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ARTICLE OF THE MONTH

Surgical Decompression for Space-Occupying Hemispheric Infarction

Reinink H, Jüttler E, Hacke W, et al. Surgical Decompression for Space-Occupying Hemispheric Infarction. Jama Neurol. 2021;78(2):208-216. 10.1001/jamaneurol.2020.3745

Welcome to another session of Article of the Month, May 2021. This month we discuss Surgical Decompression for Space-Occupying Hemispheric Infarction, commentary by Dr. Mehmet S. Ozcan.

As always, readers are welcome to join us for further discussion and feedback on the SNACC **Twitter** feed, or on **Facebook**.

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Dr. Mehmet S. Ozcan Biographical Sketch
Dr. Mehmet S. Ozcan is an Associate Professor of Clinical Anesthesiology at Yale University Department of Anesthesiology. He graduated from the Istanbul University Cerrahpasa Medical School in Istanbul, Turkey. Dr. Ozcan completed an internship and anesthesiology residency at the University of Florida, followed by fellowships in both critical care medicine and neuroanesthesia, also at the University of Florida. He has practiced as a neuroanesthesiologist and neurointensivist at University of Illinois Chicago and at University of Oklahoma before joining his current institution. He has been a longtime member of SNACC member and has been serving as a member of the SNACC scientific affairs committee for the past 5 years.

Commentary

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It would not be an exaggeration to say that we have witnessed a revolution in the management of acute ischemic stroke (AIS) within the past decade.[1] Most important aspect of this is an increasing role for mechanical thrombectomy (MT) in stroke cases due to large vessel occlusion (LVO). Depending on the degree of reperfusion, MT has the potential for decreasing the cerebral infarct volume improving functional independence.[2]

Unfortunately, there are still many patients presenting with LVO in whom cerebral reperfusion cannot achieved. Those would develop large hemispheric strokes, leading to space-occupying brain edema, typically within the first 4 days

following an AIS. Mortality rate in these patients remains very high, up to 80% in case series in which cerebral edema was managed solely with supportive care and medical management.[3] On the other hand, there is a dramatic decrease in mortality (as low as 16%) if a craniectomy was performed within the first 2 days of an AIS to achieve surgical decompression.[4]

However, surgical decompression could also result in survival with a poor functional outcome, which could be inconsistent with the patient's preferences in goals of care. Therefore, the decision to perform surgical decompression after a large hemispheric stroke requires a careful discussion with the patient and family, focusing on an accurate description of the benefit it can provide for the specific circumstances. Although several studies showed an overall survival benefit for surgical decompression compared to medical management, they were underpowered to assess the difference in outcomes for several distinct patient categories. Therefore, there has been little evidence available to the clinician in terms of the benefits of surgical decompression for specific patient subgroups.

The present study is a meta-analysis that pooled data from a total of 488 patients across 7 randomized clinical trials.[5] This fills an important gap in allowing us to compare the outcomes for surgical decompression and medical management in a number of patient subgroups with adequate power. Patient subgroups were determined by age (18-50, 51-60, 61-70, and >70 years), gender, presence of aphasia, vascular territory (MCA alone vs MCA and ACA or PCA), time from stroke onset to randomization, and NIHSS score at baseline (≤20, 21-25, and >25). The authors used a robust method of assessing bias in individual studies as well as following a reporting guideline (Preferred Reporting Items for Systematic Reviews and Meta-analyses- PRISMA) that is considered a best-practice for conducting meta-analyses. The primary endpoint of the study was a favorable outcome, defined as a score of ≤3 on the modified Rankin Scale score (mRS) at 1 year after stroke. Secondary endpoints were functional independence (mRS score ≤2), reasonable outcome (mRS score ≤4), and mortality at 6 months and 1 year after the stroke.

The results of this study confirm the findings of individual studies, showing that the decompressive surgery increases the chance of a favorable outcome (defined as mRS ≤3) at 1 year. As a new finding, this benefit seems to be independent of factors including aphasia, stroke severity, and involvement of other vascular territories in addition to the MCA. Therefore, it presents supporting evidence against withholding decompressive surgery based on these factors. On the other hand, this study was unable to show a clear benefit of surgery when it is performed after the first 48 hours or in patients older than 60. It was underpowered for the former variable while there was too much heterogeneity among individual studies for the latter.

Limitations of this study are the inclusion of some studies with missing data points or relevant variables, that could limit the power to detect heterogeneity. Besides, pooling data from different studies conducted in 6 different countries over a span of several years does bring the possibility of unrecognized confounding factors that could affect the findings.

In summary, this study confirms the benefit of surgical decompression for a wide range of patients with space-occupying hemispheric infarction. These findings should be valuable in presenting an evidence-based case when an informed consent is sought for this group of patients.

References

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