Thoracic Aortic Surgery in the 21st Century

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Central Message

Thoracic aortic surgery is changing rapidly, and challenging times are ahead on this journey. In this editorial, we shed light on what the future holds for an aortic surgeon.

Before a look to the future, we should reflect and acknowledge the contributions of those who came before us, starting with the first description of aneurysm by Galen of Pergamon in the 2nd century.[1] Antyllus, a Greek surgeon, suggested and discussed that aneurysms were due to clotting phenomena.[2] In 1555, the Flemish surgeon Vesalius offered description of thoracic and abdominal aneurysms[3] and Ambroise Paré, of Paris, stated that opening an aneurysm would result in fatal bleeding and that "the aneurysms which happen in the internal parts are incurable." Those historical observations created a reticence to treat aortic disease and made successful treatment of aneurysm elusive. Most therapeutic measures were attempts to relieve pain and forestall inevitable rupture. Such strategies remained unchanged until the mid-20th century when Drs Debakey and Cooley established a new era in the treatment of aortic aneurysm, marked by a seminal presentation of their work at a meeting of the Southern Surgical Association, titled "Surgical Considerations of Intrathoracic Aneurysms of the Aorta and Great Vessels." This was a turning point for aortic surgery and encouraged other surgeons to follow and contribute to the progress.

Evolution and innovation over the last half century have led to marked improvements in open surgical techniques, the development of less invasive, endovascular approaches, and even hybrid approaches that combine open and endovascular therapies. Coupled with sophisticated diagnostic imaging, better strategies for cerebral and other organ protection and tailored intensive care, aortic surgery can now provide the vast majority of patients with a safe intervention and control of aortic pathology in both the elective and emergency settings.

Where do we go from here, and what does the foreseeable future hold? Better understanding of the genetic underpinnings of aortic disease, leading to prediction of natural history is a current emphasis and will likely play a greater role in precision medicine, the tailored patient-centered approach. Pharmacologic modulation of aortic wall biology holds great promise and imaging prowess will continue to increase. That catheter-based treatments will extend to all parts of the aorta seems a safe prediction, and will be necessary given the aging and growing frailty of our patients. We are witnessing the second era of rapid discovery and technologic change, at a rate not seen by previous generations of surgeons. Watch this space.

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1043-0679/$–see front matter
https://doi.org/10.1053/j.semtcvs.2019.09.014