Decompressive craniectomy for ischemic stroke

Anterior and posterior circulation acute ischemic stroke carries significant morbidity and mortality as a result of malignant cerebral edema. Decompressive craniectomy has evolved as a viable neurosurgical intervention in the armamentarium of treatment options for this life-threatening edema [1].

Daou et al conducted a retrospective electronic medical record review of 1624 patients from 2006 to 2014. Subjects were screened for decompressive hemicraniectomy (DH) secondary to ischemic stroke involving the middle cerebral artery, internal carotid artery, or both. Ninety-five individuals were identified. Univariate and multivariate analyses were performed for an array of clinical variables in relationship to functional outcome according to the modified Rankin Scale (mRS). Clinical outcome was assessed at 90 days and at the latest follow-up (mean duration 16.5 months).

The mean mRS score at 90 days and at the latest follow-up post-DH was 4. Good functional outcome was observed in 40% of patients at 90 days and in 48% of patient at the latest follow-up. The mortality rate at 90 days was 18% and at the last follow-up 20%. Univariate analysis identified a greater likelihood of poor functional outcome (mRS scores of 4-6) in patients with a history of stroke (OR 6.54 [95% CI1.39-30.66]; p = 0.017), peak midline shift (MLS) > 10 mm (OR 3.35 [95% CI 1.33-8.47]; p = 0.011), or a history of myocardial infarction (OR 8.95 [95% CI1.10-72.76]; p = 0.04). Multivariate analysis demonstrated elevated odds of poor functional outcome associated with a history of stroke (OR 9.14 [95% CI 1.78-47.05]; p = 0.008), MLS > 10 mm (OR 5.15 [95% CI 1.58-16.79; p = 0.007), a history of diabetes (OR 5.63 [95% CI 1.52-20.88]; p = 0.01), delayed time from onset of stroke to DH (OR 1.32 [95% CI 1.02-1.72]; p = 0.037), and evidence of pupillary dilation prior to DH (OR 4.19 [95% CI 1.06-16.51]; p = 0.04). Patients with infarction involving the dominant hemisphere had higher odds of unfavorable functional outcome at 90 days (OR 4.73 [95% CI 1.36-16.44]; p = 0.014), but at the latest follow-up, cerebral dominance was not significantly related to outcome (OR 1.63 [95% CI 0.61-4.34]; p = 0.328).

History of stroke, diabetes, myocardial infarction, peak MLS > 10 mm, increasing duration from onset of stroke to DH, and presence of pupillary dilation prior to intervention are associated with a worse functional outcome [2].

Indications

Decompressive craniectomy for ischemic stroke indications

1)
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2)
Daou B, Kent AP, Montano M, Chalouhi N, Starke RM, Tjoumakaris S, Rosenwasser RH, Jabbour P. Decompressive hemicraniectomy: predictors of functional outcome in patients with ischemic stroke. J Neurosurg. 2016 Jun;124(6):1773-9. doi: 10.3171/2015.6.JNS15729. Epub 2015 Nov 27. PubMed PMID:

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