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Past and Present Challenges in ICU Management



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Introduction

Maintaining an intensive care unit (ICU) and providing intensive care for all patients who benefit from it necessitates a high investment in personnel, technology, and material resources within a short time period, and is naturally associated with costs. The complexity of the care processes involved, and the fluctuation in the number of patients needing intensive care at a specific time, make managing intensive care resources very challenging. Having too many resources can be notoriously expensive and can lead to an inappropriate use of ICU beds, while having too few ICU resources prevents timely admission of patients, increases the risk of poor outcomes, and may paradoxically increase costs by unnecessarily prolonging patients' stay in the ICU. Optimising the whole patient care process—including the pre-ICU, ICU, and post-ICU phases—has the greatest potential for efficient resource use and improved outcomes.

Lessons From the Past

The challenges of ICU management are nothing new. The whole principle of concentrating care personnel and cohorting the sickest patients in one area for more intensive monitoring and care was established over centuries of treating the casualties of wars, epidemics, and natural catastrophes.

The care of patients during polio epidemics in the 1950's in Copenhagen, often referred to as the birth of modern intensive care, was a masterpiece of care process optimisation, organisation and management. Clinical observations suggesting hypoventilation as the cause of patient deterioration were confirmed and the problem was treated using a new application of available technology (combination of tracheostomy with prolonged manual ventilation). A therapeutic strategy was then developed for large-scale use of such treatment, and associated decision-makers were convinced to provide the necessary resources. Furthermore, a multidisciplinary team and the logistics necessary for long-term treatment of large numbers of patients were introduced. Finally, quality assurance was undertaken by assessing the outcomes of this care process.

The subsequent proliferation of ICUs in Europe, North America, and Australasia further revealed the complexity of ICU management. A report from National Academy of Sciences – National Research Council Committee on Anesthesia: Workshop on Intensive Care Units, which was held on 14 October, 1963, in Washington, DC, summarises many problems that are still very relevant (Hamilton 1964). The following provides a brief overview and summary of this report, which can be considered a seminal paper on ICU management.

National Academy of Sciences – National Research Council Committee on Anesthesia: Workshop on Intensive Care Units

In the decade following the polio epidemics, many surgical, medical, and respiratory ICUs had been opened, and the pioneers in the new specialty area faced many novel challenges. Patient management-related themes were heavily focused on treatment of respiratory failure (airway management, humidification, recognition and management of respiratory insufficiency), thus reflecting the major and dramatic achievements during the decade after the polio epidemics. Other clinical themes included characterisation of patient populations in the various participating ICUs (case mix) and infection control—both still very current today. The main management themes discussed included architecture and design of ICUs, organisation, staffing, and training of doctors and nurses.

Many of the contributors were already, or were soon to become, established and renowned scientists in areas that would play a role in the future of intensive care medicine, but in the aforementioned workshop it was their insight into organisational and administrative issues that was most impressive. From today's perspective, it is fascinating to note that those early pioneers pointed out most of the problems related to intensive care that remain challenging or unsolved still today, almost half a century later: the role of different specialties in the treatment of a patient with multidisciplinary problems; the need for specialty training for both nurses and doctors; the need for attending specialists to be directly involved in and responsible for patient care. In the words of Dr. D Bates from Royal Victoria Hospital, Montreal: "The main responsibility for cases should, I believe, rest with attending staff, since no resident who has not had special training in this discipline is capable of taking care of these cases." Dr. J Severinghaus, University of California Medical Center at San Francisco, who is best known for his decades-long contributions to our understanding of respiratory and blood gas physiology, addressed the question of who holds ultimate responsibility for admitting and taking care of patients in ICUs, and who is responsible for the general administration of intensive care: an organisational issue still very current today.

Dr. J Kinney, at the time a surgeon at the Peter Bent Brigham Hospital in Boston and a future pioneer in metabolic research in the critically ill at Columbia Presbyterian Medical Center, New York, pointed out that no single physician can cover a critically ill patient 24 hours a day for five to six days, a typical average length of stay in many units then (and now), necessitating that responsibility be shared—a very simple fact still denied in many hospitals today. It was recognised that an interdisciplinary team approach with defined leadership was necessary, although some participants questioned this, favouring that referring physicians have privileges to use intensive care facilities—the still continuing debate over 'closed' vs. 'open' intensive care units. Dr. P Safar, the developer of cardiopulmonary resuscitation as we know it today, strongly advocated an interdisciplinary, 'closed' model.

Safar presented a comprehensive review of his concepts of intensive care, based on his experience in setting up intensive care services first in Baltimore in 1958, and subsequently in the Presbyterian-University Hospital in Pittsburgh, starting in 1961. In Pittsburgh, an interdisciplinary subcommittee was formed for intensive care. It consisted of representatives from surgery, medicine, infectious diseases, neurosurgery, nursing, administration, and anesthesia, with the chief of anesthesia as chairman. The Intensive Care Unit Policy summarised the purpose, admission and discharge concepts; triage in the case of lack of resources; patient assignment to a single responsible service; ordering concepts, consultations, definition and use of guidelines and protocols for various procedures and aspects of care; training; and delegation of selected complex tasks to highly trained nursing staff. Dr. Safar summarised the prerequisites for smooth functioning of intensive care as interdepartmental cooperation, well-defined responsibilities and authority, and the physical set-up and standardisation of certain procedures—all principles applicable today as well. Moreover, Dr. H Pontoppidan, another acute respiratory failure specialist, presented an ICU patient classification system based on the level of care needed.

Past and Present

Management and organisational solutions in intensive care medicine have without a doubt matured. Many ideas and principles of organisation, structure, leadership, and training that were formulated in the 1950's and 1960's have been institutionalised, and intensive care medicine has established itself among other specialties, with fights over ownership belonging in the past. One important lesson is that competency based training programmes are the way to develop open access to intensive care medicine.

In 1973 Dr. W Shoemaker wrote a summary of the principles necessary for organising and managing intensive care medicine, which are still very valid today: "Traditionally, complicated cases are handled by calling for consultations. When the complications are few and they appear in staggered fashion, this approach may function reasonably well. But management of the critically ill patient with multiple vital organ failures often requires maximum coordination of a wide range of professional activities and close monitoring of the patient's course. This can best be attained in a multidisciplinary ICU where the maximum input of specialties may be coordinated with continuous surveillance and laboratory support. The patient with multiple injuries and the acutely ill patient with multiple vital organ failure have many common physiologic problems. As the same therapeutic modalities are used, the multidisciplinary team approach is optimally suited to coordinate therapy for multiple organ failure."

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