Surgical mentorship

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It has been stated before that, 10 seconds after being thankful for the nomination, one's heart is filled with fear about the presidential address. My topic is a little different than many previous presidential addresses. We have certainly heard about the importance of technology, changes in thoracic surgical education, and the importance of transforming our specialty. My topic is much more basic. I plan to discuss the linking of 2 of my passions: surgery and mentoring residents. I hope to describe what it takes to mentor a surgeon and to truly train him or her in technical surgery.

This has been a difficult year in my personal life. What saved me professionally were my family, my friends, and the operating room. The operating room is often the place I live. I think most surgeons would tell you that the operating room is the place they feel most at home. One does an operation that is often graceful and delicate. One gets to work with a team who shares the purpose of saving the patient. Most extraordinarily, the vast majority of patients do well, despite these tremendously complex operations. The joy, teamwork, and friendship in the pursuit of excellence in the operating theater is a unique privilege that very few get to experience. There is an adrenaline rush that relates to the frequent stressful situations. It is probably the only field in which the surgeon can lose a patient in any operation that is done. Most patients recover well and there is instant gratification in how we improve their lives.

Let me illustrate this atmosphere with a real-life example that occurred last summer. I was on call over a weekend when a heart donor was offered for a long-term patient with a ventricular assist device. I had a terrific team that day. They organized around the careful preparation of the complex recipient. All were intent on the care of this patient. The room was quiet. We do not play music out of respect to the patient and to maintain our focus. The airlines have a 10,000 foot rule below which there are no distractions for the pilots. We follow this rule during the critical portions of the operation. Suddenly, I was notified that a patient with an acute aortic dissection was in the emergency room. I looked up when my colleagues in nursing and anesthesia asked how they could help. The anesthesia attending began preparing the room next door and extra personnel were called in. We fixed the dissection before the donor heart arrived at the hospital. Both patients did great with no delay in their care. Team members who were not on call willingly gave up part of their weekend to save these patients. What other field of endeavor can provide that satisfaction and purpose?

We are unique in the respect that is held by other professionals for our specialty. I was on an airplane a couple of years back and sat next to a huge man who had multiple military tattoos including daggers on his arms. We began speaking and I found out he had been in The Special Forces for many years. As we discussed his responsibilities, he regaled me with exotic Rambo-like stories. He then asked what I did. I told him I was a cardiac surgeon. For a moment he stared at me thoughtfully. I thought he was considering killing me. He then exclaimed how cool my job was. Indeed, we have cool jobs.

THE MAKING OF A SURGEON

The question is, how do we get there? William Nolen[1] in 1970 published the book *The Making of a Surgeon*. He stated "… exactly what happens in this apprenticeship. It transforms him from a helpless, frightened medical school graduate into, hopefully, a capable competent surgeon." This is the part that I think we have the most difficulty with. I believe we have didactic teaching down. I believe we understand the knowledge base that the thoracic surgeon of the future must learn. The difficulty we have is in fact how we transform our residents and fellows into capable thoracic surgeons. Clearly, a major part of this transformation includes technical abilities.

The question is, what is technical surgery? This is a juxtaposition of one's hands and brain. It requires working with a team. It requires being able to work with tension and the various emotions caused by uncertain situations. If done well, there is a wonderful result for the surgeon, the team, and most importantly, the patient.

How do we get there? Norman Shumway has been quoted: "… the hardest thing about cardiac surgery is getting to do it."

Why is it so hard to change this? Developing these clinical skills is probably the most difficult thing that we do. There is little question that a technically perfect operation will likely lead to excellent outcomes. Certainly comorbidities play a role, as well as the urgency of the operation. However, it is clear that when the operation is done well, good outcomes are likely to follow. Conversely, no amount

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of critical care will fix a bad operation. My former partner, Curt Tribble, has stated this as well as anyone: ''Patients do well, but not by much.''

Finally, the most difficult thing is that we face time constraints in which we must perform our operations. Those of us who do cardiac surgery by and large use cardiopulmonary bypass, which is clearly imperfect technology. Therefore, we have to do precise operations in the least time possible. We are plastic surgeons, but on the clock. Therefore, even when we are teaching we must also provide the patient with an efficient operation.

When I served as chair of the Thoracic Surgical Residency Review Committee, I heard about many graduating residents who could not operate. They would go out into the world and fail, often at the expense of their patients and their own careers. Let me lay the gauntlet down. This should never occur! We have failed our students by failing to teach, giving them more time, or failing to counsel those few who should not be surgeons. I have been program director for 20 years, and our program has graduated approximately 40 residents without a single failure. This statement is not about boasting but about persistence.

TEACHING SURGERY

What is the best way to teach surgery? We have all seen the graphs demonstrating reduced interest in our specialty. We have, as a specialty, developed multiple potential solutions to solving this problem. There has been a great deal of effort in streamlining residencies resulting in the integrated programs out of medical school. There also has been increased interest in simulation. Rick Feins and his colleagues have done an outstanding job with the Boot Camp in teaching this technology. We are much more focused on use of sophisticated models. Unfortunately, we have basically ignored teaching our residents to operate. The reason is not lack of interest but lack of clarity in how best to do this. We have inherited different styles of teaching in surgery in multiple institutions, but we have not attempted to standardize teaching technical procedure. It is easy to think that streamlining residencies with more focus on thoracic surgery will make a difference. It probably will. Simulation is critically important as well. However, one must eventually play the game. Practicing surgical technique is important but does not replace the operating room environment. A review of the literature over the past 10 years reveals that there have been 8225 published articles on mitral valve surgery. There have only been 5 articles on teaching mitral valve surgery. We need to instruct each other in how to teach surgery.

Why should one teach and mentor surgery? There are many obstacles to this, but there are some very good reasons to do so. The best residents will come to your program if you truly can teach them to operate. Every resident who enters our field wants to learn to operate. You also develop the next generation. Most surgeons personally do 200 operations a year and presumably help most of those patients. If you train 50 residents during a career, then you will have 10,000 patients helped yearly. Most important, you protect the patients of the future and perhaps eliminate learning curves. If we can do this, then we will truly contribute to the welfare of our present and future patients.

There are real and legitimate obstacles to teaching surgery. There are many who believe that the best way to learn surgery is observation. Some very talented surgeons have large groups of residents and visiting surgeons watch them operate. By and large the observers get good at observing. Just imagine how it would be if some of those wonderful surgeons actually would make use of their talent in teaching parts of these operations with hands-on mentorship. There are others who believe that helping a resident is committing malpractice. As a matter of fact, this was quoted to me by a prominent congenital surgeon when I first helped propose the need for congenital heart disease residencies approved by the Accreditation Council for Graduate Medical Education. There is no question in my mind that he believed strongly that the best person to do that operation was himself. However, that certainly limited his ability to improve the next generation and perhaps improve the care for his own patients. There is also a belief that ''real surgeons'' must do the entire case. There is a sense of pride that the operation is so difficult that the resident cannot participate except as an observer. Finally, there is a perception that there is just no time to help a resident do part of an operation. Certainly attending surgeons have time constraints in academic and private institutions. There are a lot of patients to look after and there are meetings one must attend. However, the longest amount of time is not actually doing the critical portion of the operation but preparing the operation as well as finishing it up. If you want to be truly efficient, you can open and close and then help the resident do at least part of the critical portion of the operation.

The main obstacle is whether the quality of the operation goes down if the resident is supervised during surgery. There is no question that unsupervised care will lead to disasters. For example, the Libby Zion case in New York led to the present work-hour restrictions. However, there are no publications in cardiac surgery that demonstrate that helping a resident hurts the outcome of the operation. There have been multiple publications demonstrating that complex procedures such as mitral surgery and off-pump coronary surgery can be successfully accomplished by supervised residents.[2-9]

Part of our issue is that we cannot even define objectively what excellent surgical technique is. There is no doubt that any ''expert'' surgeon can walk into an operating room and determine if indeed the surgeon in that room is doing the operation well. Usually it would take most of us 5 to 10 minutes. However, we have never defined what we are looking for. I think we should. A rating system has been

accomplished in multiple other fields. Anders Ericcson spoke at the recent Boot Camp held in Chapel Hill. He studies acquisition of expert performance.[10] He has studied musicians and other professionals in terms of what defines expert performance. For us to best teach surgery, we are going to finally have to do this for ourselves. In speaking with him, I learned that he believes this is a task that we can easily do if we put our minds to it.

What are the elements of truly teaching surgery? I think most of us believe that they are pretty straightforward. You must be hands-on. You cannot teach from the office. The first part is preparation: you must be there from the beginning and plan the operation ahead of time with the resident. The resident and the faculty member must be organized enough to know what is going on. Ideally, the attending and resident each operate in most cases. A lot of it is helping the resident, but some of it is the resident watching the attending doing complex maneuvers. Clearly, both the faculty member and the resident have to be totally involved in the case. Certain cases must be done by the attending, either owing to complexity or at patient request. Essential portions of the operation may have to be done by the attending if they are so critical that they will result in patient harm. An example may be harvesting coronary buttons in an arterial switch or resecting an appropriate amount of leaflet in mitral valve surgery. This does not take away, however, the majority of steps in most of these operations.

One must teach efficient surgery. It does not help a resident if he or she learns a tedious style. One's reputation in a hospital is based on the nurses and anesthesiologists who observe. If the future attending takes forever to do a case, that person will be considered a poor surgeon. Efficiency, however, is not moving one's hands fast. Efficiency is just staying organized and not repeating unnecessary steps. Finally, the level of responsibility must increase with the seniority of the resident. Not every case can be done by any resident in the program. However, if a resident comes in prepared and is at the appropriate level of seniority, he or she should be in a position to do much of the operation.

SURGERY HEURISTICS

One of my former Australian fellows, Adam Zimmet, introduced me to the field of surgical heuristics. Patkin[11] has written a great deal about this subject. ''Heuristics are rules of thumb that experts learn through trial and error. Many of them apply to the elements of manual or perceptual skills and are used during surgical dissection on a daily basis. Examples are the way that surgeons cut through tissues at right-angles to lines of tension. … [H]euristics are the elements of the skill rather than the total performance.''

Patkin breaks down the types of heuristics. There are motor, which include handling tissues and anastomoses. There are perceptual, which involve ''the trained eye.'' These include recognizing anatomic variants. Finally, there are cognitive, ''planning a movement and checklists.'' Heuristics help with common problems in teaching surgery. For example, these include tremor and creating or planning proper geometry of anastomoses. In addition, they include visualization of what the end product should be before even dealing with the pathology.

Tremor is a difficult problem for surgeons. Although I have been fortunate enough to never have had a tremor, I have a great deal of experience dealing with this since I seem to cause it in some of my residents. Solutions that have been advocated include beta blockers. Some treat tremor by yelling at the residents who have them. Believe me, the latter does not work. The simplest method is resting and supporting the hands when performing fine tasks. This markedly reduces the tremor. Again, this is an example of heuristics at work.

Surgical geometry is absolutely critical. Tom Spray, former president of The American Association for Thoracic Surgery, has mentioned that a mark of a good surgeon is being able to properly cut a patch without a whole lot of planning. Residents tend to focus on hemostasis rather than creating a patulous anastomosis. They need to be able to visualize what it should look like instead of worrying about one stitch at a time. This requires preparation before the operation. Simulation will definitely help here, particularly as it relates to repetitive tasks such as anastomoses. Visualization of what it should look like is a much more difficult subject. It surely helps when looking at a diseased mitral valve to know how it should appear when you are done. This probably relates to ''The 10,000 Hour'' concept by Malcolm Gladwell.[12] One has to look at a lot of valves to figure out what they ought to look like. However, the proper teacher can probably shorten this process for many residents.

SURGICAL MENTORSHIP

There is a Buddhist proverb that states, ''if you save a life, you are responsible for that life forever.'' Let me suggest this should also be true for our residents. They become our heritage and responsibility forever. They are the fabric of our programs. We need to help them obtain work, subsequently help them through tough cases, and infrequently help them in their darkest hour.

Mentorship is more than just about technical surgery, but about life. Cardiac surgery is a life-time obsession. There is more to life than this. We as teachers must convey this to our residents and students. Balance is everything. We must be able to look after our families, our friends, and ourselves. Teaching this aspect of humanity will make us better physicians and surgeons. If one stays obsessed with just the technical aspects of surgery, one will forget what makes us human.

FAMILY

Our family suffered a great tragedy this summer. My youngest son, Brian, died suddenly in July. He was truly

a special human being. The day before he died I had made plans to go fishing with him. We have a small farm on one of the local rivers that we both thoroughly enjoyed. We would typically spend the day, fish, smoke a cigar, and talk about life. He was ready to go back to school and I had a lot of things I needed to do. However, we decided to spend this time together. The day before we planned to go, I was called about doing an extra operation. I am sure he would have been fine about putting off this trip. However, I decided that this fishing date with Brian was a priority. I had been taught by my mentors how critical it is to enjoy one's family and children. The trip was wonderful. Brian was an exceptional fisherman, and watching him stand in the middle of the river with his Green Bay Packer's hat on backward and his blond hair in the sunshine was an incredible sight. The fly line he was casting stretched across the entire river. He made one particularly terrific cast and hooked and landed the biggest small-mouth bass I had seen in that river in several years. Watching the joy in his face and his excitement is something I'll never forget. We left that river together and we told each other how much we loved each other. Unfortunately, it was our last trip together. I will never forget that day. Things would be so much worse if I did not have that scene etched in my memory and in my heart.

After Brian's death, one of my former residents, Thomas Matthew, wrote me the following: ''Losing a son is a horrible thing. I am sure I have no idea of the true meaning, but I want to say you have many surgical sons and daughters that you have prepared well and sent out into the world.'' We must always remember our responsibility to our residents—our surgical sons and daughters. My great hope is that we begin to refocus on exactly how we teach technical surgery and define and standardize the method. We are obsessed with how many years it should take to train a surgeon rather than whether the resident reaches the appropriate levels of competency along the way. The responsibility is on us. We must teach surgical mentors the proper side of the table to stand on and how to let their egos stand down in pursuit of the greater good. It is without question that we can improve our teaching of these complex operations. Only then can we improve the care of our patients, present and the future. Let me state emphatically that no resident should complete a program incompetent to perform surgery. They are our ''surgical'' children. We must love and cherish them all.

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While many books focus on specific research or technical surgical topics, there is a need for an accessible, user-friendly text on the subject of surgical mentorship and leadership. In particular, there is a strong desire among trainees and young surgeons to learn about mentorship, as well as define leadership tools. Currently, there is a gap in the market for a definitive reference on surgical leadership and mentorship. Mentorship has been found as a key factor for a successful and satisfying career in academic medicine and surgery. The present study was conducted to describe the current situation of mentoring in the surgical community in Switzerland and to evaluate sex differences regarding the impact of mentoring on career success and professional satisfaction.Â Mentor-related and trainee-related characteristics were assessed. The INplant Mentorship Program was designed to give the general practitioner the knowledge, skill, and...Â See more of INplant Surgical Mentorship Program on Facebook. Log In. or. Create New Account. See more of INplant Surgical Mentorship Program on Facebook. Log In. Forgot account? Mentorship in Neurosurgery. William Couldwell. May 12, 2017.Â Grand Rounds-Measuring and Improving Performance in Surgical Training. Grand Rounds-To Operate or Not to Operate: When is Surgery Necessary for Chiari Malformation. To Operate or Not to Operate: Implications for Management of Arachnoid and Pineal Cysts.