 (37)</td>
<td>19 (27)</td>
</tr>
<tr>
<td>51–99</td>
<td>26 (39)</td>
<td>39 (55)</td>
</tr>
<tr>
<td>100</td>
<td>12 (18)</td>
<td>13 (18)</td>
</tr>
</tbody>
</table>

Percentages in parentheses.

Table 3
Number of subjects choosing to ignore prognostic information and distribute organs randomly

<table>
<thead>
<tr>
<th>No. of subjects choosing to ignore information</th>
<th>Blood marker respondents</th>
<th>Retransplant version respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignore information</td>
<td>43</td>
<td>31</td>
</tr>
<tr>
<td>Do not ignore</td>
<td>25</td>
<td>41</td>
</tr>
</tbody>
</table>
to the first survey question), more chose to ignore the information than the number who selected this allocation. When asked to distribute organs using the prognostic information, 44 of the 138 (32%) respondents favored an equal distribution of organs between the prognostic groups. Yet, 74 of the respondents (54%) would choose to ignore the prognostic information if they could, a significantly higher figure ($\chi^2(1) = 524.9, P < 0.001$). This suggests that some people will use prognostic information if they are given it, but would be happier not having the information in the first place.

4. Discussion

Our results show that respondents answering the retransplantation survey were more likely to distribute organs to candidates with better prognoses than were those who answered the blood marker survey. This suggests that people consider retransplant status to be a morally relevant allocation criteria above and beyond its effect on transplant efficacy.

How important is retransplant status in determining people’s allocation decisions? Although retransplantation survey respondents showed a systematic tendency to give more organs to the better prognostic group compared to the blood marker respondents, these differences were not very large. Some may argue that we would have shown a larger difference by giving all respondents both surveys and comparing within subject distributions under the two scenarios. While this approach has its advantages, our study design has its own advantages. First, subjects presented with identical questions about the two groups might think that they were expected to answer the questions differently. Second, they might recognize the central importance of the retransplant issue and exaggerate their responses to one or both surveys to give their own responses greater weight. Nevertheless, in future research it would be interesting to compare the responses in our between-subject design to those using a within-subject design.

Our study reveals several other interesting findings across the two survey groups. Fewer than 20% of respondents in both survey groups were willing to give all the organs to the better prognostic candidates. This is an important finding. The prognostic difference between the two groups of candidates is significant, and any departure from the survival maximizing choice will result in substantially lower rates of survival. To the extent that subjects were aware of this, this suggests that they placed a high enough value on equity to sacrifice up to 20 lives. It would be interesting to see how many would still be willing to make these tradeoffs if the number of lives lost by their allocation choices were made explicit, or if they were told that their decisions would apply to even larger groups of transplant candidates, thus multiplying the number of lives saved or lost.

Subjects’ reluctance to allocate organs solely according to survival rates may reflect the importance they place on other criteria, such as age, desert, personal responsibility or nationality of the candidates. Alternatively, their reluctance may reflect the difficulty subjects have abandoning any group of candidates, regardless of these other criteria. This reasoning would help explain why some respondents
chose to give over 90% of the organs to the better prognostic group, as if saying that although prognosis is important, some amount of organs should be set aside to give hope to the other candidates. Further work needs to be done to sort out the importance of these and other factors in guiding people’s allocation decisions.

Our findings raise important issues both for cadaver organ allocation and for health policy rationing in general. Respondents in our study sought, in general, to distribute organs in a way that balances efficacy and equity. They also acted as if retransplant status should be taken into consideration as an allocation criterion. Both of these findings contradict our present transplant system, which ignores efficacy and retransplant status in distributing scarce, vital organs.

These findings also have important implications for the role of utilitarianism, or efficacy maximization, in health care policy. When the public has been directly involved in health policy, it has not shown a tendency to be strictly utilitarian. For example, the State of Oregon created a cost-utility ranking of health services that it hoped to use to set allocation priorities. This list was soundly rejected by a public that did not think it captured their values [10]. Other empirical research suggests that people are not utilitarian when allocating scarce medical goods [11,12]. Our study provides further evidence that many people are not solely interested in the aggregate medical benefit brought by different allocation systems, but are also interested in the amount of benefit brought to the worst off.

Appendix: Survey instruments

The Director of a regional liver transplant network wants the public to help the network decide how to distribute scarce transplant organs. According to the Director, 200 people are waiting to receive a liver transplant. If they do not receive transplants within 1 year they will die. In that time, the Director predicts that only 100 transplantable livers will become available. Thus, 100 of these people will die before a liver becomes available.

**Blood marker survey**

- Group 1 (No blood marker): 70% chance of surviving if transplanted (100 patients).
- Group 2 (Blood marker): 30% chance of surviving if transplanted (100 patients) (Remember, patients not transplanted will die).

**Retransplant survey**

- Group 1 (First transplant): 70% chance of surviving if transplanted (100 patients).
- Group 2 (Second transplant): 30% chance of surviving if transplanted (100 patients).
(Remember, patients not transplanted will die.)

**Both surveys**

The question is: What percentage of livers should go to each group? (The total for the two groups should add up to 100%.)

- **Group 1:** 
- **Group 2:** 
- **Total:** 100%

Suppose the director could ignore the blood marker and distribute the organs randomly to 100 people, regardless of their group. Would you advise him/her to do so?

Yes No

**References**


