

SCA 7

PREVALENCE AND ASSOCIATIONS OF SILENT BRAIN INFARCTION IN ELDERLY CARDIAC SURGERY PATIENTS WITH SYSTEMIC ATHEROSCLEROSIS

Ito A, Maekawa K, Honma K, Baba T, Goto T

Anesthesiology, Kumamoto Chuo Hospital, Kumamoto, Japan

Introduction: Silent brain infarctions are frequently detected on magnetic resonance imaging (MRI) in healthy elderly persons, but their significance in patients undergoing coronary artery bypass grafting (CABG) has not been examined. We determined the relationship between silent brain infarction and systemic atherosclerosis in elderly patients undergoing CABG.

Methods: After institutional approval, we studied 449 patients aged 60 years and older, who underwent CABG with cardiopulmonary bypass. Preoperative cranial MRI, intracranial MR angiography (MRA), carotid MRA and intraoperative ultrasonographic scanning of the ascending aorta were performed. The preoperative risk factors assessed were age, gender, renal dysfunction (creatinine ≥ 1.9 mg/dl), hypertension, diabetes, hyperlipidemia, cerebrovascular disease (CVD: transient ischemic attack, stroke), peripheral vascular disease (PVD), and abdominal aortic aneurysm. For analysis, patients were divided into 3 groups according to the history of CVD and the presence of infarctions on MRI: Silent brain infarction (without CVD and with one or more infarcts), symptomatic brain infarction (CVD and with one or more infarcts), and control (without CVD and without any infarcts). The patients' neuropsychological (NP) performance was assessed 1 day prior to and 7 days following surgery by the same anesthesiologist using Hasegawa Dementia Scale (HDS). Preoperative cognitive decline was defined as HDS < 24 . NP dysfunction was defined as a postoperative decrease in HDS ≥ 4 . Demographic data and preoperative characteristics were analyzed with unpaired t test and chi-square test as appropriate. $P < 0.05$ was considered statistically significant. Stepwise logistic regression was used to assess the predictors of silent brain infarction.

Results: Silent brain infarction was detected in 158 patients (35.1%) and symptomatic brain infarction in 66 (14.7%). Patients with silent brain infarction were older and had a statistically higher

prevalence of PVD, abdominal aortic aneurysm, and renal dysfunction than those in the control group. Severe atherosclerosis of the ascending aorta, and intracranial arterial stenosis greater than 50% were also determined to be significant. Male gender, hypertension and intracranial arterial stenosis greater than 50% were statistically more common in symptomatic brain infarction patients than those with silent brain infarction. But there were no differences in other characteristics between these two groups. The frequency of preoperative cognitive decline (14.6% vs. 4.9%, $p = 0.001$), NP dysfunction (15.2% vs. 6.2%, $p = 0.004$), perioperative stroke (5.7% vs. 1.3%, $p = 0.032$) were statistically higher for those with silent brain infarction compared with controls. There was no significant difference in the frequency of these variables between silent brain infarction patients and those with symptomatic brain infarction (24.2%, 18.2%, and 9.1%). Stepwise logistic regression analysis performed on patients with control, with silent brain infarction as the dependent variable, showed that preoperative cognitive decline (OR: odds ratio, 2.77; $p = 0.011$), renal dysfunction (OR, 2.45; $p = 0.012$), intracranial arterial stenosis greater than 50% (OR, 1.62; $p = 0.073$), age (OR, 1.41; $p = 0.057$), and severe atherosclerosis of the ascending aorta (OR, 1.31; $p = 0.056$) were independently associated with silent brain infarction.

Conclusion: Our data indicates that the incidence of NP dysfunction and perioperative stroke is higher in patients with silent brain infarction undergoing CABG. The presence and progression of atherosclerosis, such as PVD, abdominal aortic aneurysm, and renal dysfunction is apparent in patients with silent brain infarction, as well as in those with symptomatic brain infarction. Silent brain infarction may be a marker of systemic atherosclerosis.

References

1. Price RT, Manolio TA, Kronmal RA, et al. Silent brain infarction on magnetic resonance imaging and neurological abnormalities in community-dwelling older adults. The cardiovascular health study. *Stroke* 1997; 28: 1158-1164
2. Vermeer SE, Koudstaal PJ, Oudkerk M, et al. Prevalence and risk factors of silent brain infarcts in the population-based Rotterdam scan study. *Stroke* 2002; 33: 21-25