Compressed true lumen in the innominate artery: A pitfall of right axillary arterial perfusion in acute aortic dissection

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Although axillary arterial perfusion (AX-P) is often preferred to femoral arterial perfusion (FA-P) in acute aortic dissection because it is associated with a lower incidence of malperfusion, it is unlikely to be perfect.¹ We used near-infrared spectroscopy and orbital Doppler to detect cerebral malperfusion and transesophageal echocardiography (TEE) to clarify the malperfusion mechanism^{2,3} and observed a case of malperfusion after bilateral AX-P, which was relieved after interruption of the right AX-P.³ We report another case of malperfusion after right AX-P resulting from the narrowing of the innominate artery (IA) lumen.

CLINICAL SUMMARY

A 46-year-old man had an episode of chest pain 3 days before being transferred to the Hiroshima University Hospital. The patient was in shock and underwent a Bentall operation. Preoperative computed tomography showed a Stanford type A dissection and narrow true lumen of the proximal IA, compressed by a radiopaque false lumen (Figure 1). Intraoperative TEE showed that all arch branches were involved. In the left subclavian and left common carotid arteries, blood flow was detectable in both true and false lumina. The false lumen of the IA was partially echogenic with a mobile intimal flap (Figure 2). The entry was situated in the distal ascending

aorta. Right orbital flow was reduced, and right radial artery pressure was lower than the dorsalis pedis artery pressure by 20 mm Hg. We considered that 1) inflow without outflow inflated the false lumen of the IA, but retrograde AX-P would decompress the true lumen, and that 2) left AX-P or FA-P might lead to false lumen perfusion because reentry could become an entry under retrograde perfusion. After right AX-P, however, dorsalis pedis artery pressure decreased to 30 mm Hg, and the blood flow in the left subclavian and left common carotid arteries and left orbit became undetectable. TEE revealed that the true lumen of the IA remained narrow.

As left AX-P was added, systemic and left hemisphere perfusion recovered without false lumen perfusion. The near-infrared spectroscopy readings could be maintained within the normal range. Although the narrow true lumen and slight pressure gradient remained, the patient had a favorable postoperative course without complication.

DISCUSSION

This case suggested another mechanism of malperfusion after AX-P: refractory narrowing of the true lumen in the IA. On the basis of computed tomography and TEE findings, we devised 2 strategies: 1) right AX-P or 2) left AX-P and/or FA-P. However, the initial assessment that the false lumen was flexible was not correct. From a review of the TEE findings, we concluded that the thrombus was echogenic and lacked fluidity. The thrombus might have been formed at the onset of dissection 3 days before. When malperfusion was detected after right AX-P, we had 2 subsequent strategies: FA-P or left AX-P. Although both had a risk of false lumen perfusion because of the

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FIGURE 1. Preoperative computed tomography scan demonstrating narrow true lumen with radiopaque false lumen.

FIGURE 2. Intraoperative transesophageal echocardiogram demonstrating the narrow true lumen of the IA.

presence of reentry, we decided to add left AX-P because the bilateral axillary arteries had been routinely prepared for selective cerebral perfusion at the Hiroshima University Hospital. The addition of FA-P might be another strategy in other institutions.

Because there are unpredictable factors in acute aortic dissection, decisions need to be made stepwise and be based on real-time information at each step. Although our initial assessment was incorrect, TEE and orbital Doppler findings steered the subsequent management toward a good outcome.

Compression of IA can be a mechanism of malperfusion after right AX-P. In acute aortic dissection with many unpre-

dictable factors, real-time, on-site information is essential for intraoperative navigation.

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Partial left ventricular support implanted through minimal access surgery as a bridge to cardiac transplant

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The clinical benefits of implantable left ventricular assist devices (LVADs) as a bridge to transplant and for destination therapy have been demonstrated.¹⁻³ The low rate of LVAD use is attributed to the invasive nature of the implantation surgery and the relatively high rate of complications.⁴ If

LVADs were used in less critical hemodynamic and clinical states, the flow requirements could be reduced.

The Synergy Micro-Pump (CircuLite, Inc, Hackensack NJ) is approximately the size of a size AA battery, weighs only 25 g, and can pump as much as 2.5 to 3 L/min. Its small size permits insertion through a right-sided minithoracotomy. The pump is then placed subcutaneously in the pectoral region, similar to a pacemaker. This is the first clinical report describing the Synergy Micro-Pump's implantation procedure, hemodynamic effects, and clinical results.

CLINICAL SUMMARY

The patient was a 46-year-old man (weight 85 kg, height 184 cm, body surface area 2.01 m²) without significant illness in his medical history who had a large anterior myocardial infarction in March 2007. New York Heart Association

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