



Integrated Surgical Residency Initiative: Implications for Cardiothoracic Surgery

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The history, conceptualization, and implementation of the integrated six year cardiothoracic residency paradigm is discussed. Emphasis is placed on critical logistical points, as well as the challenges associated with obtaining operative case requirements. Strategies for providing and monitoring didactic and technical skills education are presented.

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HISTORY AND DEVELOPMENT

Formal thoracic surgery education began when John Alexander established the first thoracic surgery residency at the University of Michigan in 1928. At that time, thoracic surgery consisted mostly of surgery for tuberculosis and empyema. At the 1936 American Association for Thoracic Surgery (AATS) meeting, Alexander¹ discussed thoracic surgery education and stated that in addition to general surgery training, “two years of intensive study and practice... are sufficient to take the examination of a board.” He went on to say, however, that “a greater length of time would be desirable.” With the passage of time, thoracic surgery expanded to include all types of pulmonary and esophageal surgery, adult and pediatric cardiac surgery, heart and lung transplantation, and ventricular assist devices—to mention just a few. Despite this much more comprehensive specialty and knowledge base, thoracic surgery residency remained 2 years in duration. Recognizing that the specialty had expanded, some residency programs lengthened their residency from 2–3 years in the 1980s to meet the needs of the changing specialty.

As an aside, it should be noted that thoracic surgery education was not then and is not now uniform throughout the world. Exposure to thoracic surgery ranges from 22–90 months in different

countries and is not even defined in many. For example, the European Association for Cardio-Thoracic Surgery is currently developing a pan-European training curriculum that will make thoracic surgery education more standardized among all European countries. Training exposure to general surgery is also highly variable.²

The American Board of Thoracic Surgery (ABTS) began as a subsidiary board of the American Board of Surgery (ABS) but became an independent board in 1971. By the late 1980s and early 1990s, virtually every ABTS meeting included formal and informal discussions regarding changes needed to improve thoracic surgery education. Numerous presidential addresses to the AATS, Society of Thoracic Surgeons, and Thoracic Surgery Directors Association (TSDA) were devoted to this same topic.³ Two major stand-alone meetings, Snowbird (1991) and Oakbrook (1992), were devoted to thoracic surgery education and changes were advocated. There was general agreement that time devoted to general surgery training should be decreased and that time for cardiothoracic (CT) surgery should be increased.

Numerous discussions were held with ABS leadership to explore ways to increase exposure to thoracic surgery during general surgery residency while still allowing for ABS certification. These discussions were not fruitful and in fact requirements for ABS certification became even more rigid. Another issue that frustrated thoracic surgery program directors was that residents spent their first year of CT training concentrating on studying to pass the ABS examination (which was a requirement for subsequent ABTS certification), leaving little time to learn CT surgery.

A major hindrance to change was that many organizations (ABTS, TSDA, AATS, Society of Thoracic Surgeons, and Thoracic Surgery Residency Review Committee [RRC]) within the specialty had

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significant influence on thoracic surgery education, and, hence, obtaining unanimous agreement on change was essentially impossible. To address this, the Joint Council on Thoracic Surgery Education (JCTSE) was first formed in 1996 and included representation from each of these organizations. It quickly became clear that the major impediment to substantive change was the requirement (by the ABTS) for ABS certification as a prerequisite for subsequent ABTS certification. In 1999, members of the ABTS unanimously agreed that at some time in the future (after input was obtained from all interested parties), ABS certification would become optional. The JCTSE subsequently proposed a series of recommendations that were carefully considered, modified, and approved by the ABTS in October 2001. The most important of these was that certification by the ABS would become optional, rather than mandatory, for residents beginning thoracic surgery training in July 2003 and after. This decision opened the door for several possible pathways to ABTS certification, one of which was a categorical 6-year integrated CT surgery residency, which would match directly out of medical school with a curriculum to be developed by the TSDA. Before approving and implementing such programs, standards and requirements would require approval from the Surgery RRC. Residents in this program (subsequently termed integrated [I-6]) would be under the direct supervision of the thoracic surgery program director for the entire 6 years, even though some rotations would occur in other specialties (general surgery, vascular surgery, cardiology, etc.). It was estimated that the first I-6 program would begin to accept residents by 2004 at the earliest. The first 3 programs approved (Stanford, University of Pennsylvania, and Medical University of South Carolina) accepted their first class in 2009. Although there had been much discussion about whether medical students would want to match directly out of medical school, competition for these initial positions was intense and has continued even though the number of approved programs has now increased to 25.

PREREQUISITES AND LOGISTICS

A critical component to the success of the integrated 6-year program is engagement by all faculty members. The I-6 CT residency caters to a different population of trainees than the classical traditional paradigm. Residents have completed medical school but have limited or no experience in patient care and technical surgical skills. As a result, faculty surgeons must be prepared to spend more time than they may be used to with residents

and caring for their patients. In this training paradigm, the faculty has the opportunity to develop the clinical skills of these residents from the beginning. Some will view this as a welcome challenge, others, as a nuisance. This latter type of perception from faculty members must be vehemently discouraged. During the application and interview period, I-6 residency applicants may develop misgivings about programs where it is clear that certain faculty members are not enthusiastically engaged in the training paradigm, as a result, such interactions will no doubt effect their ultimate ranking of those programs.

Program directors will need to decide, given their yearly resident number allotment, whether to abandon the traditional training route and convert exclusively to the I-6 paradigm. Arguments for maintaining the traditional paradigm include the opportunity for I-6 residents to work with more mature resident trainees who have already completed a surgical residency. It is also interesting, from an academic point of view, to measure the progress of the senior I-6 residents compared with the traditional residents regarding their in-training examination scores, technical skills, case numbers, and overall patient management skills. Lastly, there is a concern regarding resident attrition in the first few years of the I-6 program just as there is in general surgery programs. Because, the RRC currently does not permit a resident to transfer into the I-6 program past the second year, maintaining the traditional training pathway allows a mechanism to recruit other residents to maintain the required complement for that program should attrition occur. Interestingly, although attrition rates in general surgery residencies approach 20%,⁴ there has been very little attrition in the I-6 paradigm thus far.

Currently, there is no set guideline for the rotation structure for the I-6 paradigm. Hence, program directors have considerable freedom in designing rotation blocks. However, it must be borne in mind that the rotations assigned must conform to ABTS case requirements. A sample 6-year rotation block is provided in [Figure 1](#).

Part of the attraction to (and hopefully the success of) the I-6 program lies in its ability to provide residents with an advanced, comprehensive breadth of training in the treatment of cardiovascular and thoracic disease. This goal is accomplished by the inclusion of a variety of rotations that would ordinarily not be obtained in the traditional paradigm such as advanced vascular surgery, interventional radiology and cardiology, heart failure cardiology, pulmonary medicine, and advanced chest imaging. It behooves the program directors

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