An Evolving Role of Anesthesiologists in the Management of Thoracic Aortic Diseases

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Thoracic aortic diseases are a spectrum of medical conditions for which surgery is the definitive treatment. For that reason, anesthesiologists are likely to encounter patients with thoracic aortic diseases and have an important role in their care. The importance of the anesthesiologist was recognized in the 2010 ACCF/AHA/AATS/ACR/ASA/SCAI/SIR/STS/SVM guidelines for the diagnosis and management of patients with thoracic aortic disease appearing in this issue of the journal and originally published in Circulation.1 In this first iteration, The Society of Cardiovascular Anesthesiologists (SCA) and 9 other medical societies worked together to create a multidisciplinary set of guidelines for screening, diagnosis, and treatment of patients with thoracic aortic diseases. Together, we believe that guidelines are most valuable to clinicians when they are disease focused rather than specialty focused or intervention focused.

By providing detailed, accessible guidelines for the detection, diagnosis, and management of thoracic aortic diseases, the American College of Cardiology Foundation (ACCF) and American Heart Association (AHA) also addressed the publicity generated by the death of John Ritter, a well-known actor who died on September 11, 2003 of an acute aortic dissection. After his death, John Ritter’s widow, also an actress, filed a wrongful death lawsuit against the physicians who had failed to diagnose and immediately treat her husband’s condition. Although she did not win the lawsuit, she stated that the case was important because it brought together experts and raised public awareness about aortic disease. “I don’t know what you call it in medicine, but in acting or art, it would be called a master class. The most brilliant minds in the aorta business were there.”*

In the same year, beginning in January 2003, The Wall Street Journal published a series of articles to bring attention to the incidence of aortic disease and the absence of any organized effort on a national level to identify and treat patients with these conditions.† These articles, by Kevin Helliker and Thomas Burton, had provocative titles such as, “A Death Sentence You Can Avoid,” “Ordering an Autopsy Could Save Your Life,” and “Knowledge Gap. Medical Ignorance Contributes to the Toll from Aortic Illness. Many Doctors Don’t Realize Aneurysms Are Treatable; a Paucity of Experts.” From a physician’s perspective, the articles were especially haunting. Kevin Helliker, an avid triathlete, described vividly in first hand what it was like to be diagnosed with a thoracic aortic aneurysm at the age of 43 years and the inevitable lifestyle changes and decisions that he will have to face. In 2004, the Pulitzer Prize for Explanatory Reporting was awarded to Kevin Helliker and Thomas Burton “for their groundbreaking examination of aneurysms, an often overlooked medical condition that kills thousands of Americans each year.”

One such American, Michael DeBakey, the cardiac surgeon who pioneered the use of the Dacron vascular graft for aortic repair and whose name is used in the nomenclature for classifying aortic dissections, almost died from an aortic dissection in 2005. This publicity, together with the publication of the guidelines from the ACCF and AHA, will increase the public’s expectations and the responsibilities of health care providers for diagnosing and managing patients with thoracic aortic diseases.

Improved screening and early diagnosis of thoracic aortic diseases would provide little benefit if the prospects for surgical repair were only marginally better than the consequences of the disease itself. Undertaking operations on the thoracic aorta, the conduit for blood to the entire body, is a serious commitment with inherent risks. Strategies to protect the heart, brain, spinal cord, and mesenteric organs from ischemic injury are necessary to ensure successful operations. Fortunately, cardiothoracic surgeons together with anesthesiologists have accomplished much to improve the safety and outcome of these operations. Some examples of specialized organ-protection strategies advocated by the guidelines include: (a) deep hypothermic circulatory arrest, antegrade cerebral perfusion, and retrograde cerebral perfusion alone or in combination to minimize brain injury (section 14.5.1); (b) cerebrospinal fluid drainage and spinal cord perfusion pressure optimization.

to decrease the risk of spinal cord ischemic injury in patients at risk (section 14.5.2); and (c) motor or somatosensory evoked potential monitoring to detect spinal cord ischemia, guide reimplantation of intercostal arteries, and guide hemodynamic optimization to prevent or treat spinal cord ischemia (sections 14.2 and 14.5.2). In addition to organ-protection strategies, new approaches, such as thoracic endovascular aortic repair and hybrid repairs using both open and endovascular techniques, have shown promise in decreasing the risk of operations.

Despite many advances in the management of thoracic aortic diseases, authors of the guidelines were careful to point out that many of the recommendations are supported by only limited studies, expert opinion, or specific institutional experience (Level of Evidence B or C). Limited institutional case experiences, the heterogeneous patient population that is affected by these diseases, and regional variability in surgical and anesthetic practices all pose serious challenges to investigators trying to accumulate the necessary data to generate evidenced-based guidelines. Nevertheless, the guidelines’ contributors attempted to include descriptions of all techniques used in contemporary practice that are of potential benefit. The contributors acknowledge the limitations of the recommendations in the guidelines by rating both the strength of the recommendations and the strength of the evidence supporting them. For this reason, many of the recommendations constitute a range of acceptable approaches rather than a “standard of care.” Many of the recommendations, particularly those involving preprocedural and perioperative care, are qualified by the statement, “Institutional experience is an important factor in selecting these techniques.” The field of thoracic aortic surgery and anesthesia continues to evolve with ample opportunity for further progress.

The importance of imaging in thoracic aortic disease is a major emphasis of the guidelines. Imaging is important, because thoracic aortic diseases are manifested by structural changes that make imaging essential for diagnosis and management. The widespread availability of transesophageal echocardiography (TEE) and increased expertise with intraoperative TEE has affected the diagnosis and management of acute aortic syndromes. For this reason, TEE, together with computed tomography and magnetic resonance imaging, were assigned a Class I recommendation, meaning that the procedures should be performed for urgent and definitive imaging of the aorta to identify or exclude thoracic aortic dissection in patients at high risk for the disease by initial screening (section 8.6.1.3). TEE also received a Class IIa recommendation for all open thoracic aortic repairs, meaning that its benefits exceed its risks. TEE was also judged reasonable for use in endovascular procedures (section 14.2). The guidelines provided criteria for elective repair based on aortic diameters for Loeys-Dietz syndrome (section 5.1.2), Marfan syndrome (section 5.1.1), ascending aortic aneurysms (section 9.2.2.1.1), bicuspid aortic valve with dilated ascending aorta (section 9.2.2.1.1), and descending thoracic or thoracoabdominal aortic aneurysms (section 9.2.2.3.1). These criteria will serve as valuable references for training programs, referring physicians, surgeons, and anesthesiologists using intraoperative TEE for surgical decision-making. In addition, the guidelines specify precisely how and where measurements should be made in the thoracic aorta. For example, measurements performed using TEE measure the internal diameter of the aorta whereas computed tomography measures the external diameter of the aorta (section 4.1). Establishing uniform reporting standards based on precise definitions combined with disease registries and systematic quality-improvement efforts will increase the prognostic value of these tests in the future.

Publication of the thoracic aortic disease guidelines is the latest in a series of multidisciplinary guidelines on which the SCA has collaborated with the American College of Cardiology, AHA, the American Society of Anesthesiologists, the Society of Thoracic Surgeons, and the American Society of Echocardiography.† The SCA leadership believes that fostering professional dialog and continued collaboration among medical societies in areas of common interest is an important direction for the subspecialty. The SCA applauds the ACCF and the AHA for finding common ground among participating subspecialties in the creation of this set of guidelines to advance the care of patients with thoracic aortic diseases.

**DISCLOSURE**

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**REFERENCE**
