Snakes on a plan

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Snake technique. Reproduced with permission from Woo and colleagues.¹

Central Message

The snake technique to facilitate spinal cord reperfusion should be on the aortic surgeon's plan as a potential need when performing TAAA replacement surgery.

See Article page 1399.

Our colleagues in Valencia provide a case report and video showing their technique for the reattachment of intercostal arteries (ICAs) during repair of a thoracoabdominal aortic aneurysm (TAAA), in this case an extent I TAAA.² They describe their rationale for use of the “snake technique” in mitigating spinal cord injury (SCI). Despite the advancement of adjunctive measures, SCI occurs in a significant proportion of patients undergoing TAAA repair.³ Their accompanying video well complements the article.

The importance of ICA reattachment has been debated, with some suggesting reestablishment of ICA perfusion is less important than preemptive occlusion of ICAs.⁴ However, the more pervasive opinion is that ICA reperfusion significantly affects SCI outcome, especially in more extensive TAAA pathology.^{5,6} The finding that endovascular exclusion of extensive descending thoracic pathology (essentially immediate occlusion of the ICAs) still results in SCI rates of 3% to 10%⁷ supports the latter assumption.

The snake technique has been adopted by several groups since being described by Woo and colleagues.¹ Fletcher-Sanfelio and colleagues² provide some valuable suggestions to consider when performing the snake technique. They also call attention to some advantages and disadvantages that the snake technique has over other techniques, such as the ICA island patch and the end-to-end interposition graft. Concerns that the ICA island patch leaves behind a portion of diseased aorta that could become aneurysmal led to an end-to-end anastomosed interposition graft technique. However, the small caliber of the ICAs produces high resistance to flow with potential thrombosis of the graft or ICAs. The snake technique addresses this latter concern because high outflow through the distal reattachment back onto the main graft limits the risk of graft thrombosis. In addition, the snake technique more readily facilitates reattachment of multiple ICAs, thereby reducing resistance to outflow, increasing distal runoff, and providing a broader spinal cord territory of reperfusion.

However, we then return to the original problem of leaving behind a larger patch of aorta that could become

aneurysmal with time. Experience may show us that this is easily addressed by endovascular exclusion of the proximal entry and distal exit of the snake graft, or perhaps by the sequential exclusion of the proximal connection temporally followed by distal connection exclusion, all under evoked potential monitoring to assess for, and further attenuate, the risk of SCI. Staging repairs has been shown to lower the risk of SCI in open⁸ and endovascular repair,^{9,10} so this benefit might extend to addressing snake graft patch aneurysm by staged endovascular treatment as well.

Superimposed on all of this is that although it seems reasonable that a snake technique better protects against SCI than other methods, evidence for this is absent. Among the many tools available to perform TAAA repair successfully, the snake technique is one of the more novel ones. Its potential use during TAAA repair should be part of any aortic surgeon's plan.

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