Decompressive Hemicraniectomy in Elderly Patients With Malignant Hemispheric Infarction
Open Questions Remain Beyond DESTINY

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Elderly patients are underrepresented in stroke trials because their inherent comorbidity may potentially challenge the trial success. This results in a lack of consistent evidence for many stroke therapies in a majority of the stroke population. Certainly, age is one of the most powerful predictors of poor outcome after thrombolysis, rescue endovascular therapies, and carotid endarterectomy. However, setting an upper age limit in trials should be used to optimize the target population rather than to deny future access to treatment for older patients.

Decompresive hemicraniectomy (DH) represents the paradigm of an “age-sensitive” stroke intervention. The pooled analysis of 3 small randomized controlled trials, including 93 patients, all younger than 61 years of age, confirmed the suggestions from nonrandomized studies that DH undertaken within 48 hours of stroke onset reduces mortality rates and increases the number of patients with favorable functional outcomes after malignant hemispheric infarction. Overall, early DH reduced the mortality rate by 50% at 1 year compared with best medical treatment. The age limit of 60 years in these trials was based on observations from small nonrandomized uncontrolled studies that identified age as a main predictor of benefit from DH. These studies, however, had selection bias resulting in marked unbalances between age groups with older patients treated later and less aggressively. So, the use of a rigid age cut-off for DH is somewhat artificial and arbitrary.

van den Worp and Kappelle “turn thumbs down” on our 70-year-old patient, stating a clear and evidence-based position based on their belief that the outcome of older patients with malignant infarction is poor regardless of any treatment. They do not recommend DH because of the lack of evidence of benefit from randomized controlled trials and increased risk of survival with severe disability (modified Rankin score of 4 or 5) in older patients at the expense of reduced mortality after DH. In the opposite corner, Juttler and Hacke show some clemency and take a more flexible position to apply the current evidence from patients younger than 60 years to older patients. They consider that DH could be life-saving, and that moderate disability and even independent outcome may be possible in selected older patients, depending on the individual’s premorbid status, attitude toward life-prolonging measures, and potential acceptance of surviving with different degrees of disability.

Although the lack of evidence available makes it difficult to firmly recommend DH for malignant strokes in most patients older than 60 years of age outside randomized controlled trials. We agree that DESTINY II should provide more evidence to support the benefit of surgery (or lack of it) in the elderly. The cut-off age of 60 years is clearly arbitrary, and surgical decisions, while awaiting the results of DESTINY II, should be made on an individual basis, depending on patient characteristics, declared wishes, and available institutional resources. Several factors modulate the impact of age on outcome, including admission functional status, cognitive status, and social situation. The presence of strong family support may be as relevant as age in the decision-making for DH in elderly patients. In addition, whereas diminished capacity for neuroplasticity in elderly patients may hamper the chance of good clinical recovery, advanced age per se is not considered a limiting factor to rehabilitation after stroke. Clinical outcome is a complex and contextual measure, particularly in older patients. The ability to perform activities of daily living declines with age and outcome measures scores may differ depending on patient age. The Barthel Index and modified Rankin scale, although widely used as basic standard measures, have limitations because both correlate well with motor ability but correlate poorly with cognitive and psychological aspects, which are commonly affected in the elderly. Therefore, the outcome measures for DH in older patients should use not only stroke assessment tools but also age-sensitive assessment tools, such as the Stroke Impact Scale and the Assessment of Motor and Process Skills.
Open questions remain unanswered. Are stroke side and timing of surgery more critical in older patients? The pooling analysis did not identify any interaction between age and factors such as hemispheric dominance and timing of surgery (when performed within 48 hours). Theoretically, ultra-early DH (<24 hours) in a nondominant hemispheric stroke may prevent herniation and ameliorate the impact of age on stroke outcome. Is DH beneficial as a late salvage procedure after initial medical treatment? Surgery was performed within 48 hours in most patients enrolled in randomized controlled trials; DESTINY II also has a 48-hour window. Patients with malignant middle cerebral artery infarctions may deteriorate after 48 hours from edema formation and mass effect, which peak by days 3 to 5. Delayed DH (>48 hours) in HAMLET reduced case fatality but had no effect on functional outcome. However, the number of these patients was small. Can imaging optimize the selection of patients for DH? Although diffusion-weighted imaging lesion volume >82 mL, obtained <6 hours of stroke onset, strongly predicts the development of malignant infarction, its predictive accuracy decreases dramatically beyond 6 hours. Thus, do we still rely on clinical deterioration or midline shift in patients presenting later? Adding biomarkers information to imaging data may improve patient selection. Is DH cost-effective in elderly patients? Definitively, more studies are needed and should include a cost-effective analysis of this high-resource-consuming condition.

Disclosures
None.

References

Keywords: acute care • emergency medicine • outcomes
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Stroke. 2011;42:847-848; originally published online February 3, 2011;
doi: 10.1161/STROKEAHA.110.603613

Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://stroke.ahajournals.org/content/42/3/847

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