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Presidential Address

Keeping Neurosurgery Special

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It has been a great honor to be the President of the Congress of Neurological Surgeons for the past year and a member of its Executive Committee for the past 10 years. During that time, I witnessed the energy, dedication, sense of ethics, and commitment to excellence displayed by the young leaders of this organization and by its membership at large, and I want to thank you for the privilege of being associated with and of leading such a talented group.

I would also like to briefly mention several individuals outside my family who profoundly influenced me and my choice of paths in this life. The first is a neurosurgeon, Dr. J. Clayton Davie, I met while I was an intern in Birmingham, Alabama. A charismatic and highly skilled surgeon, he introduced me to the excitement of neurosurgery and he unknowingly became my first neurosurgical hero. Sensing and encouraging my interest, he took a chance and called to recommend me to one of his former coresidents, the newly appointed chief of neurosurgery at the University of Florida.

The second is our Honored Guest, Dr. Albert Rhoton. As an intern, I applied to only one neurosurgical residency. I was one of only two applicants for two positions at the University of Florida for that year-a real risk by today's standards. But when I showed up for my interview, Dr. Rhoton treated me like I was the best applicant in the world. Throughout my residency and beyond, he served as a model for achieving professional excellence through hard work, persistence, and a masterful knowledge of the basics of anatomy.

The third, Dr. Robert Watson, a professor of neurology and our current Dean of Education, has, since the first days of my residency, provided balance for my enthusiasm for technical excellence with a clear appreciation of the potential adverse impact of neurosurgical intervention. His encyclopedic knowledge of neurology and related sciences and his dedication to education, research, and his patients exemplifies the highest Oslerian ideals of a physician.

Finally, and most importantly, is my wife, Dana. From the first moment I saw her across a dim and smokey room in New Orleans, I was smitten hopelessly by her special qualities. In addition to

bearing and raising our three terrific children, she has been a loving, faithful, and supportive companion who gently lets me know when I have left this planet because I have become overinflated with self-importance or professional preoccupations (conditions to which neurosurgeons are occasion-ally prone). To these four individuals and my family, I thank you for your particular contributions to my life.

NEED FOR CHANGE

All of us know that we in the United States are in the midst of a health care crisis. Twenty-eight years after Medicare legislation was introduced, the United States will spend 14% of its yearly Gross National Product on health care. That figure is expected to exceed $2 trillion by the year 2000, equating a cost of approximately $25,000 per year for a family of four ([5]). When these cost escalations are combined with limited health care access for the uninsured and the threat of financial ruin in the event of major illness for those with insurance, drastic changes are obviously needed.

Despite its previous experiences with out-of-control costs, our government is making a new attempt at straightening out our nation's health care system. This plan will have three basic aims: 1) improved access; 2) cost control; and 3) quality care. Maintaining these goals, however, will be a difficult challenge, especially when one considers that the government has threatened to cut several hundred billion dollars from the Medicare budget over the next 5 years, while increasing health care coverage to 40 million more people. Yes, this new program will provide a basic benefit package to the uninsured, a very praiseworthy goal. However, when the patient needs treatment for a more complex medical condition, access has little or no relationship to quality because the patient will be treated not by the best person who could handle that condition, but by the person or group with whom the health maintenance organization has a contract-for a negotiated best price.

The impact of these changes on the individual practicing neurosurgeon will vary according to the time of training and type of practice. For some, especially those currently in training, the transition will be easy. They will enter the system without ever having known another and will simply have to follow the rules. Others, in the latter stages of their careers, may choose to withdraw from practice. For many younger neurosurgeons already heavily invested into establishing a referral base, those in solo practice or those who have a high-volume neurology or nonsurgical practice, the transition will be more difficult. Eventually, the individual neurosurgeon will probably end up performing more surgical procedures, but will not be responsible for the primary care aspects of our current practices, such as the conservative management of low back pain.

OUR ROLE IN MAINTAINING QUALITY IN NEUROSURGERY

My greatest concern about these changes is that cost controls will be emphasized to the detriment of clinical care quality, and that these changes will also stifle the basic impetus for excellence by individual physicians. In this time of uncertainty, when the whole structure of medical practice is threatened, I believe that it is incumbent upon us to examine our hearts and the inner mechanics of our specialty to look for ways to maintain or improve our quality during the chaos of health care reform, while preserving our dreams and aspirations for individual excellence and fulfillment.

But what specifically can we do? How can we best utilize our assets to effect appropriate changes within our specialty-to do our part to improve our quality? I would like to examine critically three key elements of our specialty: 1) art and science; 2) technology; and 3) teachers and other heroes.

And I would like to follow their evolution over the last 20 years, leading to our current state. Then, I would like to invoke a process of visualization to identify some ideals and goals for the future well-being for our specialty, so that we can then use images as lighthouses of excellence to guide us during the storm that lies ahead.

The model for my approach to these issues parallels that used to obtain success in many types of ventures, especially a sport like golf. Much like neurosurgeons, a winning golfer has had years of practice and training, combined with superior skills of intelligence, concentration, and timing. When they face a difficult approach shot, along a narrow fairway to a small, protected green, the best golfers talk about visualizing the perfect shot to achieve the desired result. After assessing the terrain, the wind speed, the slant of the green, and the pin placement, the player chooses a club from the bag, aims at the target, and lets it fly. When interviewed afterward, many winners state that their victory was facilitated by an enhanced image of the perfect shot before it became a reality. Perhaps, by approaching the specialty of neurosurgery in a similar fashion, we can create similar results.

NEUROSURGERY: ITS ART AND SCIENCE

20 years ago

Twenty years ago, just as I was entering my residency, an article appeared in the *New England Journal of Medicine* entitled Neurosurgery May Die ([1]). In that article, the author expressed concern that most neurosurgical residents were being directed into the general practice of neurosurgery, and that few ventured into neurosurgical subspecialties or research, areas that would lead to neurosurgical progress. Back then, life as a neurosurgeon was hard but relatively uncomplicated. If a patient presented with a neurological complaint, we only had several limited diagnostic options to support our clinical impressions, and the neurosurgeon personally performed each procedure, including lumbar puncture, ventriculography and pneumoencephalography, pantopaque myelography, and direct stick carotid and retrograde brachial arteriography. The best neurosurgeons had to augment the deficiencies of their diagnostic methods with strong adjuvant skills, including the following: 1) detailed knowledge of anatomy and physiology, especially of the blood vessels and cisterns; 2) precise and detailed neurological examinations; 3) superb knowledge of neurology; and ([4]) expert knowledge of neuropathology, with frequent trips out of the operating room to look at our own frozen sections and occasional trips to the autopsy suite to study the postmortem findings. The practice of neurosurgery at that time was not for the faint of heart.

Today

Despite the pessimism implied in that *New England Journal of Medicine* article, the reports of our [specialty's] death, as Samuel Clemens described, were greatly exaggerated ([3]). Instead, our specialty has been phenomenally successful, primarily because of the dramatic improvements in our technological capacities. Today, computed tomography, magnetic resonance imaging, transfemoral and digital arteriography, and stereotactic biopsy enable us to have certainty about a diagnosis as never before. Now, however, the initial diagnostic studies are done and interpreted for us, often before we ever see or examine the patient. Our patient histories and physical examinations are correspondingly abbreviated, bolstered by the concept that a magnetic resonance imaging scan is worth a thousand neurological examinations.

Ideals and goals

In the complexity of modern medicine, there is great satisfaction in the mastery of a small specialty, particularly one in which a technical skill is required. There is, however, a serious risk in losing perspective when one is involved in a prolonged and concentrated effort in a narrow field. Our increasing focus on the technical details of a surgical procedure rather than the neurological abnormalities and their effects on the individual patient and the relegation of authority for ordering, performing, and interpreting our diagnostic studies can diminish our diagnostic skills, reduce our three-dimensional appreciation of essential anatomy, erode our clinical judgment, reduce our doctor-patient interactions, and escalate our role as just a deliverer of procedures.

One hundred years ago, in his deliberations on the dangers of overspecialization, Sir William Osler stated: More than any other of us, he (the specialist) needs the lessons of the laboratory, and wide contact with the men in other departments who may serve to correct the inevitable tendency to a narrow and perverted vision in which the life of the anthill is mistaken for the world at large ([7]). As magnetic resonance imaging scans and other technologies replace more of our clinical histories and neurological examinations, our view of each patient is narrowed, allowing our interactions to shift away from that of a whole person with a complaint to a body part that needs repairs with screws, plates, or wires.

Against this trend, there is but one safeguard-the cultivation of the sciences on which the specialty is based. We must master the basics on which our art and judgment depends, particularly anatomy, physiology, pathology, and neurology. To keep our perspective wide, we must also maintain our cognitive skills in related disciplines, such as radiology, epidemiology, demography, immunology, and genetics, not just in general terms, but as they specifically relate to the individual patient before us.

Mastering the basics, however, does not stop on the completion of a residency, but requires a lifelong commitment to continuing education. Osler addressed this issue directly when he stated: Without a strong natural propensity to study, he (the practicing physician) may feel such a relief after graduation that the effort to take the books is beyond his mental strength, and a weekly journal with an occasional textbook furnishes pabulum enough... But ten years later he is mentally dead, past any possible hope of galvanizing into life as a student, fit to do a routine practice, often a capable resourceful man, but without any deep convictions, and probably more interested in stocks or in horses than in diagnosis or therapeutics ([9]).

Dedicated time to basic education, the thorough study of textbooks and periodicals, discussions of cases with colleagues, and attendance at meetings such as this one, is mandatory to the relentless pursuit of knowledge required for the mastery of our dynamic high-tech specialty.

TECHNOLOGY

20 years ago

Twenty years ago, we had limited treatment options for many of the clinical disorders that we handle so easily today. Our technical skills had just recently been augmented by the surgical microscope, which enabled us safely to tackle lesions that previously were unapproachable without high risks. Exploratory burr holes were common in head trauma management. Proximal vessel ligation was frequently performed for many complex aneurysms. Most spinal disorders were

treated with posterior approaches and wide laminectomy, regardless of the type of disease encountered.

Today

In contrast, today's neurosurgical procedures are technological symphonies, during which nearly every operation is facilitated and monitored by some fantastic new instrument. The use of spinal instrumentation to reduce and stabilize complex spinal injuries, the use of radiosurgery to treat deep-seated arteriovenous malformations, and the use of balloon embolization to obliterate traumatic carotid-cavernous fistulae are but a few examples.

Certainly, our specialty and our patients have greatly benefited from this new technology. In fact, patients have become so enamored by the glitter of technology that they will often seek it out for the most routine of conditions, expressing disappointment if a laser is not to be used. Like our patients, however, neurosurgeons may also fall prey to the false idol of technology. According to Medicare figures, neurosurgeons performed 51 posterior thoracolumbar instrumentation procedures in 1987; 3 years later, 541 were performed. Orthopedic surgeons performed 300 of these operations in 1987, and 2962 in 1990. The number of lumbar discectomies more than doubled during the same interval for both specialties. For the neurosurgeons, the allowed charges in 1987 were $10.4 million; 3 years later, $21.4 million ([2]). The cost of some of these individual procedures exceeded $25,000, and the cost of a single pedicle screw approaches $1000. Is there evidence of improved outcomes that can justify these increases in costs and utilization?

Ideals and goals

In my opinion, we have not always researched the benefits of new technology well enough before applying them to the general neurosurgical population. Instead, each device has its neurosurgical champion who advocates its use. Such seduction by authority has reigned for years, much like the prolonged popularity of blood letting in the United States, which was largely due to the advocacy of Dr. Benjamin Rush, one of America's early medical pioneers ([4]). The result is confusion over application and indication, increased costs for expensive but unproven methodology, and occasionally, over-utilization for the physician's financial benefit.

We must learn to harness our technology! Decisions about the utility of new technology should be based on the weight of the scientific evidence, not on the perceived prestige of its proponent. We should insist on some type of critical assessment of new ideas and technology, while not stifling their development. Most of us would welcome and be greatly relieved to have some scientific data on which to base such clinical decisions.

Over the past 2 years, the Education Committee of the Congress of Neurological Surgeons has been deliberating over methods to educate the practicing neurosurgeon in the appropriate methods and indications for new technology. The result, primarily the brainchild of Drs. Stephen Haines, Marc Mayberg, and Daniel Barrow, has been the creation and recent funding of the Clinical and Outcome Studies In Neurosurgery project (COSIN, Fig. 1).

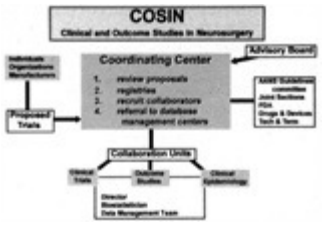

Figure 1

This project provides a mechanism by which neurosurgeons in academic and private practices can cooperate with product manufacturers and other interested groups to conduct meaningful clinical investigations. The activities of COSIN begin when an individual or group recognizes a clinical problem (i.e., is there a benefit of radiosurgery in the treatment of cerebral metastases?) and develops a proposal to answer that question. The proposal is forwarded to the COSIN central office, which then, using several collaborative units, facilitates the completion of such studies by providing the following: 1) expert review of proposals to ensure that meaningful statistical and epidemiological data can be collected; 2) registries of clinical studies; 3) recruitment of collaborators; and 4) database management referrals.

COSIN represents an idealistic, innovative, and unique concept for a surgical subspecialty-a methodical and responsible assessment of its technology. This committee will have close working relationships with the already established Guidelines and Outcomes Committee of the American Association of Neurological Surgeons, the Joint Committee on Drugs and Devices, the Joint Sections, and the various manufacturers whose products need critical clinical assessment. By providing quality information to the Food and Drug Administration, appropriate products can be approved rapidly for use. Spiraling research costs for manufacturers could also be substantially reduced, and prolonged use of inappropriate methodologies and their expenses could be curtailed.

TEACHERS AND OTHER HEROES

20 years ago

Twenty years ago, we had three full-time faculty members in our department. Through daily interactions such as clinics, nighttime phone calls, and conferences, I got regular doses of the basic and clinical sciences from the members of my faculty, who continually stressed that such fields were absolute essentials to proper patient care and surgical decision making. Because of the frequency of interactions, an intimacy was established between teacher and resident, during which time I was thoroughly scoured, to the degree possible, for deficits in my learning, judgment, ethics, and character.

Today

During the last 30 years, the faculty numbers at medical schools, particularly those of specialists, have increased 700%, while the clinical revenue generated over the same interval has, in constant dollars, increased 7000% (Fig. 2) ([10]). Neurosurgery has now become a major revenue source for medical schools and hospitals, and faculty members are encouraged to develop large, profitable clinical practices, with less emphasis placed on teaching or research programs. With the increased number of faculty and their increased clinical responsibility, the amount of time that individual teachers spend with each resident is diluted.

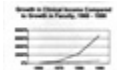
Figure 2

Figure. Legacy Answe...

These reduced interactions are further restricted by third-party payer demands to keep hospitalization to a minimum. The initial workup is often performed by a clinic resident, who will have little interaction with patients during their hospital stay. The ward resident will later meet the patient in the operating room, glance at the studies available, and sometimes proceed without a detailed discussion with the attending physician about the evaluation and judgment that led to the procedure.

Ideals and goals

Each of us was greatly affected by exposure to certain individuals, people that set a standard of excellence, which we strive to match or exceed. People like Thor Sundt, Bob Ojemann, Ben Stein, Charlie Wilson, and Albert Rhoton, men who have served as recent Honored Guests of the Congress, are classic examples, and there are many more who are less recognized. All are terrific surgeons, without doubt, but what elevates them to hero level? Each possesses a personal integrity, charisma, and intelligence, combined with discipline, dedication, and tremendous knowledge of the basics. Each uses these abilities to make careful, caring decisions for the patient, despite personal costs of time, effort, and emotion. Any system that reduces access to such individuals is far less than ideal and should be strongly discouraged. Somehow, we must make sure that our training programs continue to include ample exposure to heros of the highest caliber, because it is their standards that set the expectations of future generations.

Each of us, especially in a field like neurosurgery, will at some point in our lives have the opportunity to be a hero, often unknowingly. How many times will a medical student, undergraduate, or other young person make a lifelong decision to emulate their teacher's attributes because of some seemingly trivial encounter, during which the teacher conveyed an aura of high expectations, combined with a genuine concern and warmth toward the pupil?

This phenomenon can be no truer than our influences on our own children. Being too busy for them, preoccupied, or short-tempered can make them feel unimportant, lower their self-esteem, and turn them away. Our values and work ethics, our genuine concerns for them and others, and our desire for perfection, however, do not go unnoticed. We can and should practice our profession and lead personal lives like the heroes we can be, and we should be examples of the highest quality for them to model.

KEEPING NEUROSURGERY SPECIAL

Art and science, technology, teachers, and other heroes: Each of us can identify at least one of these areas as the one responsible for our selection of neurosurgery as our lifelong work. Today, however, stimulated by run-away costs and limited access to services, radical changes are coming to the practice of medicine, particularly to high-tech specialties like neurosurgery, changes that threaten the proper balance of these three areas. In times like these, we should recall our dreams and strive to protect the essential parts of our profession that make it so exciting, challenging, and rewarding. At the same time, we should recall the error of the dinosaurs, who, at the last gathering of the

species, joined together in a unanimous vote against adaptation.

The health maintenance organizations, the federal government and its bureaucrats, the insurance companies, the lawyers, and the paper work are not our enemies, although certainly they are major obstacles to our art. Our enemies are the malignant glioma, the ruptured aneurysm with vasospasm, spinal cord injuries, and their treatment with impersonal low-quality medicine. If we continually emphasize self-serving complaints-threats to our incomes, our lifestyles, and our freedom to practice only as we see fit-we will remain unheard, isolated, impotent, and unfulfilled. To greet these changes, we must return our focus to our primary responsibility, which is to serve as advocates for our patients' best interests.

To defeat our enemies, we must invoke the best of our art and science to resist the practice of a mechanical body-parts medicine and utilize our technological resources wisely. We must take the time to know each of our patients as a person, to listen and talk to them, to touch and examine them. We must use all the information at our disposal and our own interpretation of the conditions leading up to the consultation, discuss the case with other appropriate consultants, and then decide what is best for that individual. Implicit in those judgments must be an awareness that the mind and body are connected but separate, and that many physical ailments are expressions of mental conflict that no amount of high-tech physical correction will heal ([6]).

We must also extend our energies and the benefits of our knowledge beyond our practice into our communities, to take a responsibility for the broader human condition and improve the lives of those who share our planet. Projects such as the Think First Foundation have reached millions of our young people and educated them in methods of prevention of spinal cord injury and should continue to receive our strongest personal and financial support. We must also reserve time for ourselves, our friends, our spouses, and our families to be ordinary citizens, to learn everyday lessons, and to keep in touch with the simple and gentle things of the world, for these things are the poetry of our lives.

We are part of an exciting field, filled with the wonder of a challenging science. We practice a specialty filled with intelligent, talented, caring, and resourceful people who are capable of great accomplishments. Our residencies are overflowing with the best young minds in medicine. We have great heroes and a rich tradition of excellence and tenacity. We get to do interesting and rewarding operations, with terrific opportunities for personal fulfillment.

The depths of our rewards can be no better illustrated than by this recent experience: Several months ago, I was operating on a young school teacher who had had two major hemorrhages from a large deep-seated arteriovenous malformation in her corpus callosum. Sometime during the operation, as the last of the malformation was being delivered, I became intensely aware that somewhere in that marvelous organ that lay open before me dwelt the connection with her spirit, and that I had been entrusted with maintaining her connection with the physical world. An anxious hour later, after having collapsed at my desk, drained by hours of extended concentration and effort with the microscope, a phone call came, telling me that she was awake and that all was well. At that moment, an irrepressible smile arose from deep within me, from parts unknown, and I was filled with wonder and gratitude that I had been allowed to practice our marvelous profession.

Moments like these make all the study and work, all the long hours, all the harassment of government bureaucracy seem trivial. Moments like these make Osler's words ring true: Happiness lies in the absorption in some vocation which satisfies the soul...that we are here to add what we can to, not to get what we can from, life. Yes, neurosurgery is special, and we must do all within our

power to keep it so ([8,11]).

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