Outcome After Spontaneous Subarachnoid Hemorrhage Measured With the EQ-5D

Elisabeth Ronne-Engström, MD, PhD; Per Enblad, MD, PhD; Erik Lundström, MD, PhD

Background and Purpose—The EQ-5D measures quality of life based on self-reported health status in 5 dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. In this study, the EQ-5D was evaluated as an outcome measure for patients with subarachnoid hemorrhage.

Methods—The EQ-5D was completed in 710 patients 9 months after subarachnoid hemorrhage. Relevant demographic and clinical factors were evaluated as predictors of the 5 outcome dimensions in a series of linear regression models.

Results—Worse health status in mobility, self-care, and usual activities was predicted by increasing age and by a more severe disease as indicated by the presence of an aneurysm, worse clinical condition at admission, or more blood on the CT scan. Younger age and female gender predicted worse health status regarding anxiety/depression.

Conclusions—The evaluation of the EQ-5D reveals age-related differences in the nature of the challenges faced by these patients. (Stroke. 2011;42:3284-3286.)

Key Words: EQ-5D ▫ health-related quality of life ▫ outcome ▫ subarachnoid hemorrhage

Ideally, an outcome measurement should cover the essential aspects of daily life and still be easy to perform. This is especially important for patients with subarachnoid hemorrhage (SAH) because fatigue and cognitive problems are common. EQ-5D is a preference-based instrument measuring health-related quality of life based on self-reported health status in 5 different dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The function within each dimension is scored in 3 levels: 1 = no or minor problems; 2 = some or moderate problems; or 3 = large problems. In this way, a 5-digit number describes the health status. In the present study, we explored if the 5 dimensions of the EQ-5D could be predicted from demographic factors and parameters describing the severity of the SAH.

Materials and Methods

Patients with SAH treated at Uppsala University Hospital between February 1996 and December 2008 were screened. A total of 1529 were eligible for outcome measurements. Those in which both EQ-5D and Glasgow Outcome Scale had been used were included. The study group consisted of 710 patients, mean age was 55 ± 12 years, 65% were women, clinical condition (World Federation of Neurological Surgeons) was 2.4 ± 1.2, blood on first CT scan (Fisher) was 2.3 ± 1.5, and 83% had aneurysms. Outcome was measured after a median of 9 months (25th, 75th percentile, 7–17). The Regional Ethical Review Board granted permission for the study.

To evaluate the influence of demographic and clinical parameters on the outcome, we used a generalized linear model with a multinomial ordinal response and a logistic link function. The best subset of predictive variables was selected using Akaike information criterion. Comparisons were made with age-matched Swedish reference groups using a χ² test. P < 0.05 was considered statistically significant.

Results

The best predictors of poor outcome regarding mobility, self-care, usual activities, and Glasgow Outcome Scale were the presence of an aneurysm, older age, worse clinical condition at admission, and more blood on the CT. A different pattern was seen for anxiety/depression with female gender and younger age predicting lower quality of life. Pain/discomfort was with a marginal significance predicted by a model including age and gender (Table 1).

The study population, especially older patients, had more problems with mobility and self-care compared with the reference population (Table 2; Figure A). Usual activities was the dimension that displayed the largest difference between the study and reference groups. With increasing age, the reference population displayed a steady increase in pain/discomfort, but this was not the case for the patients with SAH. In the SAH group, problems with anxiety/depression tended to decrease after the age of 40 years (Figure B).

Discussion

Our results agree with the literature that patients with SAH patients have a lower health-related quality of life than the reference population. We found that the poor outcome regarding mobility, self-care, usual activities, and Glasgow Outcome Scale was predicted by increasing age and a more
severe injury, as indicated by the presence of an aneurysm, worse clinical condition at admission, and more blood on the CT. Problems on the anxiety/depression dimension were predicted by younger age, female gender, and worse clinical status on admission. This is important because there is a greater expectation that younger patients will return to working life, and depression has been related to impaired coping mechanisms after SAH.9 One possibility is that younger patients feel that the disease not only influences themselves as individuals, but also their ability to take care of children and to have a career.

Increasing age was associated with worse outcome regarding usual activities, mobility, and self-care. Older patients may have already started to deteriorate in mobility, which in turn impairs their usual activities and self-care. On the other hand, the proportion of patients who reported problems with anxiety/depression decreased with increasing age.

It is an advantage that the EQ-5D is not stroke-specific but instead allows comparison with health-related quality of life after other diseases. A more detailed outcome measurement could be important for rehabilitation as well as for future treatment studies. One methodological problem is that the study group represents a subset of the patients during the time period. However, apart from higher frequency of aneurysms, they seem to be fairly representative for our center.10

Conclusions
In our material, younger people suffered to a larger extent from anxiety/depression, whereas the problems experienced by older patients were more likely to be related to mobility, usual activities, and self-care. The EQ-5D in this patient group is easy to use and can add important information to that acquired using the more established scales.

Sources of Funding
Supported by Uppsala University Hospital’s grants for clinical research.

Disclosures
None.

References

Table 1. The Best Predictive Model for Each Outcome Parameter*

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Variable 3</th>
<th>Variable 4</th>
<th>Variable 5</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQ1 mobility</td>
<td>Aneurysm</td>
<td>Higher age</td>
<td>High WFNS</td>
<td>High Fisher</td>
<td>n/a</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>EQ2 self-care</td>
<td>Aneurysm</td>
<td>Higher age</td>
<td>High WFNS</td>
<td>n/a</td>
<td>n/a</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>EQ3 usual activities</td>
<td>Aneurysm</td>
<td>Higher age</td>
<td>High WFNS</td>
<td>High Fisher</td>
<td>n/a</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>EQ4 pain/discomfort</td>
<td>Woman</td>
<td>Aneurysm</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>0.078974</td>
</tr>
<tr>
<td>EQ5 anxiety/depression</td>
<td>Woman</td>
<td>Lower age</td>
<td>High WFNS</td>
<td>n/a</td>
<td>n/a</td>
<td>0.001549</td>
</tr>
<tr>
<td>GOS</td>
<td>Woman</td>
<td>Aneurysm</td>
<td>Higher age</td>
<td>High WFNS</td>
<td>High Fisher</td>
<td>&lt;0.00001</td>
</tr>
</tbody>
</table>

WFNS indicates World Federation of Neurological Surgeons. “High WFNS” indicates worse clinical condition according to World Federation of Neurological Surgeons subarachnoid hemorrhage grading scale. “High Fisher” indicates more blood on the first CT scan according to the Fisher scale.

*Models that include parameters describing the severity of the disease were the best subsets for describing EQ1-EQ3. From evaluating the regression coefficients (data not shown), younger age was predictive for a worse health status regarding EQ-4 (anxiety/depression).

Table 2. The Proportion of Individuals With No or Minor Complaints (Grade 1) in the Study Group and the Swedish Reference Group

<table>
<thead>
<tr>
<th>Years</th>
<th>SAH</th>
<th>REF</th>
</tr>
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<tbody>
<tr>
<td>18–29</td>
<td>22</td>
<td>590</td>
</tr>
<tr>
<td>30–39</td>
<td>35</td>
<td>684</td>
</tr>
<tr>
<td>40–49</td>
<td>155</td>
<td>642</td>
</tr>
<tr>
<td>50–59</td>
<td>252</td>
<td>705</td>
</tr>
<tr>
<td>60–69</td>
<td>158</td>
<td>463</td>
</tr>
<tr>
<td>70–79</td>
<td>81</td>
<td>397</td>
</tr>
<tr>
<td>80–89</td>
<td>7</td>
<td>122</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome</th>
<th>SAH</th>
<th>REF</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1 mobility</td>
<td>0.86*</td>
<td>0.98</td>
</tr>
<tr>
<td>E2 self-care</td>
<td>0.86*</td>
<td>0.97</td>
</tr>
<tr>
<td>E3 usual activities</td>
<td>0.59*</td>
<td>1.00</td>
</tr>
<tr>
<td>E4 pain/discomfort</td>
<td>0.59</td>
<td>0.97</td>
</tr>
<tr>
<td>E5 anxiety/depression</td>
<td>0.55</td>
<td>0.72</td>
</tr>
</tbody>
</table>

SAH indicates subarachnoid hemorrhage; REF, Swedish reference group.

*Significant difference.
Figure. Results from the study group (subarachnoid hemorrhage (SAH)) and the Swedish reference group (REF) for the EQ-1 mobility (A) and EQ-5 anxiety/depression (B). The complaints about impaired mobility increase with age, faster for the patients with SAH. Anxiety/depression shows another pattern with decreased complaints with increasing age in patients with SAH.

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