Quality of Life after Intra-arterial Therapy for Acute Ischemic Stroke

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Few data exist about health-related quality of life outcomes after intra-arterial therapy (IAT) for acute ischemic stroke (AIS). We assessed stroke-specific quality of life (SS-QOL) in survivors of stroke after IAT. Consecutive patients undergoing IAT for AIS from 2005 to 2010 were retrospectively identified via an institutional database. SS-QOL (using the SS-QOL score) and disability status (modified Rankin Scale [mRS]) were prospectively assessed via mailed questionnaire. We analyzed quality of life (QOL) scores by domain and summary score, with a summary score of 4 or more defined as a good outcome. Analysis of variance (ANOVA) was used to model the effect of final recanalization status, stroke severity, and mRS on total QOL score. ANOVA and Pearson correlations were used to test the association between stroke severity/mRS and QOL/time since stroke, respectively. Of 99 patients with AIS, 61 responded, yielding 11 interim deaths, 7 incomplete surveys, and 43 complete surveys for analysis. Among responding survivors, overall QOL score was 3.9 (standard deviation 0.7); 77% of these reported good QOL. Scores were higher in recanalized patients in 11 of 12 domains but was significant only for mood. Although mRS was associated with stroke severity, QOL was independent of both. Seventy-seven percent of survivors of AIS who received IAT reported good QOL. Furthermore, these data suggest that SS-QOL is an independent outcome from stroke severity and disability status. **Key Words:** Quality of life—intra-arterial therapy—ischemic stroke.

Treatment in the hyperacute phase of acute ischemic stroke (AIS) currently focuses on re-establishing blood flow with either intravenous recombinant tissue plasminogen activator (IV rtPA)[1] or newer, intra-arterial therapies (IAT), such as angioplasty, mechanical clot extraction, and stenting.[2] These interventions are not yet FDA approved for treatment of stroke but have demonstrated excellent recanalization rates and safety outcomes. Although some data support that IV rtPA is associated with improved health-related quality of life (HR-QOL),[3] little is known about how catheter-based interventions influence overall or disease-specific QOL. As new devices become available and treatment decision making becomes increasingly complex,[4] clinically relevant outcome measures, such as HR-QOL, are essential for understanding the full impact of these treatment modalities.

Among the outcome parameters currently used to establish and compare safety and efficacy of IAT for AIS, the most informative follow-up measures have yet

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to be definitively established. Pre- and postprocedure blood flow, recanalization, change in the National Institutes of Health Stroke Scale (NIHSS), 90-day mortality, and 3-month functional measures, such as modified Rankin Scale (mRS) and Barthel Index, are among the most commonly used outcome measures in pivotal intra-arterial trials.[5] These measures are primarily physician driven and do not effectively assess patient-centered elements, such as social roles, communication, and satisfaction with daily activities. The importance of HR-QOL is becoming increasingly recognized[6] and the American Society of Interventional and Therapeutic Neuroradiology guidelines now recommend the use of a quality of life (QOL) measure in trials to better assess treatment efficacy.[7] The aim of this study was to determine disease-specific HR-QOL in patients who received IAT after AIS.

Methods

This study uses retrospective chart abstraction of patient characteristics from the prospectively populated institutional stroke registry, combined with prospectively collected QOL data using the stroke-specific quality of life (SS-QOL) scale, a validated, disease-specific instrument.[8] This scale was initially developed in English in 1999 and has since been validated in both ischemic[8] and hemorrhagic stroke,[9] including use by proxy.[10]

Inclusion Criteria

Patients were identified using the University of Utah Stroke Center quality database and included if they had AIS between March 2005 and December 2010, received IAT for their acute stroke, and survived to hospital discharge. Medical decision making was on a case-by-case basis per the discretion of the stroke and neurointerventional teams. Patients were included regardless of initial administration of IV rtPA. Both thrombolysis and thrombectomy cases were included as forms of IAT. Patients were excluded if IAT was for subacute stroke.

Determination of Baseline Characteristics

Once identified, patient demographics and clinical characteristics were abstracted from source documents. Presenting stroke severity was measured by the NIHSS and recorded at presentation, except for 8 patients in whom the NIHSS was extrapolated retrospectively via a validated method.[11] We were unable to extract the NIHSS in 2 patients because of incomplete documentation of presenting examination on transfer. Stroke localization, site of occlusion, and cerebral perfusion pre- and post-IAT were characterized by review of original films (computed tomography, magnetic resonance angiography, or digital subtraction angiography). Stroke subtypes were retrospectively classified using the criteria proposed by the Trial of Org 10172 in Acute Stroke Treatment.[12] Outcome measures included recanalization, mRS at discharge and follow-up, stroke recurrence, and QOL. Stroke recurrence and QOL were determined by mailed survey. All outcome measures are described subsequently.

Angiographic Outcome Assessment—TICI Scores

Pre- and postprocedure cerebral perfusion were reported using thrombolysis in cerebral infarction (TICI) scores.[7] TICI scoring is from 0 (no perfusion) to 3 (full perfusion including distal branches). A fellowship-trained neurointerventionalist (M.W.) determined TICI scores by review of digital subtraction angiography films. We considered patients with partial (TICI 2a/2b) or complete (TICI 3) recanalization to be successful radiographic outcomes.[13]

Clinical Outcome Assessment—mRS and Stroke-Free Status Questionnaire

The mRS is a widely used assessment instrument of overall functional level.[14] The scale runs from 0 (no symptoms) to 6 (dead), with scores 0-2 generally considered to be good outcomes, based on retained ability to perform complex activities of daily living.[15] mRS values at discharge and follow-up were abstracted from the chart.

Stroke recurrence since the time of IAT was assessed via the Questionnaire for Verifying Stroke-Free Status (QVSFS), an 8-item questionnaire, and included with the mailing.[16] If any of the 8 items was marked, the patient screened positive (ie, "not stroke free"). Records from the stroke-like event were requested and reviewed to verify stroke recurrence vs an alternative diagnosis.

Patient-Centered Outcome Assessment—SS-QOL Scale

QOL was assessed using the full 12-domain SS-QOL Scale via a mailed or phone questionnaire.[8,17] The SS-QOL scale is a disease-specific HR-QOL questionnaire that uses 5-point Likert scales and encompasses 12 domains: energy, family roles, language, mobility, mood, personality, self-care, social roles, thinking, upper extremity function, vision, and work/productivity. Domain scores are reported as an unweighted mean of the individual questions within each domain. A summary score is calculated as the unweighted mean of all 12 domain scores, with a range of 1-5.[17] Higher scores indicate better QOL, a summary SS-QOL score of 4 or more is considered a good QOL.[18]

Survey Content and Administration

The survey included an informational letter, consent form including request for permission to obtain additional medical records if needed, the QVSFS, and the SS-QOL. To maximize study response rates, we used a systematic method of multiple forms of contact, including a