The First Neurointensive Care Units

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The idea of a separate hospital space designed to care for sicker patients evolved gradually over several decades mostly because surgery became more complex. There would be one defining event in the 1950s.

Intensive care units (ICUs) started as "specialized care units" or "respiratory care units." These units sprung up as a result of a sudden demand for ventilatory support during large scale poliomyelitis epidemics around the world [2, 3, 10]. Expectedly, these epidemics also led to improvement in mechanical ventilation. In the 1950s, Bendixen and Pontoppidan—both anesthesiologists—used their expertise in management of patients with poliomyelitis in Denmark to create a respiratory care unit in Boston's Massachusetts General Hospital [12].

This reality—being confronted with overwhelming numbers of patients—led to the decision to maintain a unit in the hospital that could care for patients with comparable illnesses.

The Early Days of the Intensive Care Unit

Innovative medical care associated with ICUs has been well chronicled [4, 6, 7, 12, 13, 16]. In the early 1970s, the vast majority of large medical institutions had ICUs constructed in their hospitals. These early ICUs were replaced by multidisciplinary ICUs, trauma units, transplant units, and postoperative care units. Once these specialized areas within a large hospital were established, further development of technology, treatments and standards followed [1]. Some of these were introduced anew (Swann–Ganz catheter), some were developed in the unit (e.g., positioning of the patient during ventilation, nutrition adjusted for critical illness, surveillance of ICU infections). Each unit may have had a different path of development. Hilberman summarized the development of ICUs simply as outgrowths of more demanding care [7]. Thus, surgical recovery units needed for more complex surgeries would become surgical ICUs. Advances in resuscitation techniques and the need to monitor treatable cardiac arrhythmias after myocardial infarction would lead to coronary care units [8]. Further specialization came with burn and transplant units. Therefore, the history of ICUs can be approached from different angles. There is a history of units, history of ICU technology, history of understanding and refinements of specific critical illnesses, history of critical care treatments, and even a history of ICU ethics [16].

The role of nursing care has been underappreciated by physicians who wrote the histories. Generally, there is no mention of nursing involvement in historical reviews and more typically historical reviews focus on technological innovations, and a celebration of pioneers in the field. However, nurses were the ones who saw the patient deteriorate and took action, and intensive care and neurosciences intensive care could not have progressed without specialization in nursing care. Critical care nurses started with the establishment of the American Association of Cardiovascular Nurses in 1969, changing to American Association of Critical Care Nurses and specialty certification became necessary. In the United States and Canada, the respiratory therapy specialty emerged and defined its role in overseeing mechanical ventilation and weaning. Other specialty care involved ICU pharmacists, nutritionists, and social work.

The Society of Critical Care Medicine catapulted the specialty into existence and soon training program guidelines appeared in the United States and abroad [5, 14, 15].

The Early Days of the Neurosciences ICU

The history of neurocritical care as a specialty cannot yet be written and, perhaps even the history of intensive care is far too premature. (One master historian remarked recently that the time finally has come to write the history of the French Revolution.) Some important developments, however, should be recognized.

As alluded to earlier, the history of neurosciences ICUs undoubtedly started with neurosurgeons performing more extensive surgeries. The beginnings of the neurosciences ICU—defining it as a



Fig. 2.1 Layout of Mayo Neurosciences Intensive Care Unit (opened in 1958)

combined neurology and neurosurgery ICU—are largely unknown and difficult to tease out. Many of these first units were either for neurosurgical or neurologic patients. In a broader sense, little is known about the triage of patients with acute neurologic conditions in those days.

Historically, neurosurgeon Dandy has been credited with opening the first neurosurgical ICU at Johns Hopkins Hospital in 1932. Indeed, Dandy had the fortitude to understand that some neurosurgical patients needed special care, and he chose a ward that he dedicated to the care of the sicker postoperative neurosurgical patients. In London, the Batten Respiratory Unit at the Institute of Neurology and National Hospital for Nervous Diseases opened in 1954 to treat mostly patients with acute neuromuscular disease, as well as those with stroke and spinal cord disorders who required mechanical ventilation [11].

The development of the neurosciences ICU at Mayo Clinic recently has been reported [18] (Fig. 2.1). This unit at Saint Marys Hospital was one of the first newly built combined neurosciences ICUs in the United States. It started as a unit with predominantly neurosurgical patients, and most of the expertise was developed in the care of these patients. Soon, acutely ill neurologic patients were admitted. A new culture of neurosciences was nurtured with specific attention to the care of the neediest patient. Teaching of nursing staff and the beginnings of administration became part of the neurosciences ICU responsibilities. The development of the neurosciences ICU also can be seen clearly as an outgrowth of nursing ingenuity. Moreover, neurosciences ICU nursing became an accepted subspecialty, and annual meetings were held.

In the United States, most neurosciences ICUs combined neurosurgical and neurologic patients. This would seem logical because acutely ill neurologic patients could need neurosurgical intervention (e.g., cerebral hematoma), and acutely ill neurosurgical patients could benefit from neurologic expertise (e.g., seizure management). Because of the open nature of the neurosciences ICU, physicians from multiple disciplines would closely cooperate in patient management. Often, a close cooperation between neurology and neurosurgery consultants in the neurosciences ICU was needed. There was a renewed interest in closely studying and treating acute neurologic and neurosurgical conditions and this led to a better understanding of the risks for deterioration.

Several other landmark developments should be noted. First, neurologists became interested in acute neurologic conditions (i.e., coma) after patients survived as a result of more advanced resuscitation. Neurologists often were asked to judge the severity of injury and to prognosticate. Neurologists Fred Plum, Raymond Adams, and C. Miller Fisher were the first to describe causes of coma and other acute conditions (i.e., brain death, locked-in syndrome, anoxic-ischemic encephalopathy). A better understanding of neurologic complications of critical illness soon followed, and consultations in ICUs increased.

Second, with the emergence of neurosciences ICUs, coverage was needed. In the 1980s, neurologists would be stationed in these units. The presence of a neurologist in the neurosciences ICU provided a major benefit to neurosurgeons who would not always have the opportunity to immediately go to the bedside (e.g., during a long and complex neurosurgical procedure). Neurologists became more knowledgeable in management of acute neuromuscular respiratory failure, treatment of increased intracranial pressure, and systemic complications specific for acute neurologic disease. Neurologists would join intensivists (mostly anesthesiologists) and developed sufficient hands-on training that would allow them to fully manage these complicated patients.

Third, a flurry of scientific publications followed that would further define the field and its boundaries. Better understanding of causes of deterioration and recognition of opportunities of early intervention would lead to more complex and specialized care.

Finally, in 2004, a Society was founded and with it a journal [17]. Accreditation was sought through the American Academy of Neurology (United Council of Neurologic Specialties).

Those who practiced neurocritical care noted similar deficiencies and concerns as physicians

in the general ICUs. These were open ICUs with different physicians with different specialties, lack of leadership, lack of protocols, lack of effective communication, lack of experienced care in emergency conditions, and lack of organized multi-institutional research. All this is changing rapidly due to a new cadre of dedicated neurointensivists. The physical presence of a neurointensivist in a neurosciences ICU should improve care and outcome. Multiple—albeit retrospective—studies have shown that outcome in certain conditions can be improved with an attending neurointensivist [9]. Benchmarks can be defined (mortality, morbidity, length of stay, number of consultations, and actual costs), but evidence may be hard to obtain. Obviously prospective randomization of patients with life-threatening neurologic disease into a general medical or surgical ICU versus neurosciences ICU will be considered unethical and problematic.

Neurocritical care as a specialty is finally established and has been enthusiastically welcomed by many physicians and other health care providers. This fascinating story continues…

References

1. Aitkenhead AR, Booij LH, Dhainaut JF, et al. International standards for safety in the intensive care unit. Intensive Care Med. 1993;19:178–81.
2. Anderson EW, Ibsen B. The anesthetic management of patients with poliomyelitis and respiratory paralysis. BMJ. 1954;2:786–8.
3. Berthelsen PG, Cronqvist M. The first intensive care unit in the world: Copenhagen 1953. Acta Anaesthesiol Scand. 2003;47:1190–5.
4. Calvin J, Habet K, Parrillo JE. Critical care in the United States. Crit Care Clin. 1997;13:363–76.
5. Grenvik A, Leonard JJ, Arens JF, et al. Critical care medicine. Certification as a multidisciplinary subspecialty. Crit Care Med. 1981;9:117–25.
6. Grenvik A, Pinsky MR. Evolution of the intensive care unit as a clinical center and critical care medicine as a discipline. Crit Care Clin. 2009;25:239–50.
7. Hilberman M. The evolution of the intensive care unit. Crit Care Med. 1975;3:159–65.
8. Julian DG. Treatment of cardiac arrest in acute myocardial ischemia and infarction. Lancet 1961;2: 840–44
9. Kramer AH, Zygun DA. Do neurocritical care units save lives? Measuring the impact of specialized ICUs. Neurocrit Care. 2011;14:329–33.
10. Lassen HC. A preliminary report on the 1952 epidemic of poliomyelitis in Copenhagen with special reference to the treatment of acute respiratory insufficiency. Lancet. 1953;1:37–41.
11. Marshall J. The work of a respiratory unit in a neurologic hospital. Postgrad Med J. 1961;37:26–30.
12. Pontoppidan H, Wilson R, Rie MA, et al. Respiratory intensive care. Anesthesiology. 1977;47:96–116.
13. Rosengart MR. Critical care medicine: landmarks and legends. Surg Clin North Am. 2006;86:1305–21.
14. Thijs LG, Baltopoulous G, Bihari D, et al. Guidelines for a training program in intensive care medicine. Intensive Care Med. 1996;22:166–72.
15. Vincent JL, Artigas A, Bihari D, et al. Guidelines for the utilization of intensive care units. Intensive Care Med. 1994;20:163–4.
16. Weil MH. The Society of Critical Care Medicine, its history and its destiny. Crit Care Med. 1973;1:1–4.
17. Wijdicks EFM. A new journal, a new step, a new energy. Neurocrit Care. 2004;1:1–2.
18. Wijdicks EFM, Worden W, Miers A, et al. The early days of the neurosciences intensive care unit. Mayo Clin Proc. 2011;86:903–6.

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