Authors have nothing to disclose with regard to commercial support.

had clinical suspicion of cerebrovascular complications and underwent cerebral imaging (post-anoxic coma, salvage surgery, and cerebrovascular complications occurring after the 2 first days of intensive care unit stay were excluded). Computed tomographic (CT) angiography was mainly performed over magnetic resonance (MR) angiography (89.6% vs 10.4%). Most frequent clinical presentations were limb motor deficit and seizure (63% and 31%, respectively). Three patients of 57 (5.3%, 95% confidence interval: 1.1%-14.6%) had a LVO and one was considered as candidate for emergent thrombectomy. Delay between intensive care unit arrival and symptom detection and delay between symptom detection and cerebral imaging were 3.1 hours (interquartile range, 2.3-7.9) and 1.8 hours (interquartile range, 0.6-3.3), respectively. No risk factor of LVO has been identified in our series. These results were presented at the annual meeting of the French Society of Anesthesiology and Intensive Care (September 19-21 2019, Paris, France).

Although these 2 series have different inclusion criteria, they constitute the largest consecutive series reporting LVO stroke after CTS. The prevalence is slightly underestimated, however, because 12.8% of patients with stroke in the study of Sheriff and colleagues¹ and 15.8% in ours did not benefit from vessel imaging, despite the implementation of an institutional protocol. CT angiography was the preferred cerebrovascular imaging modality in both series, because it had better availability and less contraindication relative to magnetic resonance imaging angiography in this specific population. As opposed to the study of Sheriff and colleagues, no statistical association between cardiopulmonary bypass duration and LVO was found in our series. This was probably due to shorter mean cardiopulmonary bypass duration (106 min vs 158 min) and a smaller sample size in our series.

Although LVO stroke is a rare event in the setting of CTS, all cardiac care providers should pay great attention, because an evidence-based therapeutic opportunity now exists out to 24 hours after the last known well time.³ Efforts should be made to allow for the following: (1) early detection of clinical abnormalities by using minimal postoperative sedation and active clinical neurologic monitoring; (2) urgent cerebrovascular imaging performance; and (3) urgent referral to neurointerventional care providers to discuss thrombectomy. A preestablished multidisciplinary procedure adapted to each particular institution would largely facilitate appropriate management.⁴

Rémi Schweizer, MD^a
Matthias Jacquet-Lagrèze, MD^a

Jean-Luc Fellahi, MD, PhD^{a,b}

^aService d'Anesthésie-Réanimation
Hôpital Louis Pradel
Hospices Civils de Lyon
Lyon, France
^bInserm U1060
Université Claude Bernard Lyon 1
Lyon, France

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REPLY: TIME TO SHOW GREATER APPRECIATION OF LARGE VESSEL OCCLUSION STROKE AFTER CARDIOVASCULAR

SURGERY

Reply to the Editor:

We read with great interest the letter by Schweizer and colleagues.¹ It seems timely that efforts to increase awareness of the issues relating to the importance of treating large vessel occlusion (LVO) in the setting of cardiovascular surgery (CVS) is being brought to the forefront. LVO stroke is relatively rare; Sheriff and colleagues² reported an overall stroke rate of 2.48% in their series, of which ischemic stroke accounted for 92.5% and LVO stroke comprised only 10.1%. Similarly, Schweizer and colleagues reported an overall stroke rate of 2.9%, of which LVO stroke accounted for only 5.3%, or 3 of 57 patients.

As reported in both series, LVO stroke is relatively rare, but its significance lies in causing a preponderance of stroke-related deaths and severe disabilities.³ An LVO stroke is usually caused by the occlusion of a large terminal intracranial vessel, such as the internal carotid artery or the proximal segments (eg, M1, M2) of the middle cerebral artery.⁴ The territories covered by these vessels are poorly

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supplied by surrogate collateral reperfusion, and relief of any ongoing ischemic process may depend on timely revascularization through removal of the culprit embolic material.

Schweizer and colleagues mentioned several key ingredients for successfully treating and salvaging the ischemic brain territories: early detection, urgent cerebrovascular imaging, and rapid implementation of thrombectomy by a neurointerventional specialist. The time to thrombectomy has 2 distinct components that need to be expeditiously addressed as a prerequisite: time to detection and time to imaging. However, early detection of neurologic abnormality after cardiovascular surgery is often confounded by the inability to determine the actual time to detection from the last seen well period, because the occlusive event may occur at any time following completion of general anesthesia. Therefore, depending on when the actual embolic event had occurred and the duration of the surgery, the normal waiting period of 2–3 hours after intensive care unit admission may only prolong the critical time to image acquisition in patients at risk. The presence of shaggy aorta, arch procedures (especially total arch replacement), and prolonged cardiopulmonary bypass may increase the risk of embolic stroke as well.^{5–7} Therefore, to increase the treatment opportunities in these patients, a greater awareness and appreciation of the implications relating to these issues, followed by rapid proactive implementation of the necessary measures, are essential.

Sheriff and colleagues have also suggested that aggressive treatment aimed at removing the occlusive

material may lead to significant neurologic benefit even after the 6-hour time limit beyond which aggressive revascularization is perceived as being no longer beneficial. Therefore, serious consideration should also be given to extending the revascularization efforts in LVO stroke to those with durations lying “outside” the window of effective treatment. With continuing improvement in surgical outcomes, increasingly more elderly patients are undergoing complex high-risk cardiovascular surgeries. In keeping with this trend, it is time that greater attention is directed to the issues relating to postoperative LVO stroke.

Suk Jung Choo, MD

Department of Thoracic and Cardiovascular Surgery
Asan Medical Center
University of Ulsan College of Medicine
Seoul, Korea

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