Should Patients With Critical Limb Ischemia Undergo Routine Coronary Angiography to Detect Coronary Artery Disease?

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Atherosclerosis can affect multiple vascular territories, leading to peripheral arterial disease (PAD), coronary artery disease (CAD), and cerebral vascular disease. The leading cause of death in patients with PAD is CAD. Critical limb ischemia (CLI) is an aggressive form of PAD that can lead to amputation. Peripheral vascular intervention (PVI) is an effective treatment for limb salvage. The prevalence of diabetes mellitus (70.4%), chronic renal insufficiency (27.8%), and smoking (70% to 90%) in patients with CLI is high, increasing the risk of cardiovascular events including myocardial infarction and death. Annually, there is a 25% risk of mortality in patients, 30% will have amputation, and only 45% will remain alive with both limbs. At 5 years, over 60% risk of mortality in patients. Therefore, does the strategy of routine coronary angiography and subsequent coronary revascularization based upon clinical judgment represent a reasonable treatment strategy for patients with CLI who are at high risk for cardiovascular events?

Assessment for myocardial ischemia is essential given the high prevalence of CAD in patients with CLI. The Coronary Artery Revascularization Prophylaxis (CARP) study, which randomized 510 patients to revascularization or medical therapy without revascularization prior to elective vascular surgery, reported no significant difference in the 30-day incidence of myocardial infarction, death, or length of stay. Revascularization and medical therapy provide similar mortality rates at 6 years (22% vs 23%, P=NS). However, CAD in patients with CLI who require urgent revascularization may be more severe compared with CAD in patients with stable PAD. Patients with CLI report less cardiac symptoms, such as angina, due to limited mobility and restriction of full exercise capacity. Furthermore, in diabetic patients, angina may sometimes be under-reported, given development of autonomic neuropathy.

Given that CLI is identified as a CAD risk equivalent, the strategy of routine coronary angiography and subsequent coronary revascularization in patients with CLI who underwent PVI was assessed. Of the 252 patients with CLI who underwent coronary angiography, 167 patients (66.3%) had CAD and 85 patients (33.7%) did not have CAD. Patients in the CAD group were older, had a higher prevalence of diabetes and cerebrovascular disease, and had a lower mean ejection fraction. In the CAD group, of the 145 patients with significant CAD, percutaneous coronary intervention (PCI) was performed in 114 patients (78.6%). At 1 year follow-up, the CAD and non-CAD groups had no statistically significant differences in mortality (7.1% vs 4.7%, P=.45), myocardial infarction (1.1% vs...
0%, \( P = .31 \), and PCI (4.7% vs 1.1%, \( P = .31 \)). These outcomes were similar after the adjustment of baseline confounders. At 1 year follow-up, the CAD and non-CAD group had similar rates of repeat PTA (16.7% vs 17.6%, \( P = .86 \)), target lesion revascularization (13.7% vs 14.1%, \( P = .94 \)), and amputation (19.1% vs 16.4%, \( P = .60 \)).

One possible justification for why routine coronary angiography may be helpful is the detection of life-threatening CAD. The CAD group included 12.6% of patients who underwent PCI for ULMCA disease. Revascularization in patients with ULMCA disease is recommended due to a significantly higher mortality rate in those treated medically (50% mortality rate at 3 years).9–11 Patients with CLI have a mortality rate at 1 year of 25% and over 60% at 5 years and is mostly due to myocardial infarction and stroke.1,11–14

Noninvasive assessment of ischemia may not be able to detect unprotected left main coronary artery (ULMCA) or multivessel CAD because of the possibility of balanced ischemia. No reversible perfusion defect was observed on single-photon emission computed tomography imaging in approximately 19% of patients with ULMCA disease.16 There is a paucity of data on the use of stress echocardiography and the diagnosis of ULMCA disease.17 In the Medicine, Angioplasty, or Surgery Study II (MASS II) trial, the mortality rates in diabetic patients was highest in those who did not undergo revascularization compared with PCI and surgical revascularization (37.5%, 31.3%, and 27.5%, respectively).18

In conclusion, patients with CLI have a high prevalence of CAD. The ideal strategy of evaluation and treatment for CAD in these high-risk patients is unknown. Given that cardiovascular disease is the predominant common cause of death in CLI patients, an aggressive strategy of coronary angiography and coronary revascularization, when warranted, may detect life-threatening CAD and reduce the risk of death, myocardial infarction, and urgent revascularization. Multicenter randomized trials are needed to determine the ideal diagnostic and treatment strategy for these patients.

**Editor's note:** Disclosure: The authors have completed and returned the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr. Lee reports honoraria from CSI. Dr. Akhondi reports no disclosures related to the content of this manuscript.

Manuscript received March 23, 2015; provisional acceptance given June 19, 2015; manuscript accepted August 3, 2015.

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LETTER TO THE EDITOR