

# Perioperative Management of Combined Carotid and Coronary Artery Bypass Grafting Procedures



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## KEYWORDS

- Staged carotid and coronary artery bypass graft surgery
- Combined carotid and coronary artery bypass graft surgery
- Perioperative anesthetic management • Carotid artery stenosis
- Carotid artery stenting • Carotid endarterectomy

## KEY POINTS

- Perioperative stroke is most commonly secondary to embolic phenomena, but multiple causes can be involved.
- Current data show no clear difference in complication rates for stroke, myocardial infarction, and death between staged versus combined carotid and coronary artery bypass graft (CABG) repairs, though prospective controlled studies are needed.
- Given the generally higher rates of neurologic sequelae with combined carotid/CABG procedures (staged or simultaneous), combined repair is generally performed in patients with both severe coronary artery disease and symptomatic or severe carotid disease.
- Anesthetic and perioperative management should be focused on minimizing the risk for perioperative complications, especially stroke and myocardial infarction.

## INTRODUCTION

The efficient diagnostic and therapeutic management of patients with concurrent carotid and coronary disease presents a significant clinical challenge. The avoidance of devastating complications of stroke, myocardial infarction (MI) and death,<sup>1</sup> particularly within 30 days<sup>2</sup> of surgical intervention, is a primary goal. A review of the morbidity and mortality of various surgical management options in this problematic

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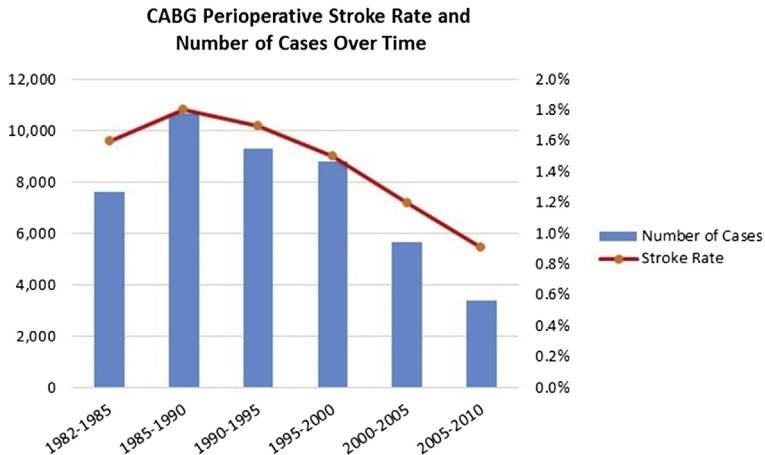
patient population can facilitate a more systematic clinical approach to perioperative management strategies.

### PERIOPERATIVE STROKE RISK IN CORONARY ARTERY BYPASS GRAFT

Overall, postoperative stroke complicates 1% to 2% of all isolated coronary artery bypass graft (CABG) surgery and can confer a 3- to 6-fold increased risk of mortality.<sup>3-6</sup> Carotid artery stenosis has been recognized as a significant risk factor for perioperative stroke in this population. As a result, strategies to identify and actively manage significant carotid artery disease before CABG have been developed, including carotid revascularization contemporaneously with coronary surgery. There is significant debate over which surgical strategies in this patient population are the most effective.

Irrespective of carotid artery disease, the overall stroke rates after isolated CABG surgery have declined over the last several decades (Fig. 1).<sup>7,8</sup> This improvement is likely to be caused, in part, by improved medical therapy for cerebrovascular disease (eg, antiplatelet therapy, statin therapy, aggressive management of hypertension). Additionally, significant improvements in perioperative management have occurred, including efforts to minimize aortic manipulation, the implementation of arterial line filters and membrane oxygenators in the cardiopulmonary bypass circuit, efforts to optimize cerebral perfusion, careful intraoperative control of metabolic derangements and hyperglycemia, and postoperative management of cardiac dysrhythmias.

Although stroke continues to be a significant source of perioperative morbidity, this trend of improvement suggests a powerful opportunity for the perioperative physician to positively impact outcomes in these patients independent of the surgical strategy used. An in-depth understanding of the best diagnostic and perioperative options is important for optimizing management and improving outcomes. As a care provider, it is, therefore, incumbent to understand the best practices for the management of these complex patients.



**Fig. 1.** Rate of stroke after CABG over last several decades. A major study of 45,432 patients at the Cleveland Clinic from 1982 to 2009 demonstrated the decline of perioperative stroke after CABG surgery. (Data from Tarakji KG, Sabik JF, Bhudia SK, et al. Temporal onset, risk factors, and outcomes associated with stroke after coronary artery bypass grafting. *JAMA* 2011;305(4):381-90.)

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