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Commentary: Stroke gives me confusion

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Stroke is a major complication after cardiac surgery with or without extracorporeal circulation¹ and percutaneous coronary intervention.² Ischemic stroke is challenging because its pathophysiology is multifactorial and may develop at any time during and after cardiac operations. Usually, intraoperative and immediate postoperative stroke are not related to an individual risk factor like carotid disease. With due controversy, perfusion pressure,³ preoperative atrial fibrillation,⁴ aortic atheroma,⁵ combined intracardiac operations,⁶ and others may have an influence on stroke and outcomes.

The landmark contribution of Roach and colleagues⁷ determined the incidence of stroke after coronary artery bypass graft (CABG) surgery and identified independent predictors of cerebral outcomes. There was an estimated 3.1% incidence of type I focal adverse cerebral outcomes with influence on mortality and disability. Twenty-five years later, premises of that study, risk factors, and ultimately outcomes are similar.

CABG is the most common operation in cardiac surgery even today with a risk of perioperative stroke of 1.3% to 1.4% or higher depending on statistics,^{8,9} the main problem being prevention. The value of preoperative imaging of the neck vessels and the brain has been studied in patients with multiple atheroma.¹⁰

Hess and colleagues¹¹ retrospectively investigated the prevalence of concurrent severe carotid artery stenosis



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CENTRAL MESSAGE

Untreated severe carotid stenosis at the time of coronary surgery yields high perioperative stroke rate and lower 5-year survival. Perioperative stroke is unrelated to a carotid stenosis in 60%.

(sCAS) at the time of CABG and its influence on perioperative and follow-up stroke. Stratification was based on $\geq 80\%$ stenosis in at least 1 carotid artery evaluated with ultrasonography. Authors enrolled 5475 patients, 8.4% with and 91.6% without sCAS. Perioperative ischemic stroke rate was 3 times higher in sCAS, but only in 40% of cases could be anatomically related to the carotid stenosis detected. One- and 5-year survivals were lower in patients with sCAS. In multivariable analysis, sCAS was associated with increased risk-adjusted hazards for mortality and stroke, and the strongest risk-adjusted predictor for stroke was a prior history of stroke.

A couple of important facts have been identified. The first is the much higher perioperative stroke rate in patients with untreated sCAS, although in less than one-half of patients a specific carotid stenosis might have been related to the event. Second, the 5-year survival was also lower in the sCAS group, with previous cerebrovascular accidents playing a role. Authors confirmed then that the structural and temporal relationships between coronary disease requiring CABG, sCAS and stroke, are quite complex and, after many years of multiple preventing strategies,¹² we still have questions to answer. With the understanding of the important intrinsic limitations of the study, such as being retrospective, the degree of carotid stenosis chosen or lack of information about the actual strategy for CABG (circulatory support and graft selection), the information produced by the authors challenges again which is the best

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preoperative surveillance for neck atherosclerosis in patients undergoing CABG.

Patients in the sCAS group were older, were more frequently women and had a higher prevalence of chronic obstructive pulmonary disease, heart failure, and peripheral arterial disease. Moreover, with only 40% of the perioperative strokes related to a given carotid location, the data shown herein may challenge not only whether or not pre-CABG carotid revascularization may be beneficial, but also whether or not routine carotid ultrasound workup should be performed in the absence of symptoms. The topic is still open for discussion.

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