



Make Cardiac Surgery Great again: The Perks of Being a Resident

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Thorac Cardiovasc Surg Rep 2021;10:e6–e8.

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Abstract

Keywords

- ▶ cardiovascular surgery
- ▶ education
- ▶ all levels
- ▶ cardiac

Training in cardiac surgery is a cumbersome topic. Over the last years, major cardiac surgical operations have been found to decrease due to the increasing number in transcatheter interventions. Becoming a cardiac surgeon has become partly a hard task. Since the beginning of 2020, the new coronavirus epidemic has been shaking peoples' lives all over the world, hindering every normal hospital activity including residency programs.

Editor's commentary

This is one of three articles written on request and sponsored by the Swiss Society SGHGC/SSCC (Schweizerische Gesellschaft für Herz- und thorakale Gefässchirurgie). It was their aim to give a voice to colleagues afflicted by the Covid-19 pandemic regarding their career in cardiovascular surgery. Accordingly, personal experience is reported for which it is futile to achieve a peer review.

ThCVSReports therefore presents to you authentic OPINIONS. Discussion in the form of Letters-to-the-Editor is very welcome because this topic still raises more questions than we have currently answers for.

The Editors (BN, MH)

If you can't fly, then run,
if you can't run, then walk,
if you can't walk, then crawl,
but whatever you do
you have to
keep moving forward
Martin Luther King Jr.

Introduction and Historical Note: How Did We Get Here?

There once was a time when being a cardiac surgeon had a very special allure and our profession, cardiac surgery was our diva. Everyone wanted to be around us. Everything was glamorous and the grass was always greener on our side. Operating on the heart, exposing, and touching it was only reserved for some "special ones." Performing coronary bypasses, valve replacements, and many other procedures elevated us to the medical Elysium (!). Operating theaters were crowded, and we felt unbeatable and highly respected. There were pioneers like C. Walton Lillehei, Åke Senning, Michael De Bakey, or Denton Cooley who led the way into an even brighter future to come. We were the champions. But in 1977 Andreas Grüntzig in Zürich changed the cardiovascular world forever.¹ None could foresee his impact, and none thought back then that more than 40 years later we would be fighting to survive in a catheter-based panorama. It happened again in 2002 with Alain Cribier implanting a completely percutaneously deployed aortic valve, another wakeup call, maybe.² Major cardiac surgeries, like those our predecessors once performed, have been decreasing

received
September 20, 2020
accepted
October 7, 2020

DOI <https://doi.org/10.1055/s-0040-1721471>.
ISSN 2194-7635.

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Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

ever since, even though the world's population is bigger, we live longer and age later.³

Median sternotomies have been replaced by minimal-access approaches, sutures by catheters, and wires... cardiac surgeons nowadays subspecialize to meet the current needs and to be able to follow the pace of medical and industrial (r)evolution, which is probably reactive and not proactive.⁴ We are no longer box-to-box midfielders.⁵

The Question: COVID-19, a Game Changer?

By the very end of 2019, initial reports of a new coronavirus, the severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), from Wuhan, China, were first seeing the light of the medical world.⁶ By then, we were not aware of what was going to be our reality for the upcoming time. Not only social deprivation but also significant changes in our daily lives, and jobs have been drastically altered since the beginning of the now declared pandemic. The medical and socioeconomic impact are still a matter of debate and is unpredictable how many sequelae this crisis will cause. According to *The Economist*, on a recent report, more than 25 million elective procedures have been or will be canceled during the pandemic, ergo our training.⁷

I would like to say that my training has suffered dramatically the direct consequences of the new coronavirus and that I was in a position difficult to regain. But it would not be true. I have seen, however, how colleagues have been recruited to work in intensive care units (ICUs). I have witnessed how more experienced colleagues have had to adapt to the new situation and wait (again) for their chance. Luck and patience.

Is SARS-CoV-2 responsible for this? Or is it used as an excuse to hide fundamental mistakes in our (training) culture? If there is any

It is a fact that caseload will decrease and that minimally invasive procedures (not minimal access) will run the cardiovascular world. Transcatheter procedures will be offered to lower risk patients and indication will be broadened. It is a matter of time. Conventional surgery will have a secondary role, reserved only for complex, and selected cases and reoperations, where low-risk interventions cannot be performed without any guarantee of success.⁴

If we, the next generation, are meant to operate on more complex patients in the near future, we should then get an optimal, coordinated and structured training even during worldwide emergencies as the current pandemic.

Part of the Problem: A Controversial System

After graduating from medical school, 6 years as a minimum and passing the national license examination, junior doctors in Switzerland enter into residency programs after a selective procedure and direct interview if aptitudes are felt to match the profile of a potential cardiac surgeon. Becoming one is no bed of roses with a training program ranging from a minimum of 6 years up to a nondefined maximum. Even though efforts have been made, and a more flexible curriculum is about to be introduced, we certainly need a higher body that acts as an invigilator and regulates and controls the

quality of the training to intervene if irregularities happen to appear. For instance, how many cardiac surgeons will a country, like Switzerland, need in the next 30 years? Or how many cardiac surgeons have successfully passed the exit examination in the past 10 years?

But the question is what do you really need to become a heart surgeon? In my opinion, there are four aspects that require further explanation as follows: (1) a trainee with specific characteristics, skills, and ethics; (2) trainers (teachers) willing to teach and invest time during the learning curve and beyond; (3) a structured training program, and (4) luck and patience (unfortunately).

The Trainee

As in other professions, cardiac surgery requires specific attributes, intrinsic qualities that can be enhanced in a specialized, and focused environment. I would like to emphasize an analytical and calm temperament, structured thinking, communicative skills, social empathy, and decision making. Dexterity, on the other hand, can theoretically be trained with repetitive exercises during residency on high-/low-fidelity models. The brain gives the order, the hand executes it. A brainless surgeon is probably a good technician, but a weak doctor.

The Trainers

Probably the most important person in every surgical residency program is the trainer. All attributes from the trainee are required in this special position. Once a trainee, the trainer has the obligation to teach younger colleagues, particularly in the academic environment. This is part of the business. The teacher has to remember how his/her learning curve was, accept the role of "guardian," and intervene when needed. Teaching over personal ego, that is the priority.

A Structured Training Program

Without a clear structure, the chances of success will remain very low. Therefore, it is mandatory that every center generates an in-house curriculum with prespecified nonnegotiable and flexible objectives that are in synchrony to national and international standards of education. Interhospital discussions to optimize education should be recommended. The ideal would be that training programs that are organized from the highest level of organization of education, they should be coordinated at the Federal level.

Luck and Patience

As in terms of being at the right time, in the right place for the desired purpose.

The reality is that due to an imbalance of mainly these four aspects, a lack of transparency, and other nonmedical issues, many candidates end up biting the dust, changing specialization, or even quitting medicine.

The Potential Solution: Cardiac Surgery and Aviation

Aviation is often taken as an example regarding structured training.⁸ Both professions require a special dedication and

commitment, responsibility, and understanding, even though they are not directly linked. In fact, there are several publications that use aviation as an example of standard operation procedures, troubleshooting, and error-reporting systems.⁸

To become a pilot, military or commercial, cadets must undergo a specific training. Pilot candidates around the world train in aerodynamics, meteorology, human behavior, and other subjects during approximately 2 years before they are given their “wings” and are allowed to apply for a position as first officers. Simulators are mandatory and paramount and build the base of the training not only in forming cadets but also in refreshing experienced pilots around the world. By doing so, a controlled and continued learning system is ensured, complications can be managed and debriefed, and troubleshooting can be mastered.⁹ Moreover, psychological examinations are performed every 6 to 12 months in almost every commercial airline. In a recent publication from The Society of Thoracic Surgery survey, more than 55% of the participants, all (cardio) thoracic surgeons, reported symptoms of burnout or depression.¹⁰ Does this ring any bells?

Is there anything similar possible in our world? For sure, there is. Is it comparable to aviation? Of course, not. Simulators in aviation can replicate flight scenarios with surgical precision (mind the irony), every single data are tracked, and they can be easily reproduced by a computer/simulator where mistakes can be found and addressed.

The introduction of low- and high-fidelity simulators has been already studied by some authors.^{11–13} Even though results are promising, benefit from it for patients is debatable. However, and in spite of the economic costs, it should be used as a surrogate of real surgery.

Endnote

Cardiac surgery has lost its popularity over the last decades. Becoming a cardiac surgeon does not only involve manual and mechanical skills or activities. The overall understanding of the subjacent pathology and the patient as a human being are paramount during training. With a multifactorial influence as stated above, trainees might find many difficulties during their path where not only themselves but also the trainer(s) play an important part in developing the surgeon, and above all, the human. Of course, external influential factors like the novel coronavirus disease 2019 (COVID-19) can hinder the process and postpone manual skill development. However, external factors (i.e., a new pandemic, economic crisis, political disturbances, or belic conflicts) cannot be used as an excuse to postpone and slow down surgical training. As mentioned before, there are indeed

many aspects of a resident’s training that should be stimulated during the program. Furthermore, the lack of a high patient-case load cannot interfere with surgical development and simulation-based exercises must be introduced into daily practice. Perseverance and determination characterize our profession, and innovation and creativity have always arisen in difficult times due to different perspectives from alternate angles.

Disclosures

The author declares to be biased because he is a current trainee in cardiac surgery. Furthermore, he is son and brother of commercial pilots and his opinion might be skewed toward a more aviation-akin training. “*Special Swiss Young Cardiac Surgeon Award 2020*” *Cardiac Surgical Training at the Time of COVID-19*”.

Conflicts of Interest

None declared.

Acknowledgment

The author would like to thank Carlos A. Mestres.

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