

Editorial

A Pan-European training in cardio vascular or cardio thoracic surgery: Update and current challenges



Por una propuesta de programa Europeo de formación único en cirugía cardiotorácica

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Cardiothoracic surgery is involved in the treatment of diseases and injuries of the heart, blood vessel and lungs. It is a young specialty which has grown rapidly since the Second World War.

Johns Hopkins Hospital developed a training model that was also used for cardiothoracic surgeon education. In 1928 John Alexander instituted the first CT surgery training program at the University of Michigan: he introduced two-year period of training in cardiothoracic surgery, after ending training in general surgery. Dr. Alexander was associate professor and after full professor at the University of Michigan. He dedicated his whole teaching career to one institute and radically influenced the reputation of surgery departments. During the years he learned and transmitted to his students the best and most modern knowledge.

The American Association for Thoracic Surgery was founded in 1917 to promote scholarship and education in thoracic and cardiovascular surgery. Now the association has over 1200 members from 35 countries with main center in Massachusetts. The association organizes conferences, seminars, workshops and educational programs across the world in order to realize their aims. The society also publishes the Journal of Thoracic and Cardiovascular Surgery.

Cardio-thoracic surgery has experienced a great development during years: from the late 1970s through the 1990s, the number of training programs and cardiothoracic surgeons improved. Technological developments brought to the supremacy of CT surgery over the treatment of thoracic illness and ischemic and valvular heart disease.¹

During the years, many positive changes have occurred since the first training in cardiothoracic surgery. Medical education in thoracic surgery grew in the United States, reaching a total of 93 training programs with 350 residents annually.²

In Europe, cardiothoracic surgery's training is possible in 28 states and there are 27 official training programs. Currently, there are different training pathways in cardiothoracic surgery: for some universities thoracic surgery is a subspecialty of general surgery, in other programs thoracic surgeons are trained independently from cardiac surgeons and in some institutes cardiac and thoracic or vascular surgery training are integrated into a common certification.³

The real problem is that residency's programs are not well organized and some of the main lacks are:

- Unequal programs entry requirements

- Unequal syllabus
- Unequal quality assessment
- Unequal length of training programs
- Unequal requisites for certification
- Completely different diplomas (CCV, CC, CT, T, etc.)

Usually, manual skills are not evaluated during residents' selections for surgery training program. Current methods used for the selection of CVS trainees are inappropriate to identify some important qualities and skills required to be a surgeon. Is important to understand that the time and resources spent to select residents would help to choose those candidates suitable for a surgical training.²

There are different points, about current training, that must be reviewed:

1. European Working Time Directive/Shift working

The main purpose of the European Working Time Directive (EWTD) is to promote health and safety at work, because people working for many hours are exposed to higher risks of illness and accidents. The EWTD was first instituted in 1993. In 2000 was accepted that medical residents are subordinate to all laws of the EWTD. In 2009 residents, work was limited to a maximum of 48 h in a week. Some countries had more difficulties to reduce residents' hours of work and maintaining, at the same time, an effective service for patients and excellent educational opportunities for residents.^{4,5}

2. Protected teaching and study leave

Education is the key aim of residency training, but it is also important, for teaching hospitals and medical schools, to maintain best patient care. Teachers and residents must work together and discover new ways to preserve the complex balance between education and patient care. The Association of Program Directors of Internal Medicine Task Force on the Learning Environment delivered some recommendations about this question: reducing clinical load to preserve time for education/research and shifting activities that are common but have low educational benefits.⁶

3. Cancellation of operations and fewer "routine" cases. Higher complexity of surgical cases

These situations decrease residents' opportunities to learn and practice.

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4. Introduction of new techniques like minimally invasive techniques and percutaneous techniques

Today surgical approaches are completely modified because of mini-invasive and tran-catheter techniques development. It would be appropriate that, during residency, young doctors should be trained to be a perfect combination between a cardiologist, an angioradiologist and a cardiac surgeon. It is important that future heart surgeons must have a complete education: from hemodynamic room using catheters and sophisticated percutaneous techniques to the hybrid operating room using 3D video and robot assisted minimally invasive techniques.⁷

Training programs using specified competence are the basis for progression. Competences are defined as a combination of knowledge, skills and abilities at a level of expertise that is enough to perform specific tasks.

The most important competences that a cardiothoracic surgeon must have are:

- Basic and theoretical knowledge of cardiology at highest level
- Communicate with patient
- Communicate with the rest of the team
- Decision making
- Learn excellence in surgical skills

Milestones and Entrustable Professional Activities (EPA's) are two new methods designed to offer a different approach to use and maximize competencies: "a way to translate competencies into clinical practice".⁸ The main Knowledge/Competences should be acquired during CVS surgery training are about

- Physiology and pathology: electrophysiology, thoracic vascular pathology, ischemic cardiac disease, heart valve defects, cerebrovascular pathology, cardiac tumors, acute abdomen, ischemic leg, pericardial defects, benign pulmonary abnormalities, vascular disease, congenital cardiac disease, pulmonary malignancies and chronic venous insufficiency
- Surgery: perioperative care and complications, extracorporeal circulation and myocardial protection, vascular access, anastomosis and wound treatment, postoperative management
- Percutaneous catheterization and interventions
- Management of multi-trauma patients
- Correctly understanding of diagnostic imaging information
- Therapy: organ function replacement therapy, intensive care, surgical infections therapy

In cardiothoracic surgery training programs, there are classically 5 different levels performance-related:

- Level A: when the resident has basic knowledge.
- Level B: when the resident can perform tasks under strict supervision.
- Level C: when resident can perform tasks under limited supervision.
- Level D: when resident can perform his tasks on his own.
- Level E: when resident can transfer knowledge to younger residents.

In CVS surgery, there are three different sub-specialties: thoracic surgery, adult cardiac surgery and congenital surgery.

Talking about adult cardiac surgery, the most common pathology that a surgeon must afford, in the future, are valve surgery/intervention, coronary diseases, transplants, thoracic aortic diseases, emergencies (type A dissection, acute trauma,

acute ventricular perforation), cardiac tumors, constrictive pericarditis, ventricular aneurysms and failed percutaneous device placement.^{9,10}

Today cardiovascular disease still represents the first cause of death in the western world. Technological development and the use of highly sophisticated instruments brought to a big increase of diagnostic and therapeutic options. A great number of patients considered inoperable, now can be treated using mini-invasive techniques with a fewest number of complications. Before technological development, around the 30% of the patients with cardiac valve disease was not treated because of the elevated surgery risks. Today traditional surgery approaches, as cardiac valve's repair or replacement and bypass has been transformed with the advent of mini-invasive techniques, microsurgery and video-assisted or robotic technologies.^{7,11–13}

EACTS initiatives, about the unification of CVS residency across Europe, are focused on increase trust and transparency and improving programs to produce competent surgeons. A recent report published in the Interactive Cardiovascular and Thoracic Surgery underlined some concerns about residents/trainees in Europe: duty hours restrictions decided by European Working Time Directive brought to have no time to teach trainees to become competent surgeons. As a result of the EWTDR restrictions, is important to optimize the time residents spend in hospitals and preserve the balance between training and patients care. Training should be competence-based and perfectly planned. As an organization, EACTS, the widest cardiothoracic surgery institution in Europe, has no executive controls but can make recommendations, finance courses or workshops and promote exchange programs.¹⁴

Finally an agreement among all UE countries on the syllabus and training should be attempted through EACTS and UEMS to offer the European Authorities a consensus instead of battles.

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