Diagnosis of Carotid Artery Occlusive Disease in Patients Scheduled for Cardiac or Vascular Surgery: Is This a Place for Invasive Selective Carotid Angiography?

To the Editor:

Doppler ultrasound and recently angio–computerized-tomography (angio-CT) and angio–magnetic-resonance (angio-MR) are rapidly becoming the gold standard of diagnosis of carotid occlusive disease. Advantages of these techniques are the wide availability, relative operator independence, good imaging resolution, and noninvasiveness. On the other hand, in certain anatomical situations such as occlusion or bilateral stenosis, or particular clinical situations such as coronary or aortic surgical emergency, they can be problematic, doubtful, or impractical, and selective carotid angiography may still play a role.

Acute coronary syndromes require prompt coronary artery angiography and eventual percutaneous intervention or referral to cardiac surgeon for urgent myocardial revascularization. Every invasive cardiologist has this problematic experience of a patient undergoing urgent coronary angiography for segment (ST) elevation or nonST-elevation acute coronary syndrome (ACS) in whom unexpected severe stenosis of the left main trunk has been detected. In this case, waiting for a Doppler ultrasound scanning of the carotid arteries or for an angio-CT in order to rule out any carotid atherosclerotic involvement before cardiac surgery may be cumbersome and not really safe. A selective 2-projection carotid angiography with the same Judkins Right catheter used during the coronary artery angiography is more practical, less time-consuming, and can offer good image resolution with a low contrast dose of 10 to 15 mL.

In my opinion it is the preferred strategy and in at least 15 cases of left main trunk subocclusion in the last 5 years no complications occurred except one carotid spasm, which was resolved with nitrates. Aortic dissection in adults and elderly is another clinical situation in which selective carotid artery angiography performed at the same time as diagnostic preoperative coronary arteriography may be a rapid and practical way to rule out carotid artery involvement or significant atherosclerosis. Similarly, carotid artery angiography at the same time as coronary arteriography performed before thoracic or thoraco-abdominal aneurysm endovascular or open repair may be a practicable diagnostic option in patients with cardiovascular risk factors.

Combined aortic valve stenosis (AVS) and carotid artery disease constitute a high-risk clinical setting for simultaneous open-heart and vascular surgery. Duplex sonography constitutes the most accepted imaging modality for screening patients undergoing major vascular and cardiac surgery, but now it normally has limitations due to technical difficulties, overestimation of lesions in cases of bilateral disease, difficulty appreciation of occlusion, and complex anatomy that may be exacerbated by the characteristic abnormalities in flow velocity pattern due to aortic valve stenosis, such as increased acceleration time, decreased peak velocity, and delayed upstroke. Candidates for aortic valve surgery can benefit from a carotid artery angiography performed at the time of complete cardiac catheterization. In my experience, 15 patients (8.3% of all aortic valve stenosis patients, mean age 70±10.4 years) with severe aortic valve stenosis and inconclusive Doppler sonography were diagnosed to have critical stenosis of one (14 patients) or both (1 patient) internal carotid arteries on carotid angiography performed at the same time as cardiac catheterization. Mean carotid angiography time, mean contrast material quantity injected, and mean number of projection needed for complete study were 9.4±2.3 minutes, 16.5±3.4 mL and 2.1±1.5, respectively. Two arterial spasm cases (3.3%) and no in-hospital complications have been observed (unpublished data, 2003).

Obviously selective carotid artery angiography cannot be proposed nowadays for stratification of all patients undergoing major surgery, noninvasive techniques being recognized as the gold standard in this setting, but for patients in whom emergency revascularization cannot be delayed, or for patients undergoing coronary arteriography before cardiac or major vascular surgery, it can still play a role. Selective carotid artery angiography allows a careful assessment of anatomical location, morphology, and degree of atherosclerotic lesions and may help expedite diagnostic route and provide the surgeon with the best anatomical picture, thus avoiding long intraoperative time. My experience suggests that carotid artery angiography is not time consuming, accounting for about 10 minutes, if performed during the same session of complete right and left cardiac catheterization. Moreover, it does not require much more contrast material, adjuctive catheters, or multiple projections.

Combined cardiac catheterization and selective carotid angiography in medium to high volume laboratories may be safer, faster, more practical, and more complete in aged patients with combined comorbidities, particularly in urgent or emergent conditions, without increased cost.

Moreover, combined endovascular therapy of coronary and carotid arteries, combined endovascular and surgical therapy of carotid and heart valves, and, in the future, combined percutaneous cardiac valve implantation and carotid artery disease angioplasty can enhance the role of selective carotid artery angioplasty in assessing carotid artery atherosclerosis in patients in whom a cardiac or peripheral invasive diagnostic procedure is planned or a cardiac or peripheral endovascular intervention is scheduled.

Gianluca Rigatelli, MD, FESC, FACC, FANMCO, FASA, FSCAI
E.C.V.T.
Legnano, Italy

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