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DR. DAVID H. LIVINGSTON

How did you come to a career in surgery and trauma surgery specifically? When in your training did you decide?

DR. STEVEN R. SHACKFORD

In medical school, I had thought I wanted to be a pediatrician and, in fact, took several pediatric electives during my senior year. But I had a great deal of difficulty dealing with dying children and, simultaneously, I became very interested in surgery, primarily because of two role models: Dr. Vallee Willman and Dr. Rick Barnar.

I also took an elective in surgical technique in the animal laboratory and I was just so impressed by surgery and the immediacy of the outcome that I decided on a career in surgery. I decided on trauma surgery on the first day of my internship when, again, another mentor stepped in to my career. That was Dr. Richard Virgilio who had just returned from a tour in Vietnam. At that time, I was in the Navy and in fact I did all of my training, surgical residency, and vascular fellowship at the Naval hospital San Diego. At the time that facility was the largest military hospital in the world with over 3,000 beds, 1,000 of them being surgical beds. Dr. Virgilio, at that time, was the primary investigator on an Office of Naval Research grant investigating the metabolic and physiologic responses to shock and resuscitation, which immediately spiked my interest in trauma surgery.

I was also influenced by Dr. Richard Peters who was a thoracic surgeon at the Universi-

ty of California San Diego. Dr. Peters was a co-investigator on the grant and would frequently round at the Naval hospital and, like Dr. Virgilio, was a great teacher.

LIVINGSTON

So it would seem that your exposure to all of these post-Vietnam surgeons and mentors, the choice of trauma was a natural and big part of surgery there. Was that how it was viewed by your peers and your non-trauma mentors?

SHACKFORD

Exactly. Because the mission of the United States Navy Medical Corps at that time was care of injured Sailors and Marines, my choice was encouraged and viewed as an excellent selection.

LIVINGSTON

How was trauma considered compared to other specialties at your institution at that time?

SHACKFORD

I received some “pressure” to go into cardiothoracic surgery by two other mentors, Dr. Ted Folkerth and Dr. Jim Aurey. They did not discourage me from going into trauma, but said that I would have a more fulfilling career in cardiothoracic surgery. However, I did not agree with that because I thought the types of procedures that they did in the chest were limited and a lot of what they did was directed by cardiologists, even though there was some independent surgical judgment involved.

I decided when I finished my general surgery that I would be doing trauma surgery. I wanted to be comfortable around blood loss and fixing blood vessels so I took a vascular fellowship. But my real love was trauma.

LIVINGSTON

What was the best career or life advice you ever received? What was the worst?

SHACKFORD

I have received a lot of advice over the course of my career and it’s hard to pick good or bad. Only subsequently looking back you can see, perhaps in retrospect, what the best advice was.

Dr. Virgilio, just by the way he was so committed to patient care and achieving a good outcome, set an example and influenced me greatly. It was, basically, be the best surgeon you can be. Follow up on imaging and labs; do your very best and work hard.

The worst—well I am not sure I ever received any real bad advice. If I did, I probably had the good sense not to do stupid things when people told me to do them so I can’t really remember any bad advice that I got.

LIVINGSTON

Which contributions in research are you most proud of and how did they influence the field of

trauma care?

SHACKFORD

I think that there is a great deal of self-deception involved in claiming contributions. I think all contributions are the result of a collaboration and, in some ways, group think. Obviously, somebody has to do the grunt work and somebody has to work hard at gathering data or doing some of the more onerous work. In short, all contributions are the result of teamwork.

For my part, Dr. Virgilio early-on had used base deficit when we would evaluate patients in shock. I found that there was no literature on its clinical use. When I went to UCSD, I had the good fortune of having Dr. Jim Davis as one of our trauma fellows and I suggested to him that this might be an excellent way to evaluate our resuscitation. Jim took the bit in his teeth and he published a multitude of papers on this work. I think that my contribution in that case was stimulating Dr. Davis to do this excellent work. I am proud of him and I am proud of the work that he has done.

Secondly, I think my use of hypertonic resuscitation may have predated the surgical interest that eventually Jim Holcroft and others pursued. I got the idea from Bill Monafó, who was using it in burns. I did some work back in 1980 on hypertonic resuscitation during aortic reconstructions and found that hypertonic resuscitation compared to Ringer's lactate resuscitation during aortic reconstructions resulted in lower compartment pressures in the legs following reperfusion. When I went to UCSD and became exposed to Larry Marshall and his interest in head injury a light went off in my head and said, "Wow, this would be great for the brain." We then went to the laboratory with Mike Todd, Mark Zornow, and Mark Scheller and developed a pig model and, sure enough, intracranial pressures were reduced using a hypertonic saline. At that time we were using 3% and not 7.5%, which came into vogue later. But the use of hypertonic saline in the resuscitation of head injuries, was the result of the collaboration that developed and I am quite proud of that as well.

The third contribution, if it can be called that, was getting interested in ultrasound. Again, this was a collaborative effort. Grace Rozycki and I were talking in an airplane terminal one time and she told me about the research that she was doing on ultrasound. Following our conversation, I went to Munich to the real father of ultrasound in surgery, Dr. Tom Tiling, and spent some time with him in the ICU using a first generation Hitachi ultrasound machine. Despite poor technology, I was amazed at the information you could get. I became even further impressed with the idea that surgeons really know the abdominal anatomy pretty well and that ultrasound might have a role. I came back to the United States, talked again to Grace, and I believe we gave the first couple of surgeon-directed ultrasound courses. The American College of Surgeons got interested in it, specifically Dr. Jim Carrico. I think the first lecture on ultrasound was at the spring meeting of the ACS in the early '90's.

There is a bit of history here that others might find interesting. Once my interest was piqued in ultrasound, and because of my background in vascular surgery, using ultrasound daily in the assessment of graft patency and the assessment of the size of an aneurysm, I realized that the technology could actually be improved if there were less expensive trans-

ducers and machines for assessing general surgery patients. I also felt that general surgeons really could become facile in its use in emergency situations. At that time the radiologists at University of Vermont were not in-house and felt that the assessment of cholecystitis should be done in the morning rather than when the patients come in so that they would not have to at night. They suggested that the surgeon should admit the patients, keep them in the hospital overnight and in the morning when it was convenient to the radiologists they would perform an ultrasound. As you can imagine, that sort of raised the hackles on my back and I said why don't we begin to learn ultrasound. The radiologists were quite offended that we would even embark upon crossing specialty lines into their turf. Subsequently, a skirmish broke out with radiology and surgery at the University of Vermont. This was taken to the Dean and the Dean found in the favor of teaching surgeons to do ultrasound. I wrote an editorial (*J Trauma*. 1993;35:181-2) and then subsequently an article (Rozycki GS, Shackford SR. *J Trauma*. 1996;40:1-4) in the *Journal of Trauma* about focused abdominal ultrasound for trauma.

We also felt we needed to have an acronym for the use of ultrasound by surgeons, especially in the care of trauma patients. I was sitting around in my office one day with our vascular technologist, a guy by the name of Terry Case, and I said this is focused - F, abdominal - A, sonogram - S, by surgeons - S, in trauma - T, which was FASST. We were also teaching the emergency physicians and I said, "Well, wait a minute. It's just not surgeons. It's focused abdominal sonogram for trauma—FAST," and it became FAST.

LIVINGSTON

If you had one thing you championed or adopted that you would change in your career, what would it be?"

SHACKFORD

I was a strong advocate of total parenteral nutrition [TPN] when I was a surgical resident and junior attending. Others, such as Fred Moore, had the good sense to compare TPN to enteral nutrition and found enteral nutrition superior.

Another thing that I championed very vigorously was the use of crystalloid resuscitation. Now our military surgeons have taught us that 1:1 resuscitation or something similar to 1:1 is probably the way to go. In retrospect I remember a surgeon, Janet Mendelson, a member of the AAST, who was a colonel in the Army who at every AAST meeting would get up and say, "Why aren't we using whole blood?" The work done by Shires and Carrico and others seemed to emphasize avoiding the use of blood. The weight of Drs. Shires and Carrico and others made a junior resident and junior attending, like myself, impressed that this had to be the greatest thing since sliced bread. Ultimately, Janet Mendleson has been proven to be correct. So I wish I hadn't advocated so strongly and I'm sorry that Janet Mendelson wasn't alive to see this big change back to the use of essentially whole blood for trauma resuscitations.

LIVINGSTON

What do you consider to be the two or three greatest advances in trauma care science that

occurred during your career?

SHACKFORD

No question, number one is imaging. It is rare that we do peritoneal lavage any more. I think CT imaging and ultrasound have reversed that trend. I also think we will see less CT and more ultrasound in the future.

Number two is the conversion of TPN to enteral nutrition, using the gut more frequently. That's been a huge advance.

Number three is damage control surgery.

Number four is non-operative management, which would not be possible without improvements in imaging.

LIVINGSTON

What were the major changes in practice patterns that occurred during your career?

SHACKFORD

The first is regionalization of trauma care. Before regionalization, local hospitals took care of trauma patients, and only when the patients were quite advanced in their disease state would they transfer them to the academic medical center.

In my opinion, the increasing emphasis and practice pattern of super specialization has been a mistake. I think that general surgery has given up way too much and I'm sorry to see that. I consider myself blessed to have trained at a time when general surgeons were comfortable in the chest, in the abdomen, and in the extremities. I just don't see that any more. I'm hoping, and I think it will eventually happen, that the acute care surgery fellowship will bring back what we had when I was training.

LIVINGSTON

What aspects of your career have you found to be the most rewarding? What things give you the most joy?

SHACKFORD

I love to take care of patients. I love to make rounds with the residents. I think the combination of teaching and patient care are just about the most wonderful things that I can imagine in terms of career. I have frequently said—and I don't mean this with tongue-in-cheek—that I can't believe that they pay me to do this. One of the things that has always filled me with great emotion is having my patients come back and see me after I've taken care of them and see them now that they are well. I feel that I am very blessed to have been directed toward the profession of medicine and the specialty of surgery and specifically trauma and acute care. It's just a wonderful career.

LIVINGSTON

What parts of your job have you found to be the most challenging and difficult? What things are distressing to you?

SHACKFORD

When I was chairman of surgery at the University of Vermont, a lot of the administrative hassles and struggling with administration were difficulties. They were tough. Surgical departments are the financial engines of academic medical centers and every time you turn around the dean or the CEO is trying to reach into the coffers of the surgery department to distribute money around to other departments that, in my mind, are not held to the same standard as the department of surgery. I didn't think it was right. So for almost 20 years as chair I was trying to preserve the esprit de corps in the department of surgery and, at the same time, take great care of patients.

I say in passing that while I was there during my chairmanship, I went through something like eleven CEOs and four or five deans, so it can be difficult because what one CEO promises is not binding upon the next guy who comes in and says, "Well, that was then and this is now" and the whole landscape changes. Those were difficult, challenging, and distressing.

LIVINGSTON

What career and "life coach" advice would you give to young surgeons interested in a career in academic trauma and acute care surgery?

SHACKFORD

That is a relatively easy question to answer. The advice would be: "Success in one endeavor does not justify failure in another." I think it is so important for young surgeons to have a passion for surgery and a passion for their families. I have always told our residents that their families give up more for the patients than they do. I've been married for 36 years and there have been a lot of times when the family was all set on doing something and I had to cancel at the last minute because of an emergency case or a take-back or a problem at the hospital. They never groused about it or griped about it. On the other hand, when I was home, I was home and when I was home *I was really at home*. I put aside all the work at the hospital and unequivocally devoted my time and my focus on my family.

My mind wasn't anywhere else. And that's another thing I think is a practical piece of advice, in scheduling time away for vacation always take two weeks, minimum. The reason is that it takes about 48-hours to decompress from work. Then you can enjoy vacation and then about 24- to 36-hours before you go back your mind starts to race ahead about all the things that you have to do and the things you have to catch up on. So if you really want to enjoy vacations, plan long ones. I got that advice late in life but it has served me well.

Another piece of advice I would give my junior colleagues is, "Don't whine." You know, don't whine about the hours. Don't whine about the hard work. Don't complain. First of all,

others may hear you, particularly younger surgeons and that will be very discouraging for them. We've selected this career and the hard work and the long hours, they come with the territory. So in the words of the Eagles, "Get over it."

LIVINGSTON

What do you perceive as the greatest challenges and opportunities for the future of trauma and acute care surgery?"

SHACKFORD

I see the challenges coming from within general surgery. I think that general surgeons are reading way too much into the acute care surgery paradigm. I think that we just have to be very patient, logically address any fears they may have. We must view this as a specialty in evolution and acute care surgery must recognize it is going to be different at rural hospitals as it is at academic medical centers as it is at large community hospitals.

I think there is great opportunity when one looks at the gender demographic of people entering higher education. Most of the people entering higher education are women, which means that most of the people that will be going to medical school will be women, which means that most of the people entering a specialty will be women. Therefore, I think that the next generation of surgeons want time-specific time off. And I think acute care surgery fits that need very well. We, as more senior surgeons, must rid ourselves of the feeling, of the opinion that shift medicine is a bad idea. It is here and it is not going away. We've got to live with that. The best thing we have to do is improve our handoffs. That's all. But I think that young women and young men coming into specialties in surgery will be excited about the possibility of working hard for periods of time and then having time off.

LIVINGSTON

What are your predictions for the next great things in trauma, surgical, critical and acute care surgical care in the next 10 to 20 years?

SHACKFORD

I see further improvements in imaging. I see more in introduction of robotics and nanotechnologies in surgery. I think that there will be cell-directed therapies based on genomics. We are going to be able to tailor care based upon the genotype.

LIVINGSTON

Would you change anything related to your professional career?

SHACKFORD

I would change nothing. I think I have learned a great deal from life experiences and I think it's made me a better person. I have absolutely no regrets about my professional career.

LIVINGSTON

Anything about life outside the hospital?

SHACKFORD

I probably would have taken a little more time for myself. By that I mean probably less time at work and more time with my family and more time staying fit.

LIVINGSTON

What plans do you have in the future, clinically, academically, and personally?

SHACKFORD

Well, right now I'm 67 years of age. And I have tentatively drawn a line in the sand for 70. Right now I am taking four nights of in-house call a month which means 24 hours in the hospital and then the following 24 hours for immediate backup. I also take seven nights of vascular call a month. I've completely cut back on elective vascular surgery in order to do more teaching and some research.

So my future is that in three years I may just go "cold turkey." I really strongly believe in "compression morbidity," so I want to make sure that I am fit enough to enjoy retirement rather than having to watch the clock to make sure I get to all my doctor's appointments! I want to be able to enjoy my retirement. My wife and I and our family have lots of plans to travel which can be really curtailed if you're sick so I'm pretty sure about this line in the sand at 70—maybe sooner if I get less enthusiastic about taking call. I'm also fortunate enough to work with partners who have just said, "You tell us when you're ready to walk and we'll go for it."

LIVINGSTON

Any final words of wisdom you would leave for the 75th anniversary?

SHACKFORD

I think that trauma surgeons are really special. I don't mean privileged or anything else. I receive the most professional satisfaction at trauma meetings. I just have the greatest depth of feeling for my colleagues in the Western Trauma Association and my colleagues in the AAST. I don't get the same feeling when I go to the American Surgical and the American College meetings.

I really renew my friendships at the American College of Surgeons and enjoy the educational opportunities, but it's different at the Western and the AAST. It's a real fraternity with a wonderful group of people.

I think that the AAST has made incredible, incredible progress in the last ten years. Among the things that we've done which I think have just been remarkable are the development of the acute care surgery module and the hiring of an executive director and the staff which has been so important in the "chain of custody," if you will, of the organization. Sharon

[Gautchy] and her staff keep the continuity between presidents and boards that I think is critically important.

I also think that there has been more of a sensitivity to encouraging non-academics to join the Association. I also think that our *Journal* is going to continue to improve. I am very happy to be a part of that effort.