Long-Term Health-Related Quality of Life After Aneurysmal Subarachnoid Hemorrhage

Relationship With Psychological Symptoms and Personality Characteristics

J.M. Anne Visser-Meily, MD, PhD; Marloes L. Rhebergen, MD; Gabriel J.E. Rinkel, MD; Martine J. van Zandvoort, PhD; Marcel W.M. Post, PhD

Background and Purpose—Many patients who survive an aneurysmal subarachnoid hemorrhage experience decreased health-related quality of life (HRQoL). Physical factors have been identified as determinants of HRQoL. We describe long-term HRQoL and assessed whether psychological symptoms and personality characteristics determine HRQoL after subarachnoid hemorrhage.

Methods—In a cross-sectional study in 141 patients living independently in the community 2 to 4 years after subarachnoid hemorrhage, we assessed whether HRQoL, evaluated by the Stroke Specific Quality of Life scale, was related to psychological symptoms (mood disorders, fatigue, and cognitive complaints), personality characteristics (neuroticism and passive coping style), demographic characteristics, and subarachnoid hemorrhage disease characteristics.

Results—Best Stroke Specific Quality of Life scale scores were found in the physical domain and worst in the emotional and social domains. Thirty-two percent reported anxiety, 23% depression, and 67% fatigue. Mood (beta between \(-0.42\) and \(-0.18\)), fatigue (beta between \(-0.40\) and \(-0.24\)), and cognitive complaints (beta between \(-0.46\) and \(-0.16\)) were strongly associated with Stroke Specific Quality of Life scale scores in multivariate regression analyses.

Conclusion—Depression, anxiety, and fatigue were present in a substantial proportion of patients and were strongly related to decreased HRQoL. These symptoms identified are helpful to tailor rehabilitation to the needs of patients in the chronic phase after subarachnoid hemorrhage. (Stroke. 2009;40:1526-1529.)

Key Words: long-term quality of life subarachnoid hemorrhage

Many patients who survive the initial weeks after aneurysmal subarachnoid hemorrhage (SAH) have a decreased health-related quality of life (HRQoL).\(^1\) Even in the long term, these patients report cognitive and emotional dysfunction, vitality deterioration, and personality changes.\(^2\) Because of these long-term consequences, rehabilitation programs have been advocated.\(^3\) To tailor such programs, knowledge about the determinants of decreased HRQoL in SAH survivors is needed. Previous studies found disease-related characteristics, age, and sex to be related to HRQoL.\(^1,2\) Psychological complaints like mood disturbance, fatigue and cognitive dysfunction, and coping behavior and personality may be other powerful determinants of HRQoL of patients with SAH.\(^4\)

We assessed long-term HRQoL after SAH and determined the relationship of psychological symptoms and personality characteristics with HRQoL.

Subjects and Methods

Subjects

Patients were included who had been treated by clipping or coiling after aneurysmal SAH between January 2003 and July 2005 in the University Medical Center Utrecht and who were living independently in the community at the time of the study. Excluded were patients with severe comorbidity or reduced life expectancy and inability to speak Dutch. Patients who agreed to participate were asked to complete a mailed questionnaire. The study was approved by the Medical Ethics Committee of the University Medical Center Utrecht.

Measures

Dependent Variables

HRQoL was evaluated with the Stroke Specific Quality of Life version 2 (SSQoL).\(^5\) This scale consists of 49 items in 12 subscales merged into 4 domains reflecting physical, cognitive, emotional, and social HRQoL. (Post, unpublished data, 2008).

Independent Variables

Demographic data, neurological condition on admission (World Federation of Neurological Surgeons scale),\(^6\) location of the ruptured aneurysm, treatment of the aneurysm, complications after SAH, and handicap at discharge (Glasgow Outcome Scale [GOS])\(^6\) were obtained from the SAH database of the Department of neurology and neurosurgery of the University Medical Center Utrecht. Psychological symptoms assessed were mood (Hospital, Anxiety and Depression Scale [HADS])\(^7\), fatigue (Fatigue Severity Score),\(^7\) and cognitive complains using the self-report Cognitive Failure Questionnaire.\(^7\) The
total HADS score was used because the anxiety and depression scores were strongly associated with each other and to minimize the number of independent variables. A HADS cutoff point of 11 showed a good tradeoff between sensitivity (89%) and specificity (66%) for detecting psychiatric disorder. Coping strategy was measured using the “passive coping strategy” subscale from the Utrecht Coping List. The neuroticism subscale of the Eysenck Personality Questionnaire focuses on personality trait neuroticism.

Statistical Analysis

SSQOL scores were presented for all patients and separately for patients with good outcome (GOS V) and with minor or moderate disability (GOS III to IV). Backward linear regression analyses were performed to analyze independent relationships between demographic and SAH characteristics, psychological symptoms (HADS, Fatigue Severity Score, Cognitive Failure Questionnaire), and personality characteristics (“passive coping strategy” subscale from the Utrecht Coping List, neuroticism subscale of the Eysenck Personality Questionnaire) and SSQOL scores. Complication after SAH (yes or no), GOS (V or other), and education (high or low) were entered as independent variables. The candidate determinants were tested for multicollinearity (correlation coefficient > 0.7). All analyses were performed using SPSS Version 14.

Results

Participants

Between January 2003 and July 2005, aneurysm occlusion by means of clipping or coiling had been performed in 212 patients with SAH. Of this group, 21 died, 8 were discharged to a nursing home, 5 were emigrated, and 4 had severe comorbidity. Therefore, 174 patients received a questionnaire, of whom 141 (81%) participated in this study. There were no statistically significant differences between the patients who responded (Table 1) and who declined to participate regarding demographic and SAH characteristics and no statistically significant differences in demographic characteristics between patients who were coiled and who had surgery (data not presented).
The mean SSQOL total score was 4.00 (SD, 0.70), indicative of a relative satisfactory HRQoL (Table 2). However, a diverging pattern between the distinct domains and subscales of the SSQOL appeared, the highest scores for the physical and the lowest scores in the emotional and social domains. Lower GOS scores at discharge were only related to lower physical HRQOL and not for the other dimensions of HRQOL.

Bivariate Relationships

All psychological symptoms and personality characteristics were strongly related to the total SSQOL score. The strongest correlations with decreased HRQoL were found for mood problems (0.73) and fatigue (0.73) followed by decreased cognitive functioning (0.56), neuroticism (0.55), and passive coping style (0.53). Correlations between scores for psychological symptoms and personality characteristics were strong (0.63 to 0.68; P <0.01).

Multivariate Relationships

The final regression models are displayed in Table 3. A major part of the variance of SSQOL scores (50.6% to 70.7%) was explained. Better mood, less fatigue, and fewer cognitive complaints were consistently related to both higher SSQOL total and domain scores. Passive coping was selectively associated with lower scores in the cognitive domain. Neuroticism was only associated with lower scores in the emotional domain. The functional outcome (GOS score) at discharge was significantly associated with the physical domain scores only. All associations between demographic and hospital data and SSQOL scores were, if statistically significant, not more than weak.

Discussion

A large proportion of patients with SAH living independently in the community experience fatigue, mood disorders, and cognitive dysfunction. SSQOL scores showed a diverging pattern of good physical functioning but problems in the emotional and social domains. Mood, fatigue, and cognitive problems were strongly related to SSQOL scores in bivariate analyses, but not in multivariate analyses, probably due to strong intercorrelations between psychological symptoms and personality characteristics.

Although fatigue is a relevant symptom in the clinical assessment of depression, we entered both fatigue and depression in the analysis because both are best seen as distinct poststroke consequences. Furthermore, the HADS does not contain questions about fatigue.

Table 3. Multivariate Backward Regression Analyses Between Demographic, SAH, Psychological, and Personality Characteristics and HRQoL (SSQOL) Long Term After SAH (N=141)

<table>
<thead>
<tr>
<th></th>
<th>SSQOL Total</th>
<th>SSQOL Physical</th>
<th>SSQOL Cognitive</th>
<th>SSQOL Social</th>
<th>SSQOL Emotional</th>
</tr>
</thead>
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<tr>
<td>Demographic characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (women)</td>
<td>0.10†</td>
<td>0.16†</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Educational level</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Age</td>
<td>-0.12†</td>
<td>-0.23§</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hospital data</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Complications*</td>
<td></td>
<td></td>
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<tr>
<td>GOS*</td>
<td></td>
<td>0.22‡</td>
<td>-0.22‡</td>
<td></td>
<td></td>
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<tr>
<td>Location (ICA as reference)</td>
<td></td>
<td></td>
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<tr>
<td>MCA</td>
<td>-0.16‡</td>
<td>0.15†</td>
<td>-0.13†</td>
<td></td>
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<tr>
<td>AcomA/ACA</td>
<td></td>
<td></td>
<td></td>
<td>-0.15†</td>
<td></td>
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<tr>
<td>Vertebrobasilar</td>
<td>0.23§</td>
<td></td>
<td>-0.23§</td>
<td></td>
<td></td>
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<tr>
<td>Coiling (versus clipping)</td>
<td>0.11</td>
<td>0.12†</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Psychological symptoms</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>HADS*</td>
<td>-0.38§</td>
<td>-0.18†</td>
<td>-0.30†</td>
<td>-0.42§</td>
<td>-0.28‡</td>
</tr>
<tr>
<td>FSS*</td>
<td>-0.38§</td>
<td>-0.40§</td>
<td>-0.24†</td>
<td>-0.25‡</td>
<td>-0.32§</td>
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<tr>
<td>CFO*</td>
<td>-0.28§</td>
<td>-0.16†</td>
<td>-0.46§</td>
<td>-0.20‡</td>
<td>-0.17‡</td>
</tr>
<tr>
<td>Personality characteristics</td>
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<tr>
<td>EPQ-N*</td>
<td></td>
<td></td>
<td></td>
<td>-0.21†</td>
<td></td>
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<tr>
<td>UCL-p*</td>
<td></td>
<td>0.13</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Expl variance</td>
<td>69.3%</td>
<td>48.3%</td>
<td>56.8%</td>
<td>55.1%</td>
<td>65.4%</td>
</tr>
</tbody>
</table>

*Higher value means worse condition.
† P<0.05, ‡ P<0.01, § P<0.001.
ICA indicates internal carotid artery; MCA, middle cerebral artery; AcomA, anterior communicating artery; ACA, anterior cerebral artery; FSS, Fatigue Severity Scale; CFO, Cognitive Failure Questionnaire; EPQ-N, neuroticism subscale of the Eysenck Personality Questionnaire; UCL-p, “passive coping strategy” subscale from the Utrecht Coping List; Expl variance, explained variance corrected for no. of determinants.
patients with stroke.\textsuperscript{11} In studies on patients with ischemic stroke, also a bivariate relation was found between neuroticism\textsuperscript{12} and avoidance coping style\textsuperscript{13} with poststroke depression. This emphasizes the need to take personality into account as a potential vulnerability factor for depression.

There are some limitations to our study. We used only a self-report measure for cognitive functioning. However, subjective experience of cognitive dysfunction is important from a quality-of-life perspective. Because of the relatively large number of independent variables, our study (N=141) is slightly underpowered. Omitting independent variables would, however, compromise the results of our study because all independent variables used were related to the dependent variables and it is important to adjust for the influence of demographic and SAH characteristics. With our study design, causality cannot be established and because we included patients still alive 2 to 4 years after SAH, selection bias may be present.

The clinical implication of this study is embedded in the value of psychological symptoms and personality characteristics being associated with HRQoL. Demographic and SAH characteristics and the GOS score at discharge only do not allow a useful prediction of long-term HRQoL. The strong correlations between psychological symptoms and personality characteristics found in this study suggest that if psychological symptoms are present, assessment of personality characteristics may be needed to target interventions for these symptoms and to identify patients at risk for reduced long-term HRQoL.

**Disclosures**

None.

**References**

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