Health-Related Quality of Life After Spontaneous Subarachnoid Hemorrhage Measured in a Recent Patient Population

Martin Tjahjadi[1], Christian Heinen[1], Ralph König[1], Eckhard Rickels[2], Christian Rainer Wirtz[1], Dieter Woischneck[3], Thomas Kapapa[1]

Key words
- Cognition
- Outcome
- Quality of life
- Subarachnoid hemorrhage

Abbreviations and Acronyms
BP: Bodily Pain
CT: Computed tomography
GH: General Health
GOS: Glasgow Outcome Score
HHS: Hunt and Hess scale
HRQOL: Health-related quality of life
LP: Lumbar puncture
MCS: Mental Component Summary
MH: Mental Health
MRI: Magnetic resonance imaging
PCS: Physical Component Summary
PF: Physical Functioning
PQUASCH: Proxy Questionnaire on Subarachnoid Hemorrhage
QUASCH: Questionnaire on Subarachnoid Hemorrhage
RE: Role–Emotional
RP: Role–Physical
SAH: Subarachnoid hemorrhage
SF: Social Functioning
SF-12: Short-Form 12 Health Survey
SF-36: Short-Form 36 Health Survey
SFHS: Short-Form Health Survey
SIP: Sickness Impact Profile
VAS: Visual Analog Scale
VT: Vitality
WFNS: World Federation of Neurosurgical Societies


From the [1]Universitätsklinikum Ulm, Neurochirurgische Klinik, Ulm, Germany; [2]Klinik für Unfallchirurgie, Orthopädie und Neurotraumatologie, Allgemeines Krankenhaus Celle, Celle; and [3]Neurochirurgische Klinik, Klinikum Landshut, Landshut, Germany

To whom correspondence should be addressed: Thomas Kapapa, M.D. [E-mail: Thomas.Kapapa@uniklinik-ulm.de]

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OBJECTIVE: **This study sought to determine the impact of spontaneous subarachnoid hemorrhage (SAH) on health-related quality of life (HRQOL).**

METHODS: **Data were taken retrospectively from 601 patients (219 male, 382 female) treated between 1998 and 2008. Questionnaires concerning HRQOL were circulated prospectively, and the responses from 253 patients (81 male, 172 female) were analyzed. The questionnaires comprised the standardized Short-Form 36 (SF-36) and Short-Form 12 (SF-12) Health Surveys, a number of nonstandardized questions, and visual analogue scales. Statistical analysis of the results was exploratory, using unifactorial ANOVA (Scheffe), multivariate analyses of variance.**

RESULTS: **The HRQOL is reduced considerably by SAH and remains so for a period of 10 years. Physical and emotional domains are primarily affected, but also cognitive functions, including memory and concentration in particular. Similarly, certain roles are affected that prove difficult to rehabilitate after acute care and cause serious debility in the long term. The Hunt and Hess Scale, Glasgow Outcome Scale, and seizures were found to have the greatest impact on HRQOL.**

CONCLUSIONS: **Documentation of HRQOL after 6 to 12 months is useful because patients are often found to have a diminished HRQOL in the absence of a clear physical impairment. Because psychological, emotional, cognitive, and social functioning influence HRQOL in the long term, efforts at rehabilitation should focus in particular on improving such factors. Documentation of HRQOL is a useful, additive tool for consolidating and evaluating the outcome, and a treatment end point after SAH, respectively.**

INTRODUCTION

Spontaneous aneurysmal subarachnoid hemorrhage (SAH) accounts for 3% to 5% of all cases of cerebral apoplexy (65, 71). Among all forms of cerebral apoplexy, it is responsible for 5% of all deaths and a more than 25% loss of potential years of life in those over age 65 (41).

Many patients suffering SAH are left with a neurological deficit (2, 21, 71, 72). After first admittance, patients are often evaluated using the Glasgow Outcome Scale (GOS) (40). Over the further course, the treatment outcome after SAH is often categorized by clinicians in simple terms such as good, moderate, or poor for the purposes of immediate grading. This classification ensues on the basis of the prevailing functional neurological deficits, however, leaving little room for psychological, cognitive, and social components. Although physically intact, many patients still show neuropsychological and cognitive impairments (34, 35). SAH is a life-threatening disease, and therefore can decisively influence the subsequent health-related quality of life (HRQOL).

Standardized tools are used to measure HRQOL based on subjective perception and assessment by the patient and proxy. This is important because the evaluation of the treatment outcome after SAH made by a clinician can differ significantly from that of the patient and his or her family (12). A patient having suffered SAH cannot always be expected to make a full recovery. A patient with no physical traces of hemorrhage on completion of therapy will without doubt achieve a better grade of outcome than if physically debilitated, e.g., by paresis. Yet how does the reduc-

tion in HRQOL from paresis compare with that induced by deficits in attention and concentration? In such a case, grading of the individual patient's disability is useful in the clinical context (68).

HRQOL serves to consolidate and evaluate the outcome. It is helpful in understanding a patient's reactions to the disease and evaluating the efficacy of the therapeutic interventions (18). In the clinical approach to long-term, dynamic diseases, the concept of measuring the quality of life represents an independent medical parameter (19).

Many attempts have been made to identify prognostic values for SAH, e.g., in the form of initial symptoms as defined by the Hunt and Hess Scale (HHS) (31) or by the Scale of the World Federation of Neurosurgical Societies (WFNS) (27, 44) which is based on the Glasgow Coma Score (61), as well as Fisher computed tomography (CT) grading (3, 63), localization of the bleeding, treatment method, or age and gender (43, 50, 51). Such attempts have only partly been successful (8, 34, 59). So far there have only been a few studies that have concentrated on identifying the independent determinants of HRQOL over the course (42, 59). Such data are required to promote the development and efficiency of health programs, therapies, and treatment measures, as well as their transition and rehabilitation efforts.

This study has the following objectives: 1) to obtain a detailed account (physical, psychological, cognitive) of the patient's HRQOL after spontaneous aneurysmal SAH, and 2) exploratory identification of determinants to explain the often-diminished HRQOL after SAH.

PATIENTS AND METHODS

The study comprises 2 parts: 1 retrospective, and 1 exploratory and prospective. The retrospective approach involves a population of 674 patients (November 13, 1998, to December 31, 2008).

Inclusion Criteria

Inclusion criteria were proof of SAH by cranial CT, lumbar puncture (LP), or magnetic resonance imaging (MRI); proof of aneurysm by digital subtraction angiography, CT angiogram, or magnetic resonance angiography; or spontaneous SAH with no angiographic proof of aneurysm.

Exclusion Criteria

Exclusion criteria were traumatic SAH; incidental aneurysm with no proof of SAH by cranial CT, LP, or MRI; coagulation disorders; intracranial neoplasms; arthritides; meningitis or encephalitis; other atypical clinical characteristics; or first-line treatment at another institution.

The data cover the preclinical, emergency, intensive care, and inpatient phases as far as the treatment outcome. Any parameters that could be determined from the patient's history, e.g., previous diseases, risk factors, or activity at the time of onset of the symptoms, were included in the documentation: age, gender, Glasgow Coma Score (66), WFNS Scale (67), Brüssel Coma Score (6), HHS (33), Fisher Score (20), cause and location of hemorrhage source, therapeutic interventions, hydrocephalus, recurrent bleeding, duration of mechanical ventilation, length of primary hospital stay, GOS (39), state of consciousness at discharge, delirium, time of death.

Standardized Questions

The prospective data were obtained by patient questionnaires consisting of a standardized (Short-Form 36 [SF-36] and Short-Form 12 [SF-12] Health Surveys) and nonstandardized survey and visual analogue scales (VAS). The aim was to determine the patient's present situation and HRQOL.

Two versions of the questionnaires were produced and circulated: one as a Questionnaire on Subarachnoid Hemorrhage (QUASCH) for completion by the patient, and one as a Proxy Questionnaire on Subarachnoid Hemorrhage (PQUASCH) for completion by a relative, caregiver, or other individual ideally in regular contact with the patient. For a questionnaire to be included in the analysis, at least half of the questions had to be completed. The QUASCH has 96 items and takes 16 to 18 minutes to complete. The PQUASCH has 91 items and takes about 15 minutes to complete.

Nonstandardized Questions

The second section was made up of questions from the Sickness Impact Profile (SIP) questionnaire on psychosocial interaction and additional, specific nonstandardized questions on living standards. They included social and professional reintegration, family and general social interaction, specific physical impairments, severe residual physical and neuropsychological impairments, partnerships, and sexual relations.

VAS

Each questionnaire concluded with 4-dimensional VAS, classified only by the best possible (100) and worst possible (0) score. The questions addressed the average state of health before SAH and in the previous year, as well as its influence during the last year on the patient's everyday activities and ability to work. The VAS were validated for use in patients after apoplexy (54).

The QUASCH and PQUASCH were sent to all alive known patients, and included a stamped self-addressed envelope. The questionnaires were accompanied by detailed instructions: 1) The QUASCH should be filled out by the patients themselves. Assistance should only be given by manual support, if necessary. 2) The proxy or caregiver should fill out the survey separately without any influence by the patient. After a period of 4 weeks, patients were reminded to send their questionnaires by a postcard in case of nonresponding.

Clinical Factors

In this study, vasospasm is defined by Doppler ultrasound (mean flow >120 cm/s) and confirmation of vessel lumen narrowing by CT angiography, perfusion deficits in MRI or CT, as well as conventional or digital subtraction angiography. A rebleeding is defined as a new evidence of hemorrhage in CT or MRI in control scans with or without clinical worsening, excluding surgical complications or consequences. Cerebral infarction was seen as new territorial or nonterritorial ischemic hypodensity in CT or evidence of infarction in MRI (perfusion/diffusion) after surgical or endovascular treatment in control imaging.

Statistical Tests

The statistical tests were performed using the statistical program SPSS version 17.0 for Windows (SPSS Inc.). Descriptive statistics were used to present the absolute and relative frequencies of the qualitative data. The number, mean, standard deviation, median, and extreme values were used to determine the quantitative attributes. Statistical t tests were performed to analyze the mean