ORIGINAL ARTICLES

From the Eastern Vascular Society

Presidential address: A time for co-opetition

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Thank you for the great honor you have bestowed on me as your president. No one arrives here by accident, and it is with great fondness and gratitude that I pay homage to my mentors. I have been particularly blessed in my journey to cross paths with 3 very special men: Charles Rob, James DeWeese, and Frank Veith. Dr Rob bequeathed to me a surgical practice and whatever artistry I might have in the operating room. Dr DeWeese taught me how to think critically, write, and present data. He is responsible for any intellectual achievements I have made, the academic position I am honored to hold, and my view of vascular surgery as a unique and very special entity.[1] My vision of what Vascular Surgery must become is largely attributable to Dr Veith.[2]

Presidential addresses challenge a few privileged individuals to step forward and define themselves. These opportunities sometimes demand a commitment to an irreversible course of action that shapes our personal and professional identities for years to come.[3] I believe that my vascular surgical pedigree gives me license to do just that. Lest my references to business strategies give the impression that I am a closet economist and not a doctor, let me assure you that I am first and last a clinical surgeon and teacher. I am dedicated, like most of you, to providing patients with state-of-the-art care and trainees with the skills to do the same.

For many religious people, the year 2000 has been a lodestone for apocalyptic fear and hope. You may think that these millennialists who believe that 2000 heralds history's last act are semi-sane, but be careful not to dismiss the irrational as irrelevant. For we vascular surgeons, self-proclaimed masters of our universe, face a potential apocalypse.

Whether the end or the beginning comes with the millennium depends on how we, as a specialty and as individuals, respond to the challenges at hand. My biggest fear is not that we will fail, but that we are too apathetic to try or don't know how to succeed.

It's the summer of 2005. We were lulled asleep by the encouraging demographic predictions of the mid '90s: between 2010 and 2030, the population older than 65 will grow from 39.4 million to 69.3 million, 32% of the voters will be older than 65, and 49% will be older than 59 (data from Samuel H. Preston, director of the Population Studies Center, University of Pennsylvania). This group will have enormous power to divert resources to itself. Medicare will be preserved. Best estimates indicate that more than 1 million vascular procedures will be performed in the United States in the year 2020.[4] So what if the American Board of Surgery (ABS) and the Residency Review Committee (RRC) for Surgery have limited the number of trained vascular surgeons so that more general surgical residents could get senior level experience with vascular cases? Does it matter that we need 28 more fellowship positions starting now to meet the conservative needs of the population through the next 20 years? All the more work for those with training. Let those with general surgical training do the simple cases. So what if the Food and Drug Administration (FDA) has approved several percutaneously inserted stent grafts and rapid-acting thrombolytic agents and devices for clinical use? So what if only several dozen surgical groups are able to use these emerging technologies *fully*? The rest of us can do them in an operating room. So what if our physicians and our industry dedicate investment resources outside this country? Our patients will have access to the newer technologies after they pass the rigors of the FDA.

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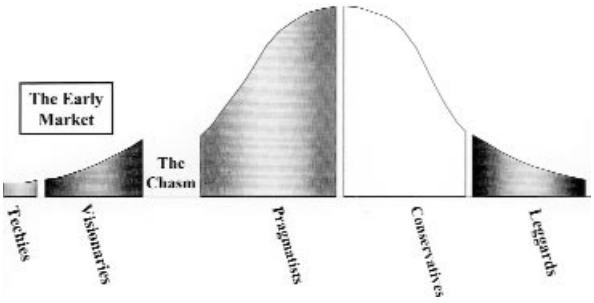

Fig 1. Schematic representation of the technology life cycle. Very little market penetration occurs during the early market. Crossing the chasm is required before the mainstream market accepts an innovation. (Adapted from Moore GA: Inside the tornado: Marketing strategies from Silicon Valley's cutting edge. New York: Harper Business; 1995. p. 19.)

If I sound like a harbinger of doom, a modern day "Chicken Little," please indulge me and consider whether we, as individuals and as a specialty, are ready and able to make the critical decisions necessary for survival in a world where everyone suddenly wants a piece of our pie? Will our progeny be more than specialists in varicose veins, arteriovenous access, and distal bypass?

History is replete with examples like ours: a story of complacency disrupted by the forces generated by discontinuous innovations. Economists describe these events as paradigm shifts. In the beginning, a breakthrough technology enabling unprecedented benefits is introduced and immediately proposed as the replacement of a whole class of infrastructure, winning early converts and enthusiastic predictions for a new order. Sound familiar? Let's take the example of communications. For the better part of a century, we were content with letters, telegrams, and telephones. In the past 30 years, we have adopted answering machines, fax machines, voice mail, e-mail, and Internet addresses. Where were you during this change? Did you rapidly embrace the newer technology or ignore it?

Don't be surprised if your adoption of e-mail parallels your reaction to the newer technologies in vascular surgery. We are conservative; we resist change, preferring to stay with the status quo. Although much may be written about a new paradigm, little of significance happens, and sometimes an innovation is never embraced. We saw that with laser angioplasty. We first behave as a herd; we mill and mill around. In other cases, there comes a flash point of change, when an entire marketplace shifts its allegiance from the old to the new. When this happens, it is unacceptable not to participate. The risk of switching too early exceeds the risk of switching too late. All of a sudden, the risks shift; we stampede. We're inside the tornado.[5] We've crossed the chasm between the early and the mainstream markets and are entering the period of mass-market adoption, when the general marketplace switches to the new paradigm. Vascular surgery has crossed the chasm. Many abdominal aortic aneurysms can be repaired with stent grafts inserted through the femoral artery, with early results that already are as good or better than those achieved by conventional methods. Those of us who have had the opportunity to treat aneurysms with stent grafts recognized after our first case that there would be no going back.

The design and manufacturing of high-tech devices, once a cottage industry, has become this decade's equivalent to Dustin Hoffman's "plastics" in *The Graduate*. By most Wall Street estimates, these industries are growing 20% annually. New technologies continue to fuel this growth. For instance, a small Minnesota-based company, Possis Inc, makes devices for cardiology and vascular markets. Its current revenues are roughly $5 million per year, and it lost $11 million last year. One of its 3 devices currently in testing is the AngioJet System that removes clots from coronary arteries, peripheral arteries, cerebral arteries, and vascular grafts. Wall Street estimates the market for this product alone is $2 billion per year, and the company's stock price has risen 45% in the last 3 months. Corporate expectation of profits of this magnitude and the relative ease of raising venture capital in this bull market will fuel the development of new, minimally invasive devices for a long time to come, whether they prove superior to conventional procedures. The challenge to these entrepreneurial technocrats is by replacing the old, you become the old. You cannot control the energy of this tornado.

Accept some responsibility if you lack catheter-guidewire skills, because many of you have squandered the opportunity to get involved with available, innovative technologies. Do you have any personal expertise with catheter-directed clot lysis, or do you refer these cases to a competing interventional radiologist? Are you using fluoroscopy to assist you in the operating room? If not, referring physicians will rapidly realize that you are an unnecessary link in the referral chain.

Social researchers in the 1950s developed a model of how communities respond to discontinuous inno-

vations. When a marketplace is faced with the opportunity to switch to a new paradigm, members segregate according to their level of risk aversion. Speculators speculate; the risk-adverse hedge. Innovators demand to be the first to try, whereas laggards retreat. These relationships can be represented as a bell curve (Fig 1). The early market consists of the technology enthusiasts and the visionaries. The owners of the patents pertaining to aortic stent grafts, such as Drs Balko, Lazarus, Kornberg, and Teheri, are names that are unfamiliar to most of you. The early adopters or visionaries are the true revolutionaries. They are the first to exploit the new capability to achieve a competitive advantage in the marketplace. Their names are associated with the paradigm shift, and their willingness to publicize the innovation gives it a boost in the marketplace. Drs Parodi, Fogarty, Miahle, May, and Veith, along with a number of other investigators participating in the phase II trials, are some of the most significant visionaries in this adaptive process. In this life cycle, however, the early market means numbers of papers at vascular meetings, but little penetration into the marketplace.

The people that determine the success of a discontinuous innovation are not the technicians or the visionaries; success depends on you. The innovation must cross the chasm, and it needs the energy from the tornado to do this. Success depends on acceptance by the early majority, or the pragmatists, and the late majority, or the conservatives. Visionaries think pragmatists are pedestrian; pragmatists think visionaries are dangerous.[6]

Pragmatists are those who do not love technology, but are smart enough to employ those who do. They believe in evolution, not revolution. They adopt innovation only after a proven track record. It is the job of the visionaries to provide scientific evidence that the newer technologies are safe and effective. The conservatives undertake innovation only under duress; they are very skeptical and very demanding. The key to winning their support is simplifying the innovation so that it just works. The laggards delight in challenging innovation, continually pointing out the conundrum physician-scientists face as they try to provide the best and safest care and yet validate the integrity of the data.

Moving the newer technologies into the mainstream market will be unlike anything we've ever faced, because earlier adaptations did not introduce discontinuity into our infrastructure. Changing from reversed to in situ saphenous vein grafts, using the retroperitoneal approach to the abdominal aorta, learning how to repair a thoracoabdominal aneurysm, and doing an eversion carotid endarterectomy are natural extensions of our skills and easily incorporated in our training programs. Furthermore, these technologies will replace procedures that in many situations are more durable. Consider, for instance, the shift away from aorto-femoral bypass grafts to percutaneous catheter-based procedures. Angioplasty and stenting of the iliac arteries has achieved a significant market position despite inferior results and increased costs if one considers the lifetime of the patient and the increased need for re-treatment. When patients are given a choice between a groin incision or puncture and a laparotomy, they will choose the former for as long as the third-party payers allow.

Some of us will enjoy catheter-based procedures, others will not. Only a few of us will have the skills, time, and interest to provide total care as individuals. The rest of us must offer and control access to these same services, but have to find alternative routes to full-service vascular surgery. We will have to bundle our services, mixing this wide array of products into a single service unit. Bundling is a recognized business tool for an organization that cannot provide a full range of services in a changing environment. When done correctly, it provides customers with simplicity and order in a chaotic marketplace. We will have to be as good as or better than each and every competitor, regardless of specialty. If we lack a critical component, we will have to purchase it, develop it, or make it unnecessary. Many of you realize by now that getting the right combination into a package can be complicated.

Of course, we could secretly hope that the new technologies fail to live up to their promise, but reserve a right to play if they do. Boston Scientific, Medtronic, and AVE allowed smaller entrepreneurial enterprises to develop stent grafts and purchased the smaller companies when it appeared that they owned marketable technology. I remember the head of research and development at Johnson and Johnson telling me 5 years ago that they were going to wait out the developmental phase of endografts and enter the market when it penetrated the mainstream market. Look for Johnson and Johnson to become a player, but remember that they have more resources than we do. If faced with the prospect of buying what we need to compete, we will have lost all that we've worked for. Instead, we must make the decision to shape the future, taking a leadership role in how the industry operates, setting standards, and determining our own manpower requirements. Eastman Kodak is clearly taking this approach by pursuing a strategy in digital imaging as this new technology supersedes the

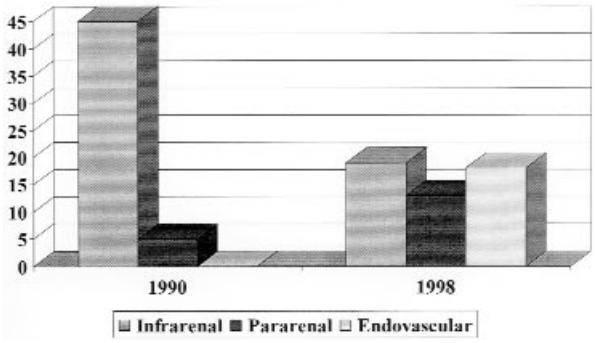

Fig 2. Bar graph showing the types of aneurysm repair done at the University of Rochester Medical Center during a 4-month period in 1990 and a similar period from 1997 to 1998. The influence of endovascular repair is evident. If this trend continues, there will be insufficient numbers of cases to train both vascular fellows and general surgical residents. Resolution of the effect of this paradigm shift will likely drive a permanent wedge between vascular and general surgery.

one currently generating most of its earnings. We must follow this path, even though catheter-based procedures currently make up a very small percentage of our practices. Our goal should be the creation of an organization that provides expertise in all vascular problems, including knowledge of natural history, high-level interventional and surgical skills, and the ability to monitor outcomes.

Many of you have already recognized our predicament and have been frustrated trying to find solutions. Either you cannot get training, or you cannot get credentials, or you are bypassed in the referral chain. You accept the manpower predictions of Dr Stanley and the Committee on Workforce Issues,[7] but also silently accept the influence of the ABS and its RRC on your lives. You come to every 1-day training session you can, but you realize that these merely whet your interventional appetite. You need access to the imaging facilities currently controlled by your competition. Access in most situations will require a deal with catheter-based physicians. If you have tried to do this, you probably realize that issues such as trust, finances, egos, clinical differences, and poor reality testing have interfered.

Equally frustrating is the impasse between vascular surgery and the ABS. I submit to you that successful resolution of this conflict is as important to us as a successful dialogue with the catheter-based specialties. In fact, both share a common goal: our ability to provide state-of-the-art care to our patients. Those involved in resident training are frustrated that the vascular trainee case load is compromised because of minimum case requirements set for general surgery residents by the RRC for surgery. Do you realize that there is not a minimum number of Whipple procedures or hepatic trisegmentectomies? Why did the ABS try to set a minimum of 10 aortic cases per general surgical resident? Preservation of the status quo potentially allows inadequately trained surgeons to think that they are vascular specialists and compromises the experience of those who will be designated vascular specialists. This problem is magnified when we consider the impact of endovascular procedures on our training programs.

We are fortunate at the University of Rochester to have a sufficient operative load, so that both our single clinical trainee and each of our 6 general surgical residents are in the 99% percentile for vascular cases. Let me show you what is happening as we switch to the new paradigm (Fig 2). I reviewed a 4-month experience in 1990 and found that 45 of the 50 aneurysms operated on were conventional infrarenal aneurysms. The other 5 aneurysms were pararenal. During a recent 4-month period, 18 aneurysms were treated with stent grafts, 13 aneurysms were pararenal, and 19 were infrarenal. I don't believe that we know what a minimum requirement should be for operations on the aorta or any other blood vessel, but it is counterintuitive to think that fewer cases make better surgeons. I am concerned about adequate volumes of conventional operations for our fellows and convinced that even training programs that had surplus volumes in the past will not be able to give general surgical residents a sufficient experience without compromising our fellows. This same analogy already pertains to the decrease in operations for aorto-femoral occlusive disease and operations for acute limb ischemia that have been replaced by increased use of iliac dilatation and stenting and catheter-directed thrombolysis, respectively. I submit to you that the transition to large numbers of endovascular cases will result in a lack of sufficient numbers of conventional operations to train both vascular and general surgical residents and will be the final wedge that divides vascular from general surgery.

We must converse at every possible level with those who are compromising our ability to provide the best training and, by extension, the best care for patients with vascular disease and change their perceptions. To do this, we must adopt the principles of game theory developed during the early days of World War II, in which the British navy played cat and mouse with German submarines. The theoretical formulation by John von Neumann and Oskar Morgenstern, *Theory of Games and Economic Strategy,*

was published in 1944 and has been heralded as one of the greatest scientific achievements of the century.

Ray Noorda, founder of Novell, calls this process "co-opetition[8]": the interplay between competition and cooperation. It is a system for creating and capturing value, a way for businesses to expand existing markets and develop new ones. In this scenario, there are multiple winners, because the pie gets larger.

In game theory, every enterprise can be diagramed in the form of a "value net," a visual representation of the interrelationships among the various players (Fig 3).[9] It shows in particular how the various players can assume different roles. A value net for vascular surgery is shown in Fig 2. A player is a "complementor" when your product has more value in the marketplace with his inclusion than with yours alone. For example, an HMO would likely value vascular surgical services at a higher premium if operative cases, interventional cases, and diagnostic studies were bundled together. Likewise, a vascular surgeon with general surgical, vascular medicine, and catheter-based training is a more complete and, therefore, more valuable vascular specialist than one with limited training. The program directors have repeatedly endorsed the importance of general surgical training as a prerequisite for a vascular fellowship. A player is a "competitor" when your product has less value when the marketplace has independent access to his product. You can quickly see how those players who could be complementors can be competitors. The program directors also acknowledge that in preparing some general surgical residents for vascular fellowships, they also prepare others to go into the communities and practice vascular surgery.

The relationships become even more complicated when the customers and the suppliers enter the picture. For example, a player is your complementor when it's more attractive for a supplier to provide you with resources when he's also supplying the other player. Consider the creation of an operating room interventional suite, something that I believe is essential for any institution interested in these new technologies. Hospital CEOs relish the thought of investing in a joint enterprise that would create new markets when surgery, radiology, and anesthesiology give support. Consider the same scenario when the radiologists resist placing "their" equipment in "our" house. Complementor quickly becomes competitor. Consider when general surgical trainees attempt to become vascular surgeons without additional training. Complementor quickly becomes competitor. Recognize that the same player can occupy multiple parts of the value net and that complementors make markets, whereas competitors divide them.

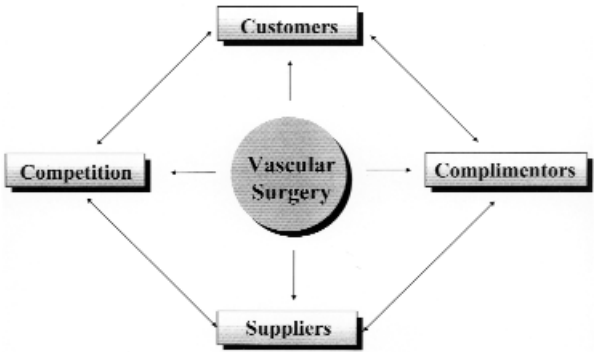

Fig 3. The value net, a game theory diagram depicting the relationships commonly encountered in any business. The critical concept is the possibility of a single player occupying multiple sites on the net. Complementors make markets; competitors divide them.

It is sometimes difficult to accept the concept that the best way to succeed is to let others do well, including your competitors. Even complementors are not your partners. Remember, however, that it is not a matter of whether others win, it is only important that you win. This does not translate into act nice and hope others reciprocate. That is a lose-win formula. You do not have to rely on the goodwill of others to succeed in our complicated marketplace. Co-opetition requires you to put yourself in the other person's shoes to assess how valuable you are to them, to anticipate their reactions to your actions, and to understand how they see the game. You must empathize with their point of view and feel their emotions to influence them. Recognize the fear the interventionalists have when we enter what they consider to be their universe. Recognize how threatened the ABS feels at the prospective loss of vascular surgery. In the end, we must change their perceptions of us as competitors and make them see us as complementors. We must show them how to enlarge the pie.

A number of groups around the country have asked me how we came to an agreement on salaries with our interventional radiologists. This seems to be a stumbling block in many ongoing dialogues. It shouldn't be. The key to understanding how the pie gets split is all in the concept of "added value," a measurement of what each player brings to the game. Your added value equals the size of the pie when you play less the size of the pie when you don't play. If you demand more than you bring, you've left the other players with less than they have

without you, and your negotiations won't go anywhere. Don't expect more than your added value, but don't accept less. To accept less is not knowing how to play in the game.

Let's consider the discussions between vascular surgeons and the ABS. It's clear how that body and its RRC have become both complementor and competitor. Residencies provide us with fellows and the community with surgeons who may also provide vascular care. The training requirements for these general surgeons dilute the experience of the vascular trainee and limit the number of trainees we can produce. Given our increasing manpower needs, our inability to influence so many other facets of our lives as a specialty, and the rapidly changing technologies, I believe that it is inevitable that there will be an American Board of Vascular Surgery.

This is not because the ABS hasn't recently attempted to address their years of inattention to vascular surgery's needs. It is not because a few troublemakers are acting out of personal avarice, as some ill-informed colleagues have suggested in the overheated rhetoric that has accompanied this debate. As much as the ABS might argue to the contrary, vascular surgery is fundamentally different as a consequence of new technologies and new knowledge. The argument that current general surgeons perform a significant number of vascular procedures is misleading and irrelevant. Most index vascular cases are clearly done by vascular surgeons, whereas general surgeons perform most angioaccess and venous surgery. In addition, we are talking about future surgeons and the ability to determine numbers and curricula to meet our obligation to provide the best possible care for patients with vascular disease. We must further recognize that endovascular procedures will substantially reduce the numbers of conventional operations and that there will not be enough cases to train both general surgical trainees and vascular fellows. We must have an RRC for vascular surgery that has authority and responsibility for vascular matters that have previously been assumed by the ABS, and this cannot happen without our own board. In particular, an RRC for vascular surgery would ensure that evaluation and approval of general surgery and vascular surgery training programs would cease to be interdependent, that censure of one program would not obligate censure of the other, and that case distribution issues would be settled at the local level. The Accredidation Council for Graduate Medical Education will not spin off the responsibilities of the RRC for surgery to a separate RRC unless there is an entirely separate board involved.

We should empathize with the ABS position on these issues. Its primary purpose, adopted at a retreat held on Dec 1, 1997, and publicized in letter to members in February 1998, was the "training of a broadly based, versatile general surgeon, well-trained in all 9 primary components of surgery…" They further acknowledged that "there must be real participation…in the decision-making process in the American Board of Surgery" by the "various maturing fields of surgery." The ABS offered in its February 1998 communication to its membership to create a vascular sub-board to "advise and make recommendations to the Vascular Examination Committee of the ABS and to the Board of Directors of the ABS concerning all issues related to vascular surgery." This offer is an attempt to both preserve what the ABS considers to be its proper domain and give vascular surgery a longer leash. I agree with the intent of the ABS, but I fear that their offer is inadequate because it does not and legally cannot give us operational control of all issues pertaining to vascular surgery, including those in the domain of the RRC for surgery. This solution perpetuates our dependence on the good will of the ABS. On April 16, 1998, Drs William Baker and William Abbott, presidents of our 2 national societies, sent a letter to Drs Josef Fischer and Wallie Ritchie, Jr, outlining their vision of what this sub-board would look like. The joint council of the national societies will consider the ABS response in June.

If a sub-board is accepted, its effectiveness must be challenged promptly. As conventional index cases drop, general surgical resident experiences must be reduced so that fellows can be trained adequately. The RRC for surgery has the authority to take disciplinary action in this setting. Can the sub-board protect the vascular program in this scenario? Will the programs with sufficient index cases be allowed to train more vascular fellows when this means a reduction in vascular experience for the general surgery residents? I believe that controversial issues will always be adjudicated for what's best for general surgery until vascular surgery has its own RRC.

Certainly each party understands the consequences of failing to reach an agreement. Explicit threats are unnecessary. Consider what is really germane to the ABS. It believes that the ABS must "evolve further into an umbrella organization encompassing the entirety of contemporary surgery" (ABS retreat proposal dated Dec 1, 1997) and that "nothing would be so disastrous as to have vascular surgery establish a primary board, which could cause the dissembling of the American Board of Surgery to

the detriment of both the ABS and vascular surgery" (Joseph E. Fischer, MD, at the Oct 30, 1997, meeting of leadership representatives of the ABS, the Joint Vascular Societies, and the Association of Program Directors in Vascular Surgery). I believe the former true and the latter false.

What possible argument could we make that would convince the ABS to relinquish authority? I believe that this question is moot. It has a public relations problem. It is perceived as arrogant and out of touch, nonreactive to changing realities. Subspecialties are rapidly emerging and are increasingly frustrated with the ABS. It is time for the ABS leadership to recognize that they can only maintain overall leadership in the entirety of contemporary surgery if they delegate authority and responsibility, while maintaining accountability. We must persuade the ABS that it can and must change with the times, that it can do so and maintain leadership. The compromise solution that works for both parties is the establishment of a conjoint board of vascular surgery, sponsored by both the ABS and the American Board of Thoracic Surgery (ABTS).[10]

A conjoint board is similar to a primary board, because it has the authority to define the criteria for certification in an area and, as such, request the development of a residency review committee. The difference between a primary and a conjoint board is that the directors of the conjoint board are appointed by one or both of 2 sponsoring boards that for us would mean the ABS and the ABTS. Currently, 35% of certificate holders on the ABTS perform 50 or more vascular cases per year.[11] These directors would come from nominations from organizations with direct interests in vascular surgery. The policies of the conjoint board must conform to those of the sponsoring boards, but the day-to-day operations would not be influenced.

Game theory teaches us that games in business are played in a fog. Perceptions, accurate or not, drive behavior, and the task of shaping competitors' perceptions is an essential ingredient in business strategy. Changing perceptions is what defines tactics. The first step in negotiation is to pass the credibility test. Are we willing to acquire endovascular skills, regardless of the cost? Are we willing to leave our practices for significant periods for specialized training, if that is our only recourse? Are we willing to take legal measures if qualified surgeons are denied access to interventional suites? Are we willing to activate the American Board of Vascular Surgery if the ABS does not relinquish the necessary freedoms we need for maintaining the level of vascular care? What we don't do sends a message to those with whom we are negotiating.

I am often asked, "How did you get the radiology chair to agree to let his interventional section merge with vascular surgery?" The answer is simple. I didn't get him to do anything that was not in his best interest. These arrangements made sense. Internal conflicts are bad for any organization, because they inevitably channel energy towards negative ends. Take advantage of the competition between interventional radiologists and cardiologists, and recognize that you bring a patient-base, as well as your technical expertise. Persuade your dean or the CEO of your medical center at an early stage of negotiations that 2 groups with overlapping skills working together add value to their product.

I am told that many groups have tentatively agreed on the center concept in principle, but cannot agree on the financial splits. This is not surprising, because creating business is the cooperation aspect of this process, whereas dividing the pie is the competition aspect. This is made more difficult when department chairs realize their potential losses. In an academic institution, the dean must serve as a mediator, using the principle of settlement escrow. Each party confides in the mediator the minimum needs for a deal, without disclosing this information to one another. The mediator explores whether the positions cross and works out a compromise within the boundaries given. If there is no common ground, the mediator informs the parties, and they can continue to negotiate without knowing each other's position. Settlement escrow allows people to negotiate in a fog. When the parties in negotiation feel safe enough to make reasonable demands, they are more likely to reach an agreement. In the private practice situation, an honest broker may be hard to find. If there is a mutually beneficial deal to be made, however, professional mediators can be hired.

Governance of the center will be an evolving process. The Joint Councils of The Society Vascular Surgery and International Society for Cardiovascular Surgery and the Executive Council of the Society for Cardiovascular and Interventional Radiology have approved a statement that would allow for shared administrative duties between vascular surgery and interventional radiology. Our center has been in existence since July 1997 and fulfills the criteria set forth in this document. To date, our first trainee has achieved great proficiency in catheter-based techniques, which has been supplemented by a 3-month experience in Malmo, Sweden. It has been an eye-opening experience for me to watch an intervention-

al radiologist train a vascular surgeon. The product is incredible, with skills and creativity beyond the traditional surgeon or radiologist. This is added value for us, but the radiologist's worst fear. We must assure them that we are not interested in replacing them. They are essential to the overall service of the group. In this transition period, we will still be surgeons and they will still be radiologists, even though we may share some skills. Our perspectives and approaches will differ. In time, as the vascular surgery–interventional radiology hybrids begin to affect practice patterns, a reassessment of manpower needs will be required as everyone's job description changes.

Lastly, I would like to address the issue of the government regulation of new technology. The FDA has the responsibility of addressing safety and efficacy issues associated with the use of drugs and devices. The regulation of medical devices has escalated as a result of the risk-adverse American public (personal communication, Dorothy Abel). I believe that its leadership understands our needs and is trying to strike a balance between protecting our citizens and delaying implementation of improved treatment modalities. It is axiomatic that in the evaluation of rapidly changing technology, the randomized clinical trial is outmoded. By the time the trial is over, the technology is already obsolete. This has become quite apparent in the aortic graft trials. Europeans are benefiting from design improvements, and we are required to use antiquated products lest we violate protocol. Of even more concern is the probability that approval will be given to outmoded technology, which, when released for general consumption, will result in significant morbidity that might be avoided if a mechanism existed that allowed immediate implementation of safer designs.

Efforts such as the FDA reengineering initiatives and the new FDA Modernization Act are certainly steps in the right direction (more information about each can be found on the Center for Devices and Radiological Health web site).

I propose that we solve this problem by creating FDA-approved centers for endovascular grafts. I propose that instead of IDE meaning investigational device exemption, the "I" represent institutional. A mechanism must be established by which proven, reliable investigators in the United States can participate in product evaluation and changes in technology can be rapidly incorporated in product design. This is a rapidly iterative process; product approval cannot keep pace with design improvements, and our patients will be deprived of the best possible care. Ms Abel tells me that she is not necessarily opposed to this suggestion, but that it will be difficult to convince manufacturers to support such studies. She sees no reason why "improved" devices can't be investigated concurrently with earlier generation products. We must convince the manufacturers to keep their products in the United States and provide our expertise for the design and completion of proper clinical trials that lead to quick, no-hassle approvals.

This is our state as we approach the millennium. First, despite all our scientific discoveries and advances in patient care, we have lost control of much of our specialty. We have milled around for too long. We lack fundamental skills in an increasingly important means of therapy and, more importantly, do not have the means to get these skills on a mass scale. Second, a body whose stated goal, by definition, conflicts with our own regulates us. Third, we are in danger of becoming second-class citizens in the larger world of vascular surgery because of an antiquated method of evaluating new technology.

What combination of shrewdness and boldness will help us implement what we know to be right? Vascular surgery is at a defining moment; a time when we must be prepared to commit to irreversible courses of action that will shape our identity for years to come. In the ongoing discussions between the ABS and the interventional radiologists, we will either live up to our ideals and emerge as a small but independent and vibrant specialty, or pay our ideals lip service and suffer the consequences.

The hyper rhetoric associated with the discussions with the ABS is understandable. We both fear oblivion. Unfortunately, the negotiations with the ABS did not occur in a fog, and each side knows the other's minimums. Our minimum was the conjoint board, and we got less. We have to convince them that they will grow along with us, that there is added value when we act as complementors rather than competitors. Negotiations always involve both promises and threats, but the latter should be left implicit. The end point of a negotiation is an agreement that doesn't require each party to see things in the same way. We must convince the ABS that allowing us the authority to make the decisions we feel necessary is the only way that it can achieve its goal of being the guiding umbrella organization for surgery.

It is not enough for a few organizational leaders to try to solve these critical issues. No one is going to give you a document that solves your problems with the catheter-based physicians or a deed to an angio suite. Start your negotiating process at the local level. Remember the concepts of added value. You have it—don't give it away. Let your societies

and their leadership know how important self-rule is to you. If we ask for less, we will get less.

We face a complicated level of uncertainty, because a range of futures is possible. This is not uncommon when new technology is introduced. Not only do we face the regulatory uncertainty, but we also have no way of determining latent demand. How many more aneurysms will we treat if stent grafts prove durable? What becomes the ideal size for repair when the 30-day mortality rate is less than 1%? The same can be said of the carotid stenosis. After all, all 80% lesions were once 50%. Will we need more practitioners? Will we be able to train them? There are things we can't know, but we can be prepared for any contingency, and that means having the authority to deal with our own needs. At the very minimum, we need to plan for a scenario of the not-too-distant future in which more than half of what we presently do will be done by endovascular practitioners.[12]

Make a value net for your practice. Identify opportunities for cooperation and competition. Establish in your own mind what your added value is and whether it can be increased. Decide whether you need a change in the rules and whether you have the power to change them if necessary. Understand how the other players perceive the game. Do their perceptions need change? Do you need to negotiate in a fog? What you don't understand you cannot change.

Gore Vidal's zero-sum view of the world states, "It is not enough to succeed. Others must fail." This strategy will not work in this marketplace. Instead, this is a time for us to adopt Bernard Baruch's positive-sum view: "You don't have to blow out the other fellow's light to let your own shine." This is all about expanding the pie. I don't believe that any of our current conflicts are win–lose struggles. Multiple winners are possible. We must quickly challenge the effectiveness of the sub-board. We can once again become masters of our universe. There is a time for all things. For us, it is time for co-opetition.

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