The sooner the better? Early strategies of peripheral vascular intervention for patients with acute aortic dissection complicated by organ malperfusion

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Central Message

Acute organ malperfusion caused by acute aortic dissection requires accurate and prompt diagnosis to proceed with an appropriate intervention for preventing irreversible organ damage.

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In Japan, 30-day mortality of surgery for acute type A aortic dissection in 2014 was 8.8%.¹ Some reasons for this higher mortality might be because of the increased recruiting of patients with aortic branch vessel occlusion, resulting in stroke, paraplegia, or renal, mesenteric, or leg ischemia. In this issue of *The Journal of Thoracic and Cardiovascular Surgery*, Uchida and colleagues have raised many important questions in treating patients with acute aortic dissection (AAD) complicated by organ malperfusion.²

The incidence of malperfusion in AAD has been reported as 4.5% to 7.7% in the coronary arteries, 2.6% to 28.0% in the carotid arteries, 2.3% to 13.7% in the mesenteric arteries, 2.6% to 12.4% in the renal arteries, 1.6% to 12.4% in the spinal cord, and 6.8% to 26.1% in the iliofemoral arteries.^{3,4} The International Registry of Acute Aortic Dissection (IRAD) study showed higher mortality with increased involvement of the aortic branches. The German Registry for Acute Aortic Dissection Type A (GERAADA) study of 2137 patients showed that the all-cause 30-day mortality was 16.9% and varied substantially according to the number of organ systems affected by malperfusion.⁵

The treatment of patients with acute type A aortic dissection complicated with organ malperfusion has been of controversy. The authors² discuss an alternative treatment of early revascularization in 108 patients with acute type A aortic dissection and malperfusion over a 10-year period. Thirty-three of 108 patients who underwent early revascularization of malperfused organs before central aortic surgery appeared to fare better than those who did not.

Kawahito et al⁶ reported that 12 of 196 consecutive patients (6.1%) with acute type A aortic dissection suffered myocardial ischemia associated with the dissection. All patients underwent coronary artery bypass grafting accompanied by aortic repair. The reported mortality rate was higher

than in patients without coronary malperfusion (33.3% vs 8.2%; $P = .019$). Uchida et al concluded that early revascularization with coronary stent placement was effective in preventing postoperative low cardiac output syndrome.²

Syncope in patients with dissection might not necessarily represent brain infarction and might be caused by cardiac tamponade or hypotension. Patients are sometimes excluded from definitive surgery or early interventions because of their high mortality and cerebral morbidity. The IRAD study⁷ revealed that aortic repair was not performed in 11% of non-brain-injured patients, 24.1% with a cerebrovascular accident, or 33.3% with coma, echoing a preference to avoid surgery in high-risk patients. Eusanio et al reported that hospital mortality was 40.2% with a cerebrovascular accident and 63.0% with coma.⁸ The GERAADA study showed neurological dysfunction occurring in 20.3% of patients with acute type A aortic dissection before surgery, 12.6% of which resolved postoperatively and 7.7% persisted.⁹ Urbanski and Wagner¹⁰ first reported on 2 cases of AAD with bilateral dissection of the common carotid artery, which resulted in cerebral malperfusion. Luehr et al¹¹ performed extra-anatomic aorto-carotid bypass in 23 patients suffering from cerebral malperfusion secondary to aortic dissection. They reported that new stroke was found in 34.8% and hospital mortality was 13.0%. We believe that aggressive direct reperfusion of

the carotid artery before aortic repair might reduce neurological complications in patients with brain malperfusion.¹²

Despite successful aortic repair, death often resulted as a result of mesenteric infarction. Fann et al¹³ suggested that, when indicated, an early aggressive surgical approach focusing primarily on the thoracic aorta, followed by secondary aortic fenestration, superior mesenteric artery revascularization, and/or bowel resection is the most prudent option for treating patients with acute mesenteric ischemia. Cambria et al⁴ advocated for local surgical treatment of visceral ischemia followed by medical or surgical management of the thoracic aorta. Di Eusanio et al¹⁴ stated that surgical or hybrid therapy appears to be associated with better long-term outcomes in this setting. Uchida and colleagues² proposed the simple solution of inserting a small catheter into the mesenteric artery, perfusing it, and proceeding to the central repair. Extensive exploration of visceral perfusion should be mandatory, and thoracic aortic repair or direct bypass to the mesenteric artery should be performed when indicated. In conclusion, acute organ malperfusion caused by AAD requires accurate and prompt diagnosis to proceed with an appropriate intervention for preventing irreversible organ damage secondary to ischemia.

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