Commentary: Acute type A dissection with malperfusion syndrome: Start your stopwatch?

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The strategy of endovascular revascularization first with delayed open aortic repair for the treatment of acute type A aortic dissection with malperfusion syndrome (MPS) has been gradually adopted in the United States and world with considerable success, and is discussed by Chen and colleagues. Chen and colleagues are to be commended for their efforts to improve care for a complex patient population, and with great success. Importantly, this study used the correct definition of MPS (end organ necrosis, dysfunction, and failure) rather than malperfusion (inadequate blood flow to the end organs). This study corroborates our experience at the University of Michigan that delayed open repair improves operative outcomes and avoids futile operations in patients with MPS. The risk of aortic rupture while waiting for delayed open aortic repair was low (3-4% in our latest study and 4.4% in their study). In our strategy, the diagnosis of MPS is made based on the presentation of the patient and not only at the time of onset of aortic dissection. Chen and colleagues present a modification of this strategy in which upfront endovascular reperfusion is reserved for patients who present with >6 hours of symptoms related to MPS, whereas the remainder undergo immediate central repair followed by endovascular reperfusion for unresolved, postoperative malperfusion.

It is interesting to consider why a 6-hour cutoff might be of particular value. Is this the mean time for which organs can tolerate ischemia? The authors suggest that the 6-hour time point is indeed based on the pathophysiology of ischemia, but further elaboration would be valuable given various organs’ broad differential tolerance of ischemia as well the complex effects of dynamic and static occlusion of branch vessels. The present literature investigating tolerance for bowel ischemia does not consider the anatomy of the obstruction, apart from traumatic or embolic occlusion, or reflect functional collateral systems. But the combination of hypertension and an anterior true lumen in the abdominal aorta, by no means a rare occurrence, can shut off flow simultaneously to celiac, superior mesenteric, inferior mesenteric, and right common iliac arteries, in which case occlusion without collateral flow for as little as 1 to 2 hours will result in extensive infarction of the small bowel and proximal colon. Computed tomography findings such as bowel pneumatosis or portal vein gas also indicate advanced bowel ischemia and, in our opinion, should supersede the 6-hour rule. In patients with static malperfusion, open aortic repair cannot resolve the end organ malperfusion and MPS is worsened throughout the course of central aortic repair, even if the onset of MPS is <6 hours. With dynamic malperfusion, organs such as intestine or lower extremities could be intermittently perfused while the blood pressure is lower and not experience necrosis after >6 hours, and could tolerate upfront open repair, especially if the patient has high risk of aortic rupture or severe acute aortic insufficiency. Although using a cutoff of 6 hours of onset of MPS is arbitrary, time is undisputedly an important variable in decision making regarding delayed open aortic repair. We believe that the 6-hour rule should be used judiciously, considering type of malperfusion, arterial anatomy, dissection flap position with respect to visceral artery origins, and signs of advanced bowel ischemia.
judiciously, considering the type of malperfusion (static or dynamic) arterial anatomy, dissection flap position with respect to visceral artery origins, and computed tomography signs of advanced bowel ischemia.

We note that the population studied in this work is much younger than patients in most studies in the United States. Supporting this is a comparison of the Registry of Aortic Dissection in China (Sino-RAD) and International Registry of Aortic Dissections (IRAD) databases that indicates that Chinese patients with aortic dissection tend to have lower relative rates of Marfan syndrome, hypertension, aortic aneurysm, diabetes, and other comorbidities. Because proximity to the treating hospital is related to risk, it would be useful to understand the geographic radius of patient homes in the authors’ population. Indeed, additional study with control for these and other confounding factors may shed light on findings such as the remarkable decrease in in-hospital mortality for patients with fewer than 6 hours of MPS symptoms from 24% to 7.5%.

We are optimistic that the group has identified a potential means of improving the strategy for optimizing the timing of endovascular reperfusion and open aortic repair for patients with MPS, but note that, although the findings indicate improved mortality compared with other previous studies, their data, which can only be interpreted as internally valid and not comparatively so, indicate only that the group has identified an improved method for treatment of patients compared with their previous strategy of upfront surgical repair for all-comers. We look forward very much to a future multi-institutional study determining whether use of this novel algorithm, integrated with judicious review of computed tomography findings, results in improved outcomes at other high-volume centers.

Conflict of Interest Statement
The authors reported no conflicts of interest.

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References