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The Changing Horizons in Anesthesiology

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Modern anesthesiology differs widely from what it was 40–50 years ago, not only because of what anesthesiology now involves in the operating room, but also because anesthesiology has expanded its horizons and activities above and beyond the provision of surgical anesthesia. These changes and the identity of modern anesthesiology are, however, but poorly understood, if understood at all, by the majority of laity and physicians alike. Such lack of identity, especially in the minds of those at the policy- and decision-making level, can only endanger the vitality and future of anesthesiology in an era of sweeping changes in health care-delivery systems. The problem of public identity of our specialty includes the historically correct, but, contemporaneously, all too often misleading name of our specialty. It is suggested that it is appropriate, at this time, to at least consider the potential advantages of changing the name of our specialty to, say, *metesthesiology* and *metesthesiologist,* to indicate that while, today, our specialty continues to involve operative anesthesia, it extends above and beyond to include a wide variety of professional activities outside the operating room richly rewarding to patient and practitioner alike. (Key words: Anesthesiology. History of anesthesia. Metesthesiology.)

ANESTHESIOLOGY has experienced profound changes over the last 40–50 years. There has, however, apparently been no published evaluation of the extent to which things have changed in our specialty, not simply in terms of anesthetic drugs, techniques, or equipment, but, rather, in terms of changes in the horizons, the scope, the vistas—the very composition and definition of anesthesiology. An overview dealing not with individual facets of anesthesiology, but dwelling on the totality of the many changes we have seen, provides the opportunity to consider the progress of anesthesiology as an identifiable intellectual and professional component of modern medical practice. To do so also provides the opportunity to consider some of the problems and challenges in anesthesiology associated with the changes in the specialty that time has wrought.

A useful way to evaluate changes over the last 40–50 years in the horizons of anesthesiology is to compare what anesthesiology consisted of in what can conveniently be referred to as the Rovenstine era—that is, the years in the late 1940s and early to mid-1950s—with the horizons of the specialty in the 1990s. The man honored by this eponymous designation, Dr. Emery A. Rovenstine (1895–1960), was Professor of Anesthesia at New York College of Medicine and Director of the Division of Anesthesia at Belleview Hospital, and one of the giants in anesthesiology during its formative years. What he accomplished and what he represented in New York was also being accomplished, to greater or lesser degrees, by other anesthesiologists outside of New York City. The term Rovenstine era is, thus, used here in a general sense to include not only anesthesiology in New York City, but also in wide areas outside New York. This era is also selected for making comparisons with the present because, starting in 1949, the author, although not in New York, was a participant in, and an observer of, the specialty in that era, as well as the changes that have subsequently taken place.

The Rovenstine Era

Anesthesiology in the Rovenstine era had, when viewed objectively, not horizons: anesthesiology had *a* horizon, a single horizon.[1] That single horizon con-

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sisted of the intraoperative care of surgical patients. Surgical—that is, operative—anesthesia constituted about 90% of the professional time and effort of anesthesiologists in that era. There were, of course, anesthesiologists, including Rovenstine,[2] who spent time in the management of patients with chronic pain. There were also anesthesiologists, such as Virginia Apgar,[3] who specialized in obstetric anesthesia. And there were those involved in management of inhalation therapy[4,5] and of blood banks[6] in that era. On average, however, about 90% of the average anesthesiologist's time and effort was spent in the operating room, 40–50 years ago. Research, mostly clinical, was being performed, but the results were easily contained in the two U.S. anesthesia journals of that era, each published bimonthly.

The Present Era

Anesthesiology today offers, in contrast to the past, a variety of professional horizons and intellectual challenges within, and outside, the operating room (table 1). Some are clinical. Some are nonclinical. When, why, and how the areas outside the operating room came to develop as constituents of modern anesthesiology is a tale worthy of more than brief mention here. It deserves a monograph. Just to list these challenges and opportunities, along with a few brief comments, allows one to perceive, however, the degree to which anesthesiology has changed since the 1940s and '50s.

Table 1. Anesthesiology Horizons: 1993

Clinical
Intraoperative
Operating room
Ambulatory surgery
Pharmacologic
Physiologic
Monitoring
Subspecialization
Obstetrical
Chronic pain
Acute pain
Intensive/critical care
Nonclinical
Research
Organizational
Administration
Teaching
Foreign

The *clinical* horizons in anesthesiology today fall into two categories: intraoperative care and management of surgical patients (what we do in the operating room), on the one hand, and, on the other hand, what we do outside the operating room in terms of patient care.

Intraoperative care of surgical patients continues to be a major component of our specialty in 1992. This is necessary and desirable. Intraoperative care of our patients must always remain a major focus of our professional attention. But the intraoperative care of our surgical patients in the operating room has radically changed over the years. One conspicuous change is the locations in which we provide surgical, operative anesthesia. We have seen a proliferation of free-standing and hospital-based ambulatory outpatient surgical centers. The classic operating suite is no longer, by any means, the only place where surgical procedures are being performed.

Not only has the where of operative anesthesia changed; so, too, has the how—the pharmacology—of modern anesthesia. Today, operative anesthesia is based on a level of polypharmacy to an extent and magnitude undreamt of in bygone eras. Indeed, operative anesthesia today may include only homeopathic concentrations of real, true inhalational anesthetics. Indeed, mixtures of intravenous opioids, benzodiazepines, and, of course, neuromuscular relaxants with, perhaps, a bit of nitrous oxide have today become the basis of much general "anesthesia" in many areas. Any consideration of the broadening of our horizons in anesthesiology deserves inclusion of the radical changes in, and the complexity of, the pharmacologic basis of modern operative anesthesia.

The broadening of our horizons within the operating room has not focused entirely on pharmacology. Equal broadening of our horizons in anesthesiology has centered about the physiology of anesthesia, be it general or regional. Aided and abetted by a plethora of sophisticated, complex monitors, invasive and noninvasive, we can today measure intraoperatively almost any physiologic function we want to. Our use of monitors has also extended our horizons, for better or for worse, into a new technical field. We are now expected to be experts in the anatomy, the mechanics, and the function of the monitoring equipment that we rely so much upon.

Still another area in which our horizons in operative anesthesiology have widened in recent years involves ever-increasing subspecialization in management of

surgical patients. We still need, and always will need, anesthesiologists best described as generalists. But today we also need (and have, fortunately) anesthesiologists who devote most or all of their attention to cardiac, to pediatric, or to neurosurgical anesthesia, to mention but some of the areas of subspecialization into which anesthesiology has expanded.

Just as our horizons have expanded in operative, surgical anesthesia, so, too, have our horizons today broadened in clinical areas outside the operating room. Especially notable has been the broadening of our horizons to include the field of obstetrics, especially control of pain during labor. The amount of time and energy anesthesiologists today devote to the relief of pain during labor surely represents one of the major areas outside the operating room into which anesthesiology has expanded since the 1940s and '50s.

A second area in which the horizons of anesthesiology have expanded in clinical areas outside the operating room is represented by our ever-increasing and ever-deepening involvement in the management of patients with chronic pain. The number of anesthesiologists today working full- or part-time in pain clinics, and the books and articles they have generated, reflect our growth in this increasingly important area.

A parallel (and long overdue) expansion in our activities has been the introduction by anesthesiologists of patient-controlled analgesic techniques for the management of acute pain, most particularly postoperative pain. This, too, ranks as a major step in the development of modern anesthesiology. As with many of the other changes in our horizons, our involvement in the control of postoperative pain increases the time, effort and energy we spend in patient care outside the operating room.

And then, too, there is the well recognized broadening of the involvement of anesthesiologists in the intensive care of critically ill patients of all ages suffering from all sorts of disorders and disease—another demand on anesthesiologists' time.

Along with the remarkable expansion of the horizons of clinical anesthesiology has been a parallel, and comparable, widening of horizons in nonclinical parts of our specialty. Particularly noteworthy has been the explosive expansion of research. One evidence of our productivity in this field is the geometric increase, an almost overwhelming increase, in the number of anesthesiology research articles being published in an apparently ever-increasing number of anesthesiology journals, certainly a desirable change for the better but not, nevertheless, without problems, too.[7]

A second important area in which we are spending more and more nonclinical time centers about two closely related activities best described under the rubric of organization and administration. These two areas of interest are, in fact, so closely related they can be regarded as one. These types of activities include involvement in intradepartmental and, increasingly, intrainstitutional affairs. More and more we see anesthesiologists assuming positions of authority and responsibility in hospitals, medical schools, and universities. These activities further include the not inconsiderable amount of time spent working in and for the many professional societies to which today's anesthesiologists belong, including national organizations, such as the American Society of Anesthesiologists and its component societies. The value and the importance of the often considerable amount of time spent in areas such as these cannot be underestimated.

Yet another nonclinical area with additional demands on the time and attention of anesthesiologists, especially those in larger, university-affiliated hospitals, is teaching in anesthesiology. Today, teaching ranges from clinical instruction in the operating room, in pain clinics, in critical care areas, to didactic teaching in seminars and to participation in local, regional, national, and international continuing-education programs. Is there any other medical specialty with as many continuing-education program?

Finally, it would be disingenuous were no mention made of the broadening horizon offered to ASA members by the ASA's Overseas Teaching Program in East Africa,[8] a program providing a unique, once-in-a-lifetime opportunity to experience living with, and working professionally with and for, East Africans.

Discussion

Anesthesiology has, indeed, come a long way since the 1940s and '50s. To borrow an analogy, anesthesiology has become a mansion with many rooms, not just one room, operative anesthesia, but with many other rooms for the many other interests and activities that, today, constitute the whole of anesthesiology. By no means, however, are all of the rooms available (table 1) equally occupied in all anesthesiology programs. All anesthesiology departments, by definition, are, of course, involved in the intraoperative management of

both surgical and gynecologic patients, be they inpatient, outpatient, or both, as well as obstetric patients having operative deliveries. Anesthesiology departments having only these responsibilities represent one end of the broad spectrum of professional activities found in anesthesiology departments throughout the country. At the opposite end of the spectrum are anesthesiology departments actively involved in all of the many areas listed in table 1.

The spectrum of professional activities of anesthesiologists today can, however, be correlated in a general way (and with notable exceptions) with the size of hospitals as measured by bed capacity. The existence and magnitude of this spectrum of hospitals of different sizes throughout the United States is not widely recognized. Statistical data provided by the American Hospital Association's survey of 5,471 of the acute, general-care hospitals nationally are, however, instructive (table 2).[9] Taking the extremes of hospital sizes, for example, shows that 126,911 (12.9%) of the 982,038 total number of beds in the 5,471 hospitals are found in 2,407 hospitals with less than 100 beds (44.0% of all hospitals). At the opposite end of the bed-capacity spectrum, 222,210 (22.6%) of the 982,038 beds nationally are found in the 330 hospitals with 500 or more beds (6% of all hospitals). In hospitals with less than 100 beds, 2,214,145 operations were annually performed (9.6% of the 23,078,383 operations performed nationally), while 4,959,344 (21.5%) of the operations performed nationally were performed in hospitals with 500 or more beds. Data from hospitals with bed capacities between these two extremes vary widely, with no readily apparent pattern established.

Data on types of operations performed as a function of bed capacity of the hospitals are difficult to obtain. It can be assumed, however, that larger hospitals are more likely to be tertiary care-referral institutions in which more complex, high-risk operations are likely to be performed. So, too, intensive-care programs would be expected to be more frequent, and larger, in larger hospitals. Other nonoperating-room activities, including teaching of medical students and residents, to say nothing of clinical and laboratory research, would, similarly, be expected to be greater in larger hospitals.

Because of the wide variation in the missions of hospitals in the United States, as exemplified by the data in table 2 from 5,471 of them, it is easy to understand why it is possible that individuals associated with but one hospital may not fully appreciate how different the practice of anesthesiology may be in other hospitals, a situation sometimes contributing to difficulty of defining, by practitioners of anesthesiology, exactly what, on a national basis, the specialty consists of.

In listing the roles of anesthesiologists outside the operating room, it should be borne in mind that all anesthesiologists may not share the interest and levels of commitment to innovative programs outside the operating room previously introduced by anesthesiologists who were, at the time, leaders in expanding the specialty beyond the walls of the operating theater. At one time, for example, anesthesiologists in some institutions were, as mentioned above, involved in management of blood banks. Perhaps fortunately enough, this was rather localized and short lived. Anesthesiologists were, more importantly, widely, if not invariably, involved in the early establishment of inhalation or respiratory-therapy departments. Less fortunately, anesthesiologists have, to a considerable degree, retreated from this field, despite their innovative leadership in promotion of such departments. Similarly, although anesthesiologists were pioneers in the development of

Table 2. Hospital Statistics

Bed Capacity	No. of Hospitals	% of All Hospitals	No. of Beds	% of Total No. of Beds	Surgical Operations	% of All Operations
<100	2,407	44.0	126,911	12.9	2,214,145	9.6
100–199	1,320	24.1	187,809	19.1	4,538,097	19.7
200–299	758	13.9	185,057	18.8	4,898,883	21.2
300–399	420	7.7	144,386	14.7	3,818,123	16.5
400–499	238	4.4	105,665	10.8	2,651,811	11.5
≥500	330	6.0	222,210	22.6	4,959,324	21.5
Total	5,473		972,038		23,080,383	

Adapated with permission from the American Hospital Association.[9]

intensive/critical-care units and, although, initially, staffing of these units was primarily by anesthesiologists, anesthesiologists no longer constitute the majority of intensivists. In 1979, 386 (44%) of the 822 physician members of the Society of Critical Care Medicine were anesthesiologists. In 1984, although the number of anesthesiologists in the Society increased to 643, they represented only 27% of the membership. In 1988, the number of anesthesiologists remained essentially unchanged (679), but they constituted only 24% of the membership.[10] The number of anesthesiologists involved in critical care medicine has apparently stabilized, but the number of other physicians in the specialty of critical-care medicine has increased, with the result that anesthesiologists now constitute a minority of physician intensivists. Whether similar changes will occur in chronic-pain clinics and in acute pain-management programs remains to be seen.

That the popularity and attractiveness of some areas into which anesthesiology has expanded may have diminished to some extent does not, however, alter the fact that the horizons of anesthesiology today are substantially greater and more varied than they were in the Rovenstine era. But what has been the effect, the meaning of this widening of our professional activities? As is the case with all changes, one can discern both advantages and disadvantages. The advantages include, without any doubt, improvement in the quality of patient care, both within and outside the operating room. Not only the quality, but the availability of quality patient care has equally increased, a reflection of the increased number of physicians entering anesthesiology. Another important advantage is the expansion of the professional opportunities and intellectual challenges offered today in anesthesiology. There is something for everyone in today's anesthesiology. No longer are our professional and intellectual horizons as restricted to, as focused on, as in the past, almost solely the intraoperative management of our patients. The present openness of the horizons of anesthesiology has undoubtedly contributed, in no small measure, to the influx of physicians into our specialty in recent years, a change good for our patients, for our specialty, and for ourselves.

There are also, however, disadvantages to at least some of the changes our specialty has experienced in recent years. One of these involves loss of contact and rapport with patients associated with the assembly-line processing of early morning admission patients and, often, ambulatory surgical patients. The decrease, or even the elimination, of personal contact and rapport with these patients is a sad commentary on changes in patient care forced upon us in the name of economy and efficiency.

Other disadvantages can be cited, too. None, however, is greater than the discrepancy between what our specialty in reality consists of and what most people, lay people and many, if not most, physicians, think anesthesiology consists of today in 1993. The difference between the widespread, general perception of what anesthesiology in 1993 consists of and what it actually involves can be seen in the difference between perceived and actual allocation of professional time of anesthesiologists. Nonanesthesiologists see anesthesiologists doing nothing aside from being in the operating room all day administering surgical anesthesia. Historically, this was generally quite true. In the Rovenstine era, some 90% of anesthesiologists' time was spent in the operating room. This is no longer the case nationally. Today, there are, indeed, still anesthesiologists who devote 90% of their time to providing operative anesthesia. This is well and good. Desirable and necessary, as it will continue to be. At the other extreme, today, we find anesthesiologists who spend little, if any, time in the operating room. This, too, is well and good. Desirable and necessary for the health and welfare of our patients and our specialty. These latter anesthesiologists might well be spending 90% of their time in clinical practice outside the operating room in areas listed in table 1. In addition, we have the anesthesiologists who spend variable amounts of time devoted to equally important, but nonclinical, activities, especially research, teaching, and administration. An estimate, based upon personal observations and conversations with a large number of anesthesiologists in a wide variety of hospitals across the country, in private practice and in teaching hospitals, is that, today, anesthesiologists spend, *on average,* across the country, somewhere close to 50% of their professional time in operating rooms.

The shift that can be discerned in 1993 in average time spent by anesthesiologists in their classic role in the operating room, a decrease from 90% to about 50%, reflects the change in horizons in anesthesiology that has occurred in the last 40–50 years. The majority of people outside anesthesiology are, however, ignorant of this change. They are ignorant of what modern anesthesiology is all about. The question is, does this lack

of understanding about the nature of 20th century *fin de siècle* anesthesiology make any difference? It does. It makes a great deal of difference. The difference is not just one of image alone. It involves matters of considerable substance, as society moves closer and closer to having both practice and delivery dictated by politicians and government agencies working in concert with insurance companies backed up by masses of computer-based data delivered by demographic statisticians. If decision and policy makers, to say nothing of the general public and many (most?) of our medical colleagues, do not understand the breadth of the role and function of modern anesthesiologists, then anesthesiologists will gradually, and increasingly, become isolated from the mainstream of medicine in future years with regression back to activities centered almost entirely within the operating room. Does the aforementioned gradual elution of some anesthesiologists from the very patient services they themselves initiated outside the operating room represent failure of administrators, third-party payers, and others to fully grasp the nature and scope of modern anesthesia, including its organizational, professional, and remunerative status?

Protection of the quality and extent of patient care provided by modern anesthesiologists working within and outside the operating room requires widespread education as to what anesthesiology has become over the years. The most direct, the most effective, even though a somewhat controversial way of defining ourselves and our specialty, must resolve the misunderstanding inherent in the word *anesthesiology* when used to refer to a specialty that includes so many activities and roles above and beyond the historical basis of simply providing operative anesthesia.

Oliver Wendell Holmes was precise, logical, and accurate when he coined the word, *anesthesia,* to describe, in 1846, the condition produced when William Thomas Green Morton gave ether to introduce the world to painless surgery. Holmes synthesized the word *anesthesia* by combining the Greek prefix *an-*, meaning without, with the Greek word for sensation, *esthesia.* Certainly, ether produces total loss of sensation, *i.e.*, anesthesia. But the derivatives of this word, *anesthesiology,* and *anesthesiologist,* are today becoming an ever-more inaccurate and misleading characterization of the true nature of what today's anesthesiologists are involved in. Anesthesiologists have so many more interests, so many more roles, so many more responsibilities than "anesthesia" as classically defined almost 150 years ago.

The time has come, it is suggested, when we should at least consider the virtue of changing the semantics of our specialty as a means for establishing the identity of modern anesthesiology. No word readily comes to mind that might simply, but clearly, indicate that, while intraoperative care of surgical patients is still, and always must be, one of our major interests, it no longer represents the one and only focus of our specialty; nor, often, what we actually do in the operating room. But something should be done to free ourselves from a 150-year-old semantic cul-de-sac that locks us into a perpetual state of misunderstanding about our specialty. The best way to solve our identity problem seems to lie in the generation of a new word to describe our specialty. One way of doing this, although other descriptive terms might be equally, if not more, appropriate, is to create a new word by replacing the prefix *an-* (without) with another Greek prefix that carries with it, among other connotations, a sense of above, beyond, or more than. This prefix is *met-*. Retaining the base *esthesia* and combining it with the new prefix, *met-*, we have *metesthesia,* that is, above and beyond *esthesia* (sensation) as in combinations such as metaanalysis, metacarpal, metaphysical, metaphor, etc. *Metesthesiology* and *metesthesiologist* are terms indicative of the fact that our specialty, while still concerned about sensation, especially pain, transcends our focus on intraoperative pain to include a collection of separate, though related, interests, skills, and obligations. Such a change in name more accurately describes what we do. Such a change in name is bold enough and conspicuous enough to be more effective in clarifying our identity than the changes from *anaesthesia* to *anesthesia* to *anesthesiology* introduced in the past for the same purpose. Metesthesiology and metesthesiologist will emphasize to patients, to physicians, and to insurance companies and government and other nongovernment third-party payers that members of our specialty are trained to do more than administer anesthetics and that activities outside the operating room are as worthy of attention (and compensation) as is administration of an anesthetic in the operating room. Current historically important organizations and publications may well, and justifiably, elect to use the older term, but Departments of Anesthesiology, to say nothing of Departments of Anesthesiology, Pain Management, and Intensive Critical Care, might welcome the clarity

and simplicity inherent in the term Department of Metesthesiology. Certainly, the suggested change in name will, more importantly, rapidly cause one and all to realize that, yes, our specialty has changed and advanced, not only from the Morton era of 150 years ago, but also from the Rovenstine era 40–50 years ago, a fact many still do not comprehend.

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