Acute retrograde aortic dissection: “To be [treated] or not to be, that is the question”

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The Stanford classification of aortic dissection simplified the clinical approach to the management of this disease, with type A aortic dissection (TAAD) (Figure 1) requiring surgical intervention and type B primarily medical management¹ and chronicity defined as presentation later than 2 weeks from the onset of symptoms. Inherent in this schema was recognition of the presence (type A) or absence (type B) of a false lumen in the ascending aorta, independent of the origin of the primary intimal tear. The earlier DeBakey classification² did specify both the origin and propagation of the false lumen, but, as noted by Lansman and colleagues,³ linked the “given tear with a given direction and extent of propagation,” thus effectively excluding the situation of the de novo retrograde type A dissection (RTAD). Not easily addressed in either classification was the dissection that began in the arch and propagated distally (23% of cases³) or the type B dissection with retrograde extension limited to the arch (16.5% of cases⁴). The guiding principle is that when the dissection involves the ascending aorta, whether as the initiating site or secondary to a RTAD, open surgical repair is the accepted approach.

In this issue of the *Journal*, Zhang and colleagues⁵ describe a 2-stage endovascular approach that involves a novel approach to inducing thrombosis of the false lumen in the ascending aorta and arch. Their approach, which advocates delayed pretreatment of retrograde extension of a distal dissection into the aortic arch and ascending aorta, is novel, uncharted, and thought provoking. In their series of 9 patients, they waited 14 or more days to pretreat the retrograde acute dissection with a combination of endovascularly deployed coils and Onyx glue (Medtronic, Minneapolis, Minn) embolization. This resulted in the occlusion of the proximal dissection, thereby establishing a landing zone for eventual endovascular treatment of the distal tear. In follow-up of 1 year, all patients survived and sustained no complication or repeat dissection.

Their data, and the known natural history of untreated TAAD within the initial 14-day nontreatment period to

Acute type A aortic dissection.

Central Message

Purposeful delay in operative treatment of acute type A aortic dissections to perform an endovascular procedure, although novel, may place the patient at risk.

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which all 9 patients were subjected, raises significant concerns about the wisdom of such an approach to an acute dissection involving the ascending aorta, albeit retrograde in nature. First, Zhang and colleagues⁵ cite data of systolic and diastolic pressure measurements in the true and false lumens (both before and after treatment) in the aortic arch that clearly indicate that the false lumen of the transverse aorta was still subjected to a mean pressure in excess of 75 mm Hg during the first 14 days of acute dissection, potentially furthering progressive retrograde dissection in both the aortic arch and ascending aorta, a point they freely admit in discussion of their results. Second, the history of acute aortic dissection has taught us two facts: untreated acute dissection, whether antegrade or retrograde, in the ascending aorta can ultimately involve the coronary anatomy and the aortic valve and can lead to frank rupture into the pericardium. The mortality from acute TAAD is 1% each hour for the first 48 hours of initiation of the dissection; the mortality from RTAD is unknown but presumably not insignificant. During the 14-day period before the first-stage surgical procedure, the 9 patients reported on by Zhang and colleagues⁵ were subjected to such risks while the attempt was made to convert the aortic dissection into its chronic phase. This remains a highly lethal window to achieve an endovascular result.

The drive behind such an approach is that perioperative mortality for emergency repair of type A dissection is 10% to 35% and that the hemodynamics, characteristics,

FIGURE 1. Acute type A aortic dissection.

process of dissection and prognosis are different between RTAD and TAAD. Kim and associates⁶ and Kaji and colleagues⁷ evaluated acute surgical treatment of RTAD and TAAD and did not allow a 14-day window before the initiation of treatment in either group. Simply put, patients with RTADs do better than patients with TAADs when they are both treated with emergency surgery, but that cannot be extrapolated to imply that RTAD with a nonthrombosed false lumen is not a lethal condition if not treated with emergency surgery.

The pretreatment that Zhang and colleagues⁵ propose is not without risk, although no complications were reported

in their small series. Embolization coils and Onyx glue are subject to migration and unintended distal embolization.^{8,9} In the aortic arch, even with an intimal tear distal to the left subclavian artery, there is a theoretic risk of embolization to the great vessels. This risk must be considered when deciding between a conventional repair and the method of Zhang and colleagues.⁵

In this article, Zhang and colleagues⁵ advocate a 14-day risk period to allow them ultimately to achieve catheter-based induction of thrombosis in the false lumen in the retrograde dissection and convert to a chronic state for endovascular treatment of a descending aortic dissection. For us to ignore the natural untreated history of acute RTAD in the ascending aorta in a hastened adoption of such treatment options may only serve to reenlighten us to the consequences.

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