With the aging population, increases in atrial fibrillation prevalence and treatment with oral anticoagulation (OAC) have inevitably been linked with increased OAC-related intracerebral hemorrhage (ICH). Yet two key clinical questions remain: optimal acute management and whether to restart OAC. To address this knowledge gap, Kuramatsu et al conducted the German-Wide Multicenter Analysis of Oral Anticoagulation-Associated Intracerebral Hemorrhage (RETRACE) study, a retrospective observational study of 19 tertiary care centers (2006–2012) involving 1176 patients with OAC-associated ICH.

The mean age of patients with OAC-ICH was 74.1 years and median initial ICH volume was 19.3 cm³ (interquartile range, 6.9–52.8). Hematoma enlargement occurred in 36.0% with a median volume increase of 14.0 cm³ (interquartile range, 4.7–36.8). Reduced rates of hematoma enlargement were associated with reversal of international normalized ratio levels to <1.3 within 4 hours (19.8% versus 41.5%) and systolic blood pressure to <160 mm Hg at 4 hours (33.1% versus 52.4%, P < 0.001). Achieving both international normalized ratio <1.3 and systolic blood pressure <160 mm Hg within 4 hours was associated with lower rates of hematoma expansion (18.1% versus 44.2%, odds ratio 0.28, 95% confidence interval 0.19–0.42) and lower in-hospital mortality (13.5% versus 20.7%, odds ratio, 0.60; 95% confidence interval 0.37–0.95). Ischemic complications were less frequent among those who resumed OAC (5.2% versus 15.0%; P < 0.001) and hemorrhagic complications were not significantly different. Propensity-matched survival analysis in patients with atrial fibrillation who restarted OAC showed a decreased hazard ratio of 0.26 (95% confidence interval, 0.12–0.53) for long-term mortality and favorable functional long-term outcome (modified Rankin Scale 0–2) in 72.6%.

This study represents one of the largest multicenter cohorts of patients with OAC-ICH and identified key clinical variables associated with decreased hematoma expansion. The study also further strengthened previous findings that restarting OAC, particularly among those with high thromboembolic risk (congestive heart failure, hypertension, age ≥75 years, diabetes mellitus, stroke [CHADS2] score ≥2), results in favorable long-term stroke outcomes without an increased rate of hemorrhagic complications. Limitations of the study include the retrospective nature, possible imprecisions in ICH volume measurement, lack of continuous blood pressure readings, and missing data. Nevertheless, the authors used rigorous statistical methods to address limitations. In the absence of randomized clinical trial evidence, this study provides practitioners with clinically useful guidance for 2 of the most commonly encountered questions about OAC-ICH management.


Although decompressive craniectomy improves survival in space-occupying malignant stroke, it comes at the expense of surviving with moderate to severe disability. The authors conducted a systematic review and meta-analysis to assess quality of life (QoL), depression, and caregiver burden in these stroke survivors. Seventeen articles (randomized-controlled trials, cohorts, case-controls, and case series) reporting on 459 patients were included.

At final follow-up (7–51 months), 30% had died and 11% were lost to follow-up. Among survivors, 39% achieved good functional outcome at final follow-up (modified Rankin Scale ≤3). Mean QoL was 60% to 67% of the best possible score (except one outlier study with a mean of 46%); studies in the general population report QOL ranging from 58% to 87%. No significant difference in QoL was noted between patients with an infarction in the dominant versus nondominant hemisphere. Treatment satisfaction, investigated by asking patients whether they would still choose surgical decompression knowing what they knew at final follow-up, showed that 143/189 (76.1%; 95% confidence interval 63.6%–85.4%) patients would again choose surgical decompression. Treatment satisfaction of caregivers ranged from 81% to 100%. Severe depressive symptoms were present in 14/113 (15.9%; 95% confidence interval 8.3%–28.1%), and mild/moderate depressive symptoms were present in 46/95 (48.5%; 95% confidence interval 38.5%–58.6%). Three studies investigating caregiver burden showed that 70% of caregivers experienced a high level of stress in their daily lives.
The literature regarding psychosocial outcomes and caregiver burden for individuals with malignant middle cerebral artery infarctions treated with surgical decompression has heretofore been scarce; therefore, this study adds valuable information. Although more than half of patients had a poor functional outcome, the vast majority were satisfied with the treatment received and would opt for it again given the same circumstances. This disputes the common assumption that a poor functional outcome is associated with poor QoL. In addition, although many centers do not offer craniectomy for individuals with malignant infarction of the dominant hemisphere, this meta-analysis showed no difference in QoL by hemisphere. This study also highlights the high rates of depression in these patients. Important limitations of the review include selection bias, heterogeneity between studies, small sample sizes, and variability in outcome measures. Future prospective studies with standardized, validated questionnaires will help illuminate the psychosocial outcomes of these patients and their caregivers. Nevertheless, this study highlights the need to develop (1) strategies to screen for, detect, and treat depression among these patients and (2) interventions to support caregivers.
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