See Article page 1713.

Check for updates

Commentary: How to diagnose cerebral malperfusion? And how to manage?

Yuichi Ueda, MD, PhD

Yuichi Ueda, MD, PhD

CENTRAL MESSAGE

A rapid strategy for initiating brain circulation is crucial to reduce ischemic brain insult for patients with cerebral malperfusion secondary to acute aortic dissection.

In this issue of the *Journal*, Sultan and colleagues[1] present International Registry of Acute Aortic Dissection (IRAD) data for surgery for acute thoracic aortic dissection in patients who had neurologic deficits before surgery. The authors defined cerebral malperfusion (CM) as when the neurologic deficit was detected preoperatively. CM is usually defined as poor cerebral perfusion due to severe stenosis or occlusion of the branches of the aortic arch due to the extension of the dissection or expansion of the false lumen. Patients with impaired consciousness are unable to complain of the typical pain of aortic dissection, so the following strange results are described in this paper. "Patients with CM were less likely to present with chest pain and back pain. CM patients were more likely to present with syncope, peripheral malperfusion, and in shock."

In this paper, there was no classification of neurologic deficit as a coma or syncope or limb paralysis. The proportion of patients with coma was unknown. There may be a significant number of cases that were not eligible for surgery due to coma status. Since these nonsurgical patients were not registered in IRAD, selection bias was considered to be significant for surgical indications. Those points illustrate some limitations of this paper, as the authors have described. Analyzes were made on surgical mortality, but there is no analysis of sustained or recovered brain function after surgery.

It is difficult to determine the malperfusion of 3 branches of the aortic arch due to aortic dissection without image findings, but the IRAD lacked image finding data.

Therefore, defining neurologic deficits by physical examination as CM is a weakness of this paper.

From the image findings, it is possible to judge the dissection of the arch branches and the degree of stenosis or occlusion. Furthermore, the region of malperfusion and degree of ischemia vary depending on the state of the circle of Willis. The surgical strategy should be selected based on these image findings.[2-4]

The cases transferred to the secondary and tertiary medical centers are in a relatively stable state that can withstand transportation, and the details of acute type A aortic dissection have been diagnosed based on computed tomography and ultrasound findings. IRAD's participating facilities are tertiary hospitals and show the results of these selected patients. The survival rate of 75% is likely to be different from the real world. In any case, the conclusions of this paper are valuable in recommending rapid surgical treatment.

Several reference papers defined CM based on image findings of occlusion or a high degree of stenosis in branches of the aortic arch. These papers also described the use of various treatment strategies aimed at the probability of cerebral perfusion from the viewpoint of brain protection, such as rapid initiation of extracorporeal circulation using carotid artery or right axillary artery cannulation.[2-4] In the future, we should clarify the criteria for surgical indications for patients with severe coma due to CM.

https://doi.org/10.1016/j.jtcvs.2019.12.032

References

1. Sultan I, Bianco V, Patel HJ, Arnaoutakis GJ, Eusanio MD, Chen EP, et al. Surgery for type A aortic dissection in patients with cerebral malperfusion: results from the International Registry of Acute Aortic Dissections. *J Thorac Cardiovasc Surg.* 2021;161:1713-20.e1.
2. Okita Y, Ikeno Y, Yokawa K, Henmi S, Gotake Y, Nakai H, et al. Direct perfusion of the carotid artery in patients with brain malperfusion secondary to acute aortic dissection. *Gen Thorac Cardiovasc Surg.* 2019;67:161-7.
3. Furukawa T, Uchida N, Takahashi S, Yamane Y, Mochizuki S, Yamada K, et al. Management of cerebral malperfusion in surgical repair of acute type A aortic dissection. *Eur J Cardiothorac Surg.* 2017;52:327-32.
4. Tsukube T, Hayashi T, Kawahira T, Haraguchi T, Matsukawa R, Kozawa S, et al. Neurological outcomes after immediate aortic repair for acute type A aortic dissection complicated by coma. *Circulation.* 2011;124:S163-7.

ADULT