Severity and Outcomes of Perioperative Stroke after CAS and CEA: Analysis of a National Database

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Background: Different randomized trials have shown an excess of minor strokes in patients assigned to carotid artery stenting (CAS) compared to endarterectomy (CEA), with no difference in rates of disabling stroke or death between the two approaches. We sought to assess the severity and impact of perioperative stroke after CEA and CAS using a real-world national dataset.

Methods: A retrospective analysis of 22,116 CEA and 690 CAS cases in the Targeted ACS-NSQIP (2011-2016) dataset was performed. The severity of stroke was categorized according to postop Rankin Scale to: 1) Minor Stroke (with no Significant or Slight Disability 2) Moderate Disability 3) Severe Disability and 4) Fatal Stroke. Multivariate logistic regression (MVR) and Coarsened Exact Matching (CEM) were performed based on demographics, symptomatic status, major comorbid conditions, contralateral stenosis, smoking history, and the use of antiplatelets & beta blockers.

Results: The overall rate of postoperative stroke was 2.2% (CAS: 3.6% vs. CEA: 2.2%, p=0.01). On MVR, CAS was associated with 82% increased odds of 30-day stroke (OR: 1.82, 95%CI: 1.11-3.01, p=0.02) compared to CEA. There was no difference in stroke severity between the two procedures on univariate analysis as well as after 1:1 and 1: Many CEM.Minor strokes occurred in 46.5% of patients, moderate in 18.6%, severe in 22.1% and fatal strokes in 12.9%. Around 67% of strokes occurred prior to patients’ discharge from the hospital, mostly within the first postoperative day. Thirty-day mortality in patients with a postoperative stroke was 9.8% (CAS: 16.0%, CEA: 9.5%, p=0.09). Patients with more severe strokes had longer length of stay and were more likely discharged to rehabilitation centers and skilled facilities rather than home (Figure). Moreover, there was a trend of increased target lesion revascularization within 30-days in patients with severe stroke (18.1%) compared to those with minor (6.8%), moderate (11.3%) and fatal (10.2%) strokes (p=0.09).

Conclusion(s): Contrary to findings from randomized clinical trials, this study shows no significant difference in the severity of stroke between CEA & CAS, despite an overall increased risk of stroke after CAS. A significant proportion of postoperative stroke caused moderate to severe disability and were associated with increased mortality, revascularization rates, length of stay and non-home discharge. Reducing stroke rate and severity, through optimal medical management, refining operative techniques and careful patient selection, is clearly crucial for improving the quality of carotid artery interventions.