

MANUAL OF SURGICAL INTENSIVE CARE

BY THE COMMITTEE ON
PRE AND POSTOPERATIVE CARE



AMERICAN
COLLEGE
OF
SURGEONS

Editorial Subcommittee

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Notice

This volume attempts to provide a useful guide to surgical intensive care. The manual does not attempt to define in exhaustive detail a particular patient's requirements for therapy, nor to prejudge for a particular physician the therapeutic regimen he or she may deem necessary in regard to that patient. The Committee does not claim that methods or approaches other than those presented in this volume may not be equally successful in the management of surgical patients.

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Preface

This volume is divided into three general sections: Development of Surgical Intensive Care, General Aspects of Surgical Intensive Care and Management of Specific Conditions. The chapters vary in length and several have been given extra space because they represent subjects of central importance (such as the management of ventilatory failure) or special difficulty not commonly faced by all surgeons (such as management of the major burn patient). There is no single discipline of medicine where the conventional training qualifies a person to manage all of the different kinds of challenges which may be met in a busy intensive care unit for surgical patients. The editors, representing two disciplines, surgery and anesthesiology, have included a chapter on the psychological aspects of an ICU, the legal problems of the ICU, and a separate chapter on the problems of the clinical laboratory in relation to the ICU. These widely varying areas of competence have become important in providing modern intensive care.

For the optimum care of their patients, informed surgeons will have more and more to accept some responsibility for the quality of intensive care in their hospital. Routine operative procedures have become more complex and are more frequently applied to the treatment of the very young, the very old and the poor-risk patient with preoperative complications. Modern intensive care is an important determinant of survival for such patients. In addition, it is often necessary for informed surgeons to apply appropriate pressure to surmount the local roadblocks to development of modern intensive care in their institutions. For this reason, a chapter has been included in this book dealing with the location and design of an intensive care unit.

The intensive care unit has been called the "hospital's hospital" for many different reasons. An ICU segregates and concentrates all of the assets of an institution for care of the critically ill. A poorly designed or carelessly operated ICU may segregate and concentrate liabilities of care, such as medication errors, infection exposure, electrical hazards and psychological trauma. Certain important features of ICU design may easily be omitted unless the surgical staff are aware of their importance and hence speak out in their defense.

Intensive care on an individual basis dates back to the first concerned physician struggling with the care of a critically ill patient. But the field of intensive care, as a formal discipline, has developed since World War II. It is a young and rapidly growing field without clearly defined boundaries and facing increasingly complex problems. Many of these current problems are related to the rapid growth of the intensive care concept. Our ability to apply advanced intensive care is exceeding our limits of money and manpower to provide such care. Therefore, we find ourselves not only striving for the optimum care for every patient but also forced to become selective in the allocation of the resources which are available for intensive care.

The ideal person to direct the day-to-day activities of a surgical ICU is not automatically someone trained in one or another specialty, but rather is the individual who is most effective in mobilizing the resources of a given institution to meet the problems of a particular patient in an effective and integrated manner. The chapter on Therapeutic Conflicts in the Intensive Care Unit highlights some of the areas where the optimum treatment of one organ system is at the expense of another. Modern intensive care demands rapid and effective communication at every level in order to achieve the greatest benefit with the least risk for the particular combination of problems presented by any one patient.

It is fitting that this book has been prepared under the auspices of the American College of Surgeons. Just as the definition of intensive care is changing rapidly and evolving in complexity, so is the responsibility of the surgeon. The concept of modern intensive care represents an unusual opportunity to demonstrate the principles set forth in the fellowship pledge of that College:

“... I pledge myself to pursue the practice of surgery with scientific honesty and to place the welfare of my patients above all else; to advance constantly in knowledge; and to render willing help to my colleagues, regard their professional interest, and seek their counsel when in doubt as to my own judgment.”

JOHN M. KINNEY, M.D., *Chairman*

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Part I

DEVELOPMENT OF SURGICAL
INTENSIVE CARE

HISTORY OF INTENSIVE CARE

HENRIK H. BENDIXEN, M.D.

JOHN M. KINNEY, M.D.

Between 1950 and 1970 there was extraordinarily rapid growth of an approach to therapy that has been called by many names, including "intensive care" and "critical care." Prior to 1950, few general hospitals had an intensive care unit; by 1970, these units had sprouted to the extent that literally every acute hospital had at least one. All bigger hospitals now are likely to have several units, each aimed at a different patient population, such as those with coronary disease, burns, or trauma. The organization of care in an acute hospital would be inconceivable without intensive care units, for the reason that they have realized a life-saving potential. Hard data are scarce, but there is little doubt that a large number of patients survive today because of intensive care units, patients who a generation ago would have died.⁵²

What prompted the efforts to provide intensive care? What made the spectacular growth possible? The answers to these questions are complex, and in order to provide answers, the intellectual and technological roots of intensive care must be examined as well as the conditions of public interest and availability of funds that were needed to support a form of therapy which was inherently expensive, although often highly cost-effective.⁷ In searching for the roots of intensive care, the primary interest is not in the first spectacular demonstration in animals, nor in the first daring application in humans. What is significant is the beginning of sustained clinical application.

Intensive care covers a large range of activities and defies any attempt to define it with precision. However, characteristics of intensive care, and of intensive care units, can be listed. Intensive care is a form of treatment of patients with serious, often life-threatening, trauma or illness, demanding special resources of manpower and technology. The practical way of delivering such care has been by centralizing patients and resources in areas where expertise can be developed and maintained, where the necessary manpower

categories can be deployed, and where the required technology can be assembled and kept working.

A common threat to the life of a patient in an intensive care unit is failure of the respiratory system in the broadest sense. Although other support systems are available or under development, ranging from the artificial kidney to circulatory assist devices, it is certainly the case that effective treatment or prevention of failure of ventilation or oxygenation, and the maintenance of a free airway, have been at the core of activities in most intensive care units. This historical sketch traces the roots of centralization of airway management, oxygen therapy, and artificial ventilation.

CENTRALIZATION OF PATIENTS AND RESOURCES IN SPECIAL UNITS

The centralization of those patients who cannot be handled elsewhere may be traced back to the origin of hospitals. The first “public” hospitals provided a place to care for those patients who could not be cared for in their homes because of a lack of resources. These early hospitals from the period 1750 to 1850 were characterized by their 12 to 20 bed wards for the poor, making supervision and care practically and economically feasible. It was much later that the well-to-do moved from their homes into hospitals for treatment, and then to single or double rooms in private pavilions.¹⁸ This happened around the turn of the century, as the hospitals grew in resources, especially with respect to diagnostic and surgical facilities.

As any house officer knows, it is difficult or impossible to provide intensive care for seriously ill patients in private rooms. Therefore, to the other reasons for having intensive care units must be added the fact that resource-demanding care of illness and trauma, involving vital organs and systems, requires a concentration of patients to be handled economically. The single or double room is viewed as the hallmark of upper class care, which should be universally available. At the same time, the hospital planner must provide intensive care areas for that fraction of the patient population that is seriously ill, and reserve the single and double rooms for those less ill. It helps that often the ward can be rearranged and equipped for intensive care fairly readily.

Centralization of patients with special illnesses or conditions goes back so far as to be lost in antiquity. The first purpose undoubtedly was to separate individuals with infectious diseases and mental afflictions for the protection and comfort of the rest of the community. Much later came centralization of patient categories because of therapeutic possibilities—examples are the gas poisoning units of World War I^{4,33} and the shock units of later wars.⁶¹ Also, in the face of civilian disaster, special units were promptly opened so that patients and resources could be centralized. A well reported example is the unit that opened at the Massachusetts General Hospital when the