

Should Non-A, Non-B Dissection of the Aortic Arch Be Managed with Medical Therapy or Surgical Repair

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Abstract

A 37-year-old lady presented with 4-day history of fatigue, non-radiating chest pain and exertional shortness of breath. Initial work up was negative for acute ischemic event, CT angiogram (CTA) revealed a dissection originating at the distal ascending aorta proximal to the origin of the great vessels and appears to terminate distal to the takeoff of the left subclavian artery giving the impression of an Isolated non-A, non-B dissection of the aortic arch. This rare subtype of AD was first described in 1994 and exactly 20 years after there are still large gaps in knowledge regarding the nomenclature for dissection that do not fit into any of the two classic AD classification systems and the consensus approach to the management of such unique cases. This article will review current knowledge on this unique type of AD and propose a trial to address the question, should this patient be managed with medical therapy or surgical repair?

1. THE PROBLEM

Aortic dissection is a potentially life-threatening cardiovascular emergency with significant and time dependent morbidity and mortality, in general, decision on optimal therapeutic approach of AD depends on its location, associated complications and comorbidities. Stanford Type A/ DeBakey Type I/II have mortality rate exceeding 50% in the first 48 h when left untreated hence emergent open surgical repair is recommended (Nienaber & Eagle, 1999). On the other hand, for dissections involving solely the descending thoracic aorta (Type B Stanford/DeBakey III) the clinical course is typically uncomplicated, hence conservative medical therapy is the most common treatment option (Howard et al., 2021; Pasic et al., 1999). Isolated aortic arch dissections have no specific classification and do not fit into either Type A or B dissections (Pasic et al., 1999), leading to confusion and dilemma regarding the optimal therapeutic approach. Many treatment plans have been proposed over the years (Howard et al., 2021; Christodoulou et al., 2023), some research papers suggested implementation of surgical treatment for non-A non-B ADs while some studies recommend conservative treatment

(Howard et al., 2021; Christodoulou et al., 2023). The scant comparative studies available were significantly limited in terms of patient samples and follow up duration (Howard et al., 2021; Christodoulou et al., 2023). Hence there is need for randomized control trials aimed at defining a unanimous gold standard treatment for non-A, non-B dissection of the aortic arch.

2. WHAT WE KNOW

The term “non-A non-B” aortic dissection was first described in 1994 by Pasic and colleagues who identified 16 patients with intimal tears in the aortic arch and classified as non-A non-B (Pasic et al., 1994). The patients were treated successfully with both medical therapy (5/16, 0% mortality) and open surgery (11/16, 9% operative mortality). Since its original description, limited case series, reviews and observational studies have demonstrated conflicting outcomes regarding the natural history and treatment outcomes of this special subtype of dissections (Howard et al., 2021; Christodoulou et al., 2023) with no established consensus till date on the gold standard optimal therapeutic approach. This calls for increased awareness, definitive nomenclature, and randomized clinical trials that compare all possible treatment options to determine the

optimal evidence-based approach and to ultimately improve outcomes for patients with this rare form of aortic dissection.

3. WHAT WE NEED

There is a need for a prospective comparative multicenter randomized controlled trial to determine the optimal management approach including medical therapy vs endovascular repair vs open surgical repair for non-A non-B dissection of the aortic arch, assessing efficacy, safety, and long-term outcomes in terms of aortic-related events and associated mortality of each treatment approach (W. ang et al., 2022).. Such trials will need to be conducted over a period of at least 5-7 years to ensure an adequate follow-up period of outcome assessment and powered adequately to detect any clinically significant difference between the treatment arms.

The practical challenges that can be encountered in executing such a trial include firstly, the rarity of this subtype of AD may complicate patient recruitment, necessitating collaboration across multiple centers to achieve an adequate sample size. In addition, long-term follow-up is essential for accurately assessing outcomes and this can pose logistical hurdles in ensuring patient retention over the trial duration. Standardizing treatment protocols across diverse clinical settings while maintaining flexibility can also add complexity. Defining relevant endpoints and implementing rigorous outcome measurement methods are critical for ensuring the validity and reliability of trial results. Addressing these challenges demands interdisciplinary collaboration, meticulous planning, and adaptability in trial design and implementation.

In Conclusion this proposed clinical trial should aim to address the current challenge of

determining the optimal management approach for non-A non-B dissection of the aortic arch through rigorous evaluation of different treatment modalities in a prospective, randomized controlled setting. By assessing both short-term and long-term outcomes, the trial should seek to provide evidence-based recommendations for the management of this rare but clinically significant condition.

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