Critical Care Medicine

OFFICIAL JOURNAL OF THE SOCIETY OF CRITICAL CARE MEDICINE

VOLUME 3 JANUARY-FEBRUARY, 1975 NUMBER 1

If one part suffers,
all parts share its suffering.
I COR. 12:26

Interdisciplinary medicine: accommodation or integration?

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Los Angeles of the 1920s was unkindly described as, "a dozen communities in search of a city." Perhaps, some future wit will look back at the Society of Critical Care Medicine and its present assembly with the similar criticism: "a conglomerate of health care specialists in search of a discipline."

In fact, the Society having survived birth, the neonatal period, and infancy, now faces its pubertal period with all the self-conscious doubts of the classic identity crisis. We have a hard time convincing ourselves as to who we are, what we are supposed to do, and where ultimately will be our place in the sun. We see ourselves beset by the over-powering parent disciplines who tend to regard departures from traditional ways as intrusions by irresponsible revolutionaries on the well established order. Even worse, efforts to organize critical care along multidisciplinary lines are often regarded as usurpation of the prerogatives of the parent disciplines. These incursions on the territorial imperatives are met with all the emotional intensity that outraged maternal instincts can muster when basic assumptions are challenged. It is little wonder that difficulty is encountered in defining the role of critical care medicine within the framework of the established health care system.

In contrast to these organizational issues, the obvious need for critical care is readily recognized in the clinical setting, at least in a conceptual frame of reference. However, in practical terms, the recognition of the need of critical care often comes too late as the primary physician tends to hold on to his patient until it is inescapable that the end is nigh. Since the responsibility and authority for patient care is most often determined by established referral patterns, the patient may belatedly be transferred to the ICU so that "all bases would have been touched." The "dumping" syndrome isn't always associated with gastrectomy.

As crucial as these political, economic, and jurisdictional problems may be, the clinical and scientific issues are even more crucial. But until the strictly scientific issues are met squarely, the political and economic issues are not likely to be resolved satisfactorily. Only as we build a record of achievement, will interdisciplinary medicine become established. Therefore, it is largely to the scientific aspects of interdisciplinary clinical problems that I wish to address myself.

Traditionally the road to fame and fortune for the young clinician has been to specialize in a smaller and smaller field until eventually he may become the world's greatest expert in a very un-

Presidential Address, Third Annual Meeting of the Society of Critical Care Medicine, Anaheim, California, February 20, 1974.

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usual or rare disease. This traditional route of the subspecialist to personal scientific success is the opposite approach that is needed in multiple vital organ failure. For example, injury, which is no respector of organs, characteristically involves multiple vital organ systems.

Preventable iatrogenic disasters often occur in patients with multiple injuries. As the patient is shuttled back and forth to radiology, various laboratories and specialists, he has an arrest. While everyone is looking carefully to his own organ and specialty, the patient is lost in the cracks between specialities. Preventable catastrophes in trauma as well as acute illness include: (a) failure to recognize the serious nature of the problem, (b) delay in diagnostic work-up, (c) failure of communication between disciplines, (d) failure to recognize and correct a complication or a physiologic derangement early, before it becomes life threatening, (e) failure to develop a well-integrated, coherent plan for prompt resuscitation, work-up, definitive therapy, and correction of the anatomical injury, (f) failure to use monitoring effectively for early warning of impending disaster, for titration of therapy, and for the correction of the physiologic defects. The lack of systematic diagnostic protocols, monitoring procedures, and treatment plans lead to errors and time delays that preclude optimal care. An ideal program provides the mechanisms where routinely there is prompt identification and treatment of life-threatening emergencies, development of priorities, a uniform data collection system, and protocols for subsequent optimization of therapy as well as long-term management programs.

The greatest single improvement in patient salvage rate lies in earlier recognition and prompt institution of appropriate therapy. By contrast, aggressive therapy instituted in the late stages, even if appropriate, is ineffective. All too frequently, the conduct of a relatively dignified demise gives way to a horrow show, which may culminate in rapid administration of many drugs, some of which may counteract each other. Heroic efforts with simultaneously administered massive doses of multiple agents in the terminal state may suggest the appearance of pharmacologic last rites, rather than that of a well thought-out plan. Unfortunately, there has been too much emphasis on who is in charge and too little emphasis on what is wrong with the system.

In general, the clinical problems of interdisciplinary medicine are highlighted in the management of trauma. The trauma patient who enters the hospital in shock is initially resuscitated with fluids and transfusions. That is, his blood pressure is resuscitated! However, the trauma shock patient may be critically ill with multiple vital organ failure. It would be of no solace that if after difficult resuscitation and reconstruction of traumatic injuries, that the patient dies of preventable complications. It would be even more tragic if those who attend the patient fail to recognize that lethal post-traumatic complications that most commonly arise from physiologic alterations associated with the original injury. These complications are often exacerbated by subsequent surgical trauma when managed suboptimally. It has been taught in some circles, almost as an article of faith, that the proper anatomic repair at the operating table will protect against subsequent complications. No one can quarrel with the idea that anatomic repair is often the *sine qua non* of successful management of traumatic lesions. But the anatomic repair of specific traumatic lesions does not necessarily restore the physiologic alterations that began in the wake of the original injury, were intensified by subsequent surgical repairs, and ultimately led to fatal complications. This attitude is exemplified by the surgeon who said, "It's not my fault the patient got pneumonia; I didn't cough in his face, and besides, I have him on antibiotics. Just look how well his surgical wound is healing."

Our observations of trauma victims who initially had been successfully resuscitated, but subsequently died, were that three-fourths died of, or with, pulmonary complications. Clearly it is encumbant on those of us who take care of trauma patients to manage these complications with maximal appropriate early therapy or, when possible, prevention. If we can't do this by ourselves, we should seek help from those who can. It is essential that the full appropriate care be provided. This entails commitment to the totality of clinical and physiologic problems, even if it requires continuous breath-by-breath evaluation of the respiratory status as well as meticulous attention to pH, fluid-electrolyte changes, cardiac and circulatory alterations.

Conventionally, in most areas of medicine where professional assistance is needed, a formal consultation is requested and, in the fullness of time, the patient is seen, examined, and evaluated; additional laboratory work-up or orders may be suggested, and subsequent follow-up by daily visits proposed. This type of input is satisfactory in most cases where the complications are few and widely spaced. But the exigencies of the

critically ill patient who may be hovering between life and death are such as to require at least three additional factors: expeditiousness, the commitment for continuous surveillance, and the coordinated care by many specialists within the health care team. The expertise that will assume this responsibility in an organized and orderly manner is the first goal of critical care.

The primary physician may accept a form of interdisciplinary medicine by accommodation. That is, he will incorporate the suggestions of the consultant into his own orders as they are offered, or more often, he will divide up the patient's organs and systems according to the domain of the various consulting specialists. Thus, the surgeon may write the fluid orders, while the anesthesiologist writes the orders for the mechanical ventilator. A common conflict in this setting is that the surgeon may want to give large volumes of fluids to treat or prevent shock while the anesthesiologist may wish to keep the patient on the dry side to prevent or treat pulmonary complications. The interest of the subspecialities in the problems of "someone else's organ" or speciality is often less than their interests in their own organ and, thus the overall problems of the patient with multiple vital organ failure are often lost in the shuffle.

The route of accommodation may be contrasted to the integrated team approach, wherein it is possible to organize the varied levels of expertise to develop coherent, well-ordered plans on the basis of priorities of life-threatening conditions. Within the framework of an organized team each member shares information needed to optimize group decisions on crucial problems; each begins to understand the problems, compromises, advantages and limitations of the other areas of expertise. From these deliberations, specific patient care plans may be hammered out with specific therapeutic goals and criteria for starting, stopping, or changing each of the various components of the therapeutic plan. Furthermore, it is possible with this approach to evaluate the adequacy of therapy at various levels of care.

The appropriateness and effectiveness of diagnostic, monitoring, and therapeutic activities should be assessed separately as finer and finer physiologic differentiations are used to assess the severity of illness. If and when the severity of illness can be quantified by a useful physiologic index, the same index may be used to follow the temporal course of the illness and to measure the relative effectiveness of various therapeutic modalities. The order of administration of each therapeutic agent, the dose, route, and interaction with other concomitant therapies, should be decided by the priorities of each complication or problem. Ideally each problem should be quantified in terms of its life-threatening probability by physiologic measurements and assessments. But "maximum" therapy for a given problem is not necessarily "optimal." For example, the patient with both cardiac and renal failure may require salt and water restriction for his cardiac failure, but contrariwise, salt and water administration may be required for his renal failure. Maximal treatment of either the cardiac or renal failure would only hasten demise; to treat one vital organ failure to a degree that would jeopardize functions of another vital organ does not produce optimal survival rates. Therapeutic goals may require that the impaired vital organs have equal degrees of failure and that none be pushed to irreversible deterioration. On the other hand, in these circumstances, the judicious therapeutic support of one failing organ may improve the functional state of other failing organs. Therapy under these conditions should be *titrated* and not prescribed by set, standardized doses to precisely defined physiologic goals.

The integrated team approach also permits the development of scientific and clinical advances. The acutely ill patient may die of any one of a large number of clinical problems including the failure of one or more of vital organs, each of which has an interminable number of regulatory and pathophysiologic mechanisms. The likelihood is remote that one unified theory will adequately explain the problem or that a single panacea will reverse the inexorable downhill course. Therefore, physiologic analysis of the problem might better be directed toward a more complete physiologic description of the common patterns of acute illness as they unfold in time, and from these data investigate the functional interactions of multiple vital organ failure. Ultimately we need to elucidate the underlying pathophysiologic mechanisms of each aspect of the physiologic pattern. In this approach, optimal therapy cannot be considered in terms of simplistic notions directed toward correcting one small aspect of the total clinical or physiological problem. It is of utmost importance to: (a) develop a complete and comprehensive physiologic analysis from descriptions of early changes that may have pathophysiologic significance; (b) use the same physiologic measurements to titrate the various therapeutic maneuvers in order to achieve "optimal" physiologic goals; (c) develop predictors

[illegible] be used as early warning criteria; [illegible] clinical and physiologic observations [illegible] and morbidity statistics; (e) [illegible] findings in a systems approach [illegible] protocols, ie, algorithms to [illegible] necessary diagnostic, therapeutic, [illegible] procedures at each step. [illegible] and the monitoring of [illegible] should be independent with [illegible] degrees of activity according to patient needs. These efforts are not competitive or mutually exclusive; both are necessary and one or the other may be absolutely essential in specific instances. In essence, physiologic problems revealed by monitoring must be treated independent of the diagnosis; eg, a patient with an acute myocardial infarction may have no circulatory deficit, but a patient with minimal infection may have severe or even fatal septic shock. It is essential to evaluate various intensities of monitoring during various stages and severities of illness. A major scientific goal in critical care medicine is to develop phases or intensities of physiologic monitoring that can be escalated where needed. This is in contrast to the all too common practice of waiting until the patient's condition is preterminal, and then applying massive monitoring, attention, and therapy to an almost hopeless situation.

The traditional scientific method developed in the physical sciences before the 18th century required experimentally verifiable hypotheses based on precise physical descriptions of the system being investigated. The concept was that if everything important about the system was known, the outcome could be predicted. Perhaps it is not too premature to apply these concepts to present-day medical science. From adequate physiologic descriptions of each life-threatening disease, we must develop a system for classification of the severity of illness based on probabilites of death; ie, predictive indices. From these we must develop criteria for early warning of impending disaster as well as more precise physiologic goals of therapy.

When physiologic measurements are made, it is essential to have the proper basis for interpretation of the significance of the derangements. For example, too often the approach is simply to correct deficits after their appearance is detected using "normal" values as the therapeutic goal. However, the values of a normal unstressed man are not optimal for the critically ill patient or the patient in shock. We must, therefore, define the "optimal" values for ill patients by more rational means.

Apart from the specific problems of a single organ failure in an otherwise healthy body, there are particular problems in the [illegible] with multiple vital organ failures. The in[illegible]tions of several organs failing in various de[illegible]s and at various times have not been properly [illegible]plored. Moreover, the therapy of a single organ failure should not necessarily be applied, quantitatively and qualitatively, to patients with multiple organ failure.

The Society is committed to stimulating scientific activities which promote interdiscliplinary aspects of critical care medicine. At this our 3rd Annual Meeting, we have inaugurated an annual lectureship in critical care medicine and have expanded the scientific program to include a symposium. The First Annual SCCM Lecture which was presented by John B. West, MD, PhD of the Department of Medicine of the UCLA School of Medicine of San Diego described a new method for determining the ventilation-perfusion ratios in critically ill patients. In the symposium on pathophysiology and care of respiratory failure, investigators outside as well as within the Society were invited to participate in order to achieve a diversity of areas of expertise. The objective was not to produce something that could be done better by a traditional specialty devoted to diseases of a single organ; rather, to develop an area not presently considered in adequate depth by any of the disciplines. Our Journal, which was founded to provide a vehicle for interdisciplinary studies in critical care not presently covered in traditional specialty journals, will publish this annual lecture and symposium as well as future lectures and symposia.*

The lectureship by a distinguished investigator outside the membership and an interdisciplinary symposium is planned as an annual undertaking to provide the stimulus to truly integrated and concerted interdisciplinary activity. In finding a relatively untapped area of responsibility, the Society may make imaginative and worthwhile contributions to the care of critically ill patients and in the course of these activities discover itself while fulfilling its highest purpose: valid contributions to science and humanity. When this happens, the identity crisis would have already given way to a sense of confidence that comes of having earned adulthood.

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* The first annual SCCM lecture was pub[illegible]d in the July-August 1974 issue (2:171-180). The symposi[illegible] pathophysiology and care of respiratory failure was also [illegible]blished in the July-August 1974 issue (2:181-227). A symposium [illegible] predictive prognostic indices appeared in the November-December 1974 issue (2:281-336).