

# Occurrence of stroke after coronary artery bypass graft surgery appears to be decreasing

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An analysis of data on more than 45,000 patients who underwent coronary artery bypass graft (CABG) surgery at an academic medical center over the past 30 years finds that the occurrence of stroke after CABG has declined, despite an increase in risk profiles of patients, according to a study in the January 26 issue of *JAMA*.

Stroke is a devastating and potentially preventable complication of CABG surgery. Because it increasingly is being reserved for elderly patients with extensive [coronary disease](#) and co-existing conditions, prevalence of [stroke](#) after CABG is likely to remain substantial. Many studies have identified patient factors associated with post-CABG stroke; however, information about timing of perioperative (around the time of surgery) stroke and the influence of different surgical techniques remains limited, according to background information in the article.

Khaldoun G. Tarakji, M.D., M.P.H., of the Cleveland Clinic, and colleagues examined the prevalence and timing of perioperative stroke, along with associated patient and surgical factors. The study included data from 45,432 patients (average age, 63 years) who underwent primary or reoperative CABG surgery from 1982 through 2009 at a U.S. academic medical center. Strokes occurring following CABG were recorded prospectively and classified as having occurred intraoperative or postoperatively. Data also included information on 4 different CABG operative strategies: off-pump (not on heart-lung machine), on-pump with beating heart, on-pump with arrested heart, on-pump with hypothermic circulatory arrest (in which a heart-lung machine is used to

cool the body during surgery, which lowers blood pressure and slows circulation to near standstill).

Among the patients in the study, 705 (1.6 percent) experienced a stroke. Occurrence of stroke peaked in 1988 at 2.6 percent, then slowly declined by 4.69 percent per year, despite increasing patient risk profile, such as higher prevalence of preoperative stroke, [hypertension](#), and diabetes. Of the 705 patients experiencing stroke, intraoperative stroke occurred in 40 percent (n = 279) and postoperative stroke in 58 percent (n = 409), with timing undetermined in 17 patients.

Risk factors common to both intraoperative and postoperative stroke included older age, previous stroke, preoperative atrial fibrillation, and on-pump CABG with hypothermic circulatory arrest. As number of arteriosclerotic (hardening and thickening of the walls of the arteries) co-existing conditions increased, stroke risk increased.

Different surgical techniques were associated with different risks of intraoperative stroke. Unadjusted rates of stroke were highest among patients who had on-pump CABG with hypothermic circulatory arrest (5.3 percent) and lowest among those who had off-pump CABG (0.14 percent) and on-pump beating-heart CABG (0 percent). Risk of intraoperative stroke was intermediate for those undergoing on-pump arrested-heart CABG (0.50 percent)

Patients who experienced a stroke had substantially worse hospital outcomes, even after adjustment for preoperative factors: 19 percent mortality vs. 3.7 percent; 44 percent prolonged ventilation vs. 15 percent; and 13 percent renal failure vs. 4.3 percent. They also experienced substantially longer intensive care unit and postoperative lengths of stay.

The authors speculate that the reason the occurrence of stroke among

patients undergoing CABG has decreased over the last 3 decades despite an increasing patient risk profile may be the result of improving preoperative assessment, intraoperative anesthetic and surgical techniques, and postoperative care.

"Further studies are needed to develop better strategies to minimize the occurrence of stroke among patients undergoing CABG," the researchers conclude.

**More information:** *JAMA*. 2011;305[4]:381-390.

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