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Editorial

Medical Student Intensive Care Rotation: Is There A Gap in Education?

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Introduction

In 2010, critical care medicine (CCM) costs in the United States was estimated to be $108 billion, representing 13.2% of hospital costs, 4.1% of national health expenditures, and 0.72% of the GDP [1]. CCM costs increased 92% and ICU costs per day increased by 61% from 2000 to 2010 [1]. The United States is by far is the highest spender on the healthcare. The high cost associated with CCM has garnered much attention, as CCM costs and the number of CCM beds continue to trend upward [2]. Between 2000 and 2010, the number of CCM beds increased 17.8% while the number of hospital beds decreased by 2.2%, resulting in a 20.4% increase in the CCM/hospital bed ratio [3]. The United States also uses intensive care services far more than other countries, especially among the elderly [4], premature/neonatal, and Medicaid populations [3].

With ICU costs representing a large portion of overall healthcare costs and an increasing emphasis on ICU care in the United States, medical education should reflect a deeper understanding of ICU care. The ICU can be overwhelming for medical students with little or no clinical experience. It differs from other medical specialties in its severity and complexity of illness, use of life-supporting medications, machines, and ethical considerations. The ICU models, lately have relied heavily on a multidisciplinary team approach and effective communication between the subspecialties. Many of the skills learned in the ICU are unique and may not have been encountered by medical students during other specialty rotations. Currently, ICU is not a required rotation in medical school for Liaison Committee for Medical Education (LCME) accreditation. In 2016 - 2017, 41% of medical schools had critical care as a required clerkship, up from 24% in 2010 - 2011 and the average total number of required weeks for critical care was 3.7 [5]. Despite significant progress, less than half of medical schools require at least 4 weeks of an ICU clerkship for graduation. Although neither ICU nor emergency medicine (EM) are required rotations, both of which help train the healthcare provider to take care of increasing numbers of emergent and critically ill patients. The Association of American Medical Colleges' (AAMC) Learning Objectives for Medical Student Education: Guidelines for Medical Schools recommends that a medical student should have "the ability to perform routine technical procedures including, at a minimum venipuncture, inserting an intravenous catheter, arterial puncture, thoracentesis, lumbar puncture, inserting a nasogastric tube, inserting a Foley catheter, and suturing lacerations" before graduation [6]. Many of these procedures are encountered in an ICU and EM setting.

Medical students undergoing their required ICU clerkship often feel overwhelmed, under-prepared, intimidated, and confused, particularly when encountering very sick patients, such as the patients on extracorporeal membrane oxygenator (ECMO), vasopressors, or in situations like active code (cardiopulmonary arrest). In 1992, Buchman., *et al.* proposed that a gap existed in medical school education between learning and application to effectively care for ICU patients7. This finding called for a wide implementation of a critical care core curriculum. Studies have shown that a critical care rotation is beneficial for medical students in acquiring skills. Promes and colleagues reported that first year residents who completed a procedure directed rotation, either EM or ICU, in medical school tends to report procedural competency [8]. Another study found that fourth-year medical students can learn complex cognitive patient management skills through a structured critical care medicine elective [9].

Medical students can also be taught invaluable communication skills to address issues, such as end-of-life care, health care proxy, and discussing patient information with families through ICU rotations using standardized family members of critically ill patients to teach and evaluate communication skills [10]. The ICU is an unique environment which forces medical students to utilize all the knowledge they have acquired throughout their clerkships and allows students to apply their knowledge and training from all specialties to help take care of critically ill patients. The ICU helps to build confidence in procedural skills beyond what can be learned in

a controlled simulation lab environment. In addition, it also teaches effective communication, system-based organization approach, and multi-disciplinary team-based approach in the management of a critically ill patients. With an increase in aging and critically ill patients, the question arises as to whether we are training our medical students and residents to deal with these challenging patient populations or are we delegating those responsibilities to intensivist who are already faced with severe intensivist shortage and are getting burn out. By reassessing, our medical school curriculum and clinical training, both in medical school and residency programs, we can train physicians who are comfortable managing critically ill patients as well as the ethical aspects of the ICU, helping to be a part of the solution rather than worsening the crisis.

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