EDITORIAL

INTENSIVISTS IN SINGAPORE : *RAISON D'ETRE* IN THE MODERN ERA OF CRITICAL CARE MEDICINE

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Singapore stands at the crossroads in Southeast Asia. It has led the region in many areas of economic development and medical achievements. Is it time for her to embrace another stage of development in her history of modern medicine? Despite the calls for greater cost-cutting and caution in the introduction of modern technology, there is an urgent need for a new area of medicine to be developed along with its own unique physician identity and standards of practice. This area is intensive care, or critical care medicine with the birth of the physician intensivist. Even though intensive care units (ICU) make up a minority of total hospital beds, it consumes an inordinately larger proportion of overall hospital cost. It therefore cannot be ignored by any country that is intent on cost containment in the health sector. Furthermore, ICUs represent the utmost in nursing and medical intensity for patient care and should be the flagship of medical care in any hospital in today's modern society. Note that various ICUs already exist in Singapore, but along specialty lines as medical and surgical ICUs, as well as cardiothoracic, neurosurgical, plus paediatric and neonatal ICUs. The establishment of critical care medicine as a recognised specialty with the birth of the "intensivist" should be promoted in Singapore to improve quality of care[1-3] that comes from specialisation, improvement in cost management, education and research, development of ethical and moral guidelines for withdrawing and withholding life-support therapies, and developing guidelines for admissions and discharges. There are now several physicians who are beginning to fill this role, which can only bode well for future development. The purpose of this article is first to discuss the historical development of critical care medicine in America in order to learn from it, and secondly, to discuss the potential advantages of developing the area of critical care medicine for Singapore.

The new specialty of critical care medicine (CCM) was initiated in the US with the creation of the Society of Critical Care Medicine in 1971[4]. Critical care medicine, initially introduced as being synonymous with acute medicine, was considered to consist of a triad of resuscitation, emergency care for life threatening conditions, and intensive care (long-term life support)[5]. The concept of intensive care has been ascribed to Florence Nightingale, who described the advantage of assembling critically injured patients into a common area during the Crimean War (1854 to 1856)[6]. The polio epidemics in the 1950's with bulbar polio causing respiratory failure led to the development of respiratory care units in Denmark. These patients were tracheotomised and manually ventilated with bags by medical students working in shifts[7]. Later, iron lungs providing negative pressure ventilation were developed[8] and were used extensively during polio epidemics in the US. Coronary care units were initiated in Ireland and spread rapidly in North America, as well as Europe. This is related to the fact that myocardial damage can lead to death from ventricular fibrillation[9]. If dysrhythmias were detected and early defibrillation applied, many lives could be saved. Postoperative monitoring units were developed following major surgery, and especially after cardiac surgery. The first postoperative neurosurgical unit was introduced by Dandy in 1923 at John Hopkins Hospital in Baltimore[6]. With time, more and more units developed, either based on organ systems (respiratory care units, coronary care units, renal units for dialysis, neurology-neurosurgical units), according to discipline (surgical, medical, paediatric, neonatal), or clinical problem (trauma/shock). The first multidisciplinary ICU with full-time physician staffing was developed at the Baltimore City Hospital in the 1950s by Peter Safar[6]. He then started the first CCM Fellowship programme for third year anaesthesiology residents at the Presbyterian-University Hospital at Pittsburgh in 1963[10]. This programme gradually accepted physicians from other disciplines to become a multidisciplinary programme in the late 1960s[11]. In 1969, the Society of Critical Care Medicine was founded in Los Angeles with Max Harry Weil as its first president, committed to improving the care of patients with acute life-threatening illnesses or injuries, by developing educational programme, and standards of practice[4]. Subsequent to this, the journal Critical Care Medicine was published as the official journal for the society under the founding editorship of William Shoemaker.

The management of patients in intensive care has led to the development of the critical care physician, who is referred to as an "intensivist". What is the role of such intensivists in today's healthcare system? Can they be distinct specialists away from the traditional departments of internal medicine, surgery, paediatrics and anaesthesiology once they have completed their basic training in one of the above disciplines, and then spending a period of higher training in a multidisciplinary training programme? Or are they merely a motley crew in search for a discipline? As of 1994, out of a total of 7,261 board certified critical care specialists in the US, 65.6% are internists with only 8.6% anaesthetists (data from the American Boards). Of all the internist applicants for the 1993 CCM board examinations, 31% were internists with only an additional CCM fellowship training (data from American Board of Internal Medicine). The data thus suggest that as far as US is concerned anyway, the majority of intensivists are internists. Which pathway leads to a better intensivist and which is appropriate for Singapore remains undetermined, and is worthy of study.

The modern era of critical care medicine has seen the introduction of advanced life-sustaining technology, which has included numerous modalities to support or even replace different organs that are failing, without which death was a certainty. This

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has included the introduction of positive pressure ventilators, defibrillators and electrocardiographic monitoring, haemodialysis and peritoneal dialysis, intra-aortic balloon pumps, ventricular assist devices and artificial hearts, extra corporeal cardiopulmonary support systems, transvenous pacing, inotropes and vasopressors, invasive monitoring, and the whole arena of modern organ transplantation, be it single or multiple organs. The introduction of such technology spawned the development of the modern day intensive care unit with its staffing of specially qualified critical care registered nurses, the support of respiratory therapists, and the advent of stat laboratories.

New moral, ethical and legal issues have arisen with the advent of the above so-called "life-sustaining therapies", as to their application, withdrawal, and use for providing organ donors[12]. The rising cost of healthcare has brought attention on the intensive care unit, where expensive therapies are being employed for a population of patients with the worst prognosis. Outcome studies are desperately needed, beyond the crude severity scores relating to mortality[13-16], to define benefits to the quality of life, and more sophisticated methods of assessing the effects of modern intensive care.

The role of the physician intensivist in this current ICU milieu of change remains to be defined. His or her training may derive from internal medicine (including paediatrics), surgery, or anaesthesia, followed by a further spell in the intensive care unit. The additional training in critical care medicine should include rotations through various types of ICUs as the norm. Most Internal Medicine based Critical Care Medicine programme are also linked to another subspecialty eg. Pulmonary Medicine, Cardiology, Nephrology or Neurology. Is there a role for the multidisciplinary physician intensivist? What distinguishes such a professional? Are they primarily internists, surgeons, or anaesthetists, with an interest in critical care, or can they exist as a totally separate specialty (not sub-specialty) of critical care medicine? The necessity of a dedicated intensivist as the intensive care unit medical director can be justified from four standpoints: improved clinical care, cost-containment, education and research, and administration.

Clinical care implies the ability to perform all necessary interventional procedures that define modern critical care, viz use of invasive monitoring, eg. insertion of intra-arterial lines, central venous catheters, and pulmonary artery catheters; airway management; chest tube insertions; transvenous pacing; fibreoptic bronchoscopy; dialysis methods; and advanced cardiopulmonary and cerebral resuscitation. In addition, knowledge is expected of all aspects of internal medicine, cardiac emergencies, toxicology, post-surgical management and anaesthesia complications, infectious diseases, transplant medicine, trauma, burns, ventilatory management, and nutrition. The intensivist should be the "super-specialist". Improvement in clinical care derives from the 24 hour availability of an experienced intensivist managing the patient, rather than the most junior house officers of the primary specialty, who are not able nor equipped to act in any emergent capacity. The holistic management of the patient in intensive care is an important turning point away from organ specific approach that treats the patient as separate parts. Instead, the patient is now treated as a complete individual bringing dignity back to the patient, away from the dehumanizing aspect of intensive care. It also allows the intensivist to act as the advocate for the patient's interest when he or she feels that inappropriate use of life-sustaining treatment is employed that does not fulfill the stated goals and objectives of that patient. There is little doubt that the experience derived from prolonged training in ICUs improves the clinical management of common scenarios like septic shock, cardiogenic shock, haemorrhagic shock, trauma, brain failure, and ventilatory strategies for adult respiratory distress syndrome, and weaning from the ventilator.

ICUs are very costly, both in terms of staffing and equipment. The average daily charge for a patient in our medical ICU was just under $2,000 (unpublished data). In the US, total ICU costs for 1992 was $55 billion representing 19.5% of overall hospital cost[17]. Cost containment is therefore a priority in the current cost conscious climate for healthcare. The intensivist can help by reducing the number of consults by other specialists, appropriate use of investigations and interventions that impact on clinical decisions, deciding on appropriate admissions, and initiating the necessary process for terminating futile life-sustaining therapies. Note that the presence of advance directives have been shown to reduce hospital costs for Medicare patients in America[18], although others have questioned the ability to make much impact on cost-savings at the end of life[19]. Newer technologies have to be evaluated to determine their effects on cost reduction: using pulse oximetry to reduce the frequency of arterial blood gas determinations; computers for automated data collection, preventing unnecessary duplication, as well as warning against medication errors, etc. Admissions should be judged by "suitability", eliminating unnecessary admissions purely for low-level monitoring, and terminal cases. The ultimate responsibility of the intensivist is not to cut cost, but to rationalise the cost incurred.

Education of junior staff and nurses is very important, as they form the initial contact with the patient, and provide the most immediate care. Furthermore, they act as gating mechanisms for the transmission of relevant data to the intensivist. Especially for nurses, education is an empowering device that allows the nurse to be intimately involved in the management of the patient, and also work as patient educator as to the processes that are going on in the patient.

Research in the clinical arena is always important in order to develop an understanding of the natural history of certain disorders, or interventions. Furthermore, evaluating interventions as to their effectiveness, especially expensive modalities are a constant necessity, eg. use of monoclonal antibodies in sepsis. Bench research is also driven by the problems encountered in the clinical arena, eg. unraveling the complexities of cytokines in sepsis, the basis of resuscitation and the development of specific organ monitors like gastric tonometry, the usage of nitric oxide as a specific pulmonary vasodilator, etc.

Education of the general public is included, especially concerning the ethical and moral issues of withdrawing life support for futile cases[20]. The call to limit the number of ICU beds in Singapore to 3% of the total hospital beds as proposed by the recent White Paper on health cited the reasons of public abuse in demanding futile and prolonged life-sustaining therapies. This indicates the need for further and more effective public education, along with the development of appropriate gate-keeping from the ICU directors, in order that the functioning of the unit is not jeopardised by such cases. There is an urgent need for the patients to define their goals, either by advance directives or communicating with their family members or physician, in order that the most appropriate medical care which they desire can be provided[21]. It would certainly be a serious injustice to subject an unwilling patient to prolonged mechanical ventilatory support despite the terminal nature of his or her condition. It is important to note that the presence of advance directives is primarily to promote patient autonomy.

Administratively, the intensive care unit is a distinct unit requiring the necessary equipment, staffing, education programme plus the appropriate space in which to exist. Unit policies with regards to admissions, and discharges have to be formulated. Protocols for certain management strategies can be

developed, eg. weaning protocols that can be run by the respiratory therapists. Infection control is increasingly important as nosocomial infections with multi-resistant organisms become a growing problem. Brain death determination and certification for organ donation and termination of life support have to be administered and updated as required. Furthermore, budgetary considerations will assume more and more importance in the future.

Frustrations however are frequently encountered in the setting of intensive care. Many physicians in the traditional specialty believe that intensive care can be managed by the standard practice of morning rounds and prescriptions. The concept of titrated patient management which is vital to an unstable patient and demands constant 24-hour attention for 7 days a week, is dismissed. Furthermore, the sickest patients are usually managed by the most inexperienced junior house-staff (inverse hierarchy principle)[11]. The insistence of admitting physicians and surgeons to remain in charge of the patient's general care in the intensive care unit, without being available to stay with their patient, is also anathema to titrated patient care. Finally, the classical fragmentation of care with several services consulting on the patient with multiple organ failure, leads to totally disparate goals of treatment and potential disasters.

Thus, the development of the discipline of critical care medicine is desperately needed, and if the arguments presented above are accepted, a highly logical step. However, great mistrust still exists in many hospitals across the country, and in different countries in letting the intensivist assume full responsibility for the patient from the primary admitting physician. This mistaken attitude is linked to the lack of recognition of the intensivist as a physician specialist in his or her own right. For instance, the surgeon no longer contemplates interfering with the work of the anaesthetists, just as the internists does not interfere with the surgeon's operative procedure. The distinction between the primary specialties therefore need to be redrawn for the full independence of the nascent specialty of critical care medicine, and the physician intensivist. This should then encourage physicians from different specialties to become intensivists in the multidisciplinary fashion by removing the fear of losing their traditional identification and potential isolation from their initial specialties, by providing a new identity that can stand proud amongst its older colleagues. In this fashion, medicine at large will continue to develop to serve humankind with the utmost that modern science and humanity can offer. ICUs can then be integrated into the overall healthcare plan to provide a more complete and higher quality of service for the community, and their priorities can be determined for future funding of healthcare[22]. Singapore should therefore be encouraged to encompass the multidisciplinary approach to intensive care, and develop this area of medicine enthusiastically by establishing standards of training and accreditation. This can be administered within the Academy of Medicine till the birth of our own College of Critical Care Medicine.

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