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Commentary and Opinions

Anesthesiologists in the modern medical school curriculum: importance and opportunity

Anesthésiologistes dans le programme d'études moderne de l'école de médecine: importance et opportunité

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Historically, anesthesia was considered a niche specialty with a near total focus on the postgraduate trainee.[1] In fact, studies from the turn of the century revealed an abysmally low participation in undergraduate medical education (UGME).[2] Financial and societal pressures have since led to changes in medical school content, delivery and structure, resulting in increased demand for pre-clerkship facilitators.[3] Over the last two decades, anesthesiologists have responded through an increase in teaching hours, the total number and proportion of faculty involved in pre-clerkship education.[3] The median number of anesthesiologists contributing to pre-clerkship education at each Canadian medical school has grown to 10, each with an average contribution of 2.2 hours, representing a 25% increase in teaching-hours.[2,3] Three-quarters of this teaching occurs in small-group and problem-based sessions, which are now prominent components of medical school curricula.[3] An appreciation for important foundational skills, referred to as Entrustable Professional Activities (EPAs), such as airway management and the recognition of a critically-ill patient, has fostered some of this increased UGME integration.[1]

Despite this momentum, Canadian studies suggest that anesthesiologists *still* do not carry their proportionate share of UGME teaching.[3,4] Barriers appear multifactorial including the lack of protected teaching time, lack of opportunity, prioritization of research over academic roles, and a disconnect between the perspectives of UGME Deans and anesthesiologists.[3-5] Addressing these issues will require systemic changes to medical culture as well as compensation and career advancement models. Seeking opportunities beyond the traditional topic of cardiorespiratory physiology is also of upmost importance.[3] Modern anesthesiologists possess a broad foundational knowledge of medicine and a mastery of applied pharmacology and practical clinical integration. In today's generalist-minded medical schools, they are well-suited lecturers for topics ranging from introductory lessons to more advanced case-based applications.[3] Their expertise can be invaluable as medical schools transition away from the traditional block-based style of instruction featuring specialty-specific silos of content, to more longitudinal and integrated approaches to medical education.[4]

Beyond didactic learning, simulation has become an important tool in medical education.[3,6] As pioneers in simulation and experts in airway management, resuscitation, hemodynamics and other high acuity medical situations, anesthesiologists are the ideal sim instructor.[1,6] Simulation sessions can be viewed as the stepping stone between textbook knowledge and patient care, thereby representing an important part of the transition to clerkship. Simulation provides students with a unique, quasi realistic opportunity to learn applied pharmacology and physiology principles, without risking patient safety or interfering with patient care.[6] Further, simulations offer value beyond the opportunity to review content and apply knowledge. Studies in medical education

have demonstrated that anesthesia-led simulations result in a dramatic improvement in role delegation, situational awareness and closed-loop communication.[7] These skills are critical in collaborative and interprofessional environments like the operating room, where anesthesiologists regularly work with respiratory therapists, nurses, surgeons, perfusionists and more. Given their own proficiency with these skills, anesthesiologists have the ability to foster the development of several key competencies outlined in the CANMEDs framework.[8]

For most medical students, the primary exposure to anesthesiology occurs in clerkship.[6] Outside of select senior electives, anesthesia rotations present a rare opportunity for 1-on-1 instruction.[6] During the maintenance phase of anesthesia, teaching can occur with topics tailored to the students level of knowledge and interests. Students are also given the opportunity to practice important skills like IV placement and airway management, under close guidance and supervision.[6] The vast majority of students agree that working with anesthesiologists offers the opportunity for skill development, regardless of their chosen specialty.[11] Given this clear educational value, it has been argued that all medical students should rotate through the service, yet only 12/17 Canadian medical schools have a mandatory anesthesia rotation.[6,11] Additionally, there is evidence that pairing the anesthesia and surgery rotations can add further value by improving medical student knowledge of perioperative medicine.[2] This, in its own right, ought to be an essential skill for all physicians.

Generally considered *the* perioperative physician, there is no better instructor than an anesthesiologist for this topic. While the field vastly encompasses preoperative, operative and postoperative principles, certain elements would benefit the practice of all physicians. Preoperative optimization, for example, is generally the responsibility of the surgeon.[11] However, surgeons often feel that they lack the expertise to adequately optimize their patients preoperative health.[11] While some centers have the luxury of stand-alone pre-anesthetic assessments for high- risk patients,[11] it is not feasible for anesthesiologists to perform these extensive optimizations with all operative candidates. Further, comorbidities often require an extended lead-time to leverage the best possible outcomes. A prime example is smoking abstinence, which significantly decreases postoperative respiratory complications.[12] Improvements in wound healing occur after 3 weeks of abstinence, pulmonary function improves after 6-8 weeks, while antimicrobial and alveolar macrophage function returns around six months of abstinence.[12] If future surgeons and general practitioners are educated on these principles, we can provide longer optimization periods and ensure that basic considerations are made for every patient. This in turn can improve patient safety and reduce morbidity and mortality, with simultaneous impacts on the economics of healthcare (i.e. reduced length of stay, reduced unintended hospitalization rates). Exposing medical students to these principles throughout their training can facilitate the process of culturalization, thereby enhancing a culture of safety and patient-centered care. Support for the deeper integration of these principles has been expressed by UGME Deans, who agree that contributions from perioperative medicine would be valuable additions to medical education.[3]

Anesthesia's relationship with medical education has experienced significant reform over the past 20 years. Changes in the priorities and structure of medical education have opened opportunities for increased representation at the UGME level. Anesthesiologists are capable of providing tremendous value to pre-clerkship studies through practical didactic teaching, small- group or case-based facilitation and simulation sessions. In clerkship, anesthesia rotations provide a rich and unique learning environment with unparalleled access to 1-on-1 instruction. Beyond the medical content, anesthesiologists are well-positioned to promote the development of nearly all the CANMEDs competencies including the communicator, collaborator, leader, and professional facets.[8] A key area for continued UGME expansion includes perioperative medicine, as medical students and patient care alike would greatly benefit from an increased exposure to these principles. Concerted efforts should focus on deepening the specialty's integration into the modern medical school curricula. Medical education, and the role that anesthesiologists play in it, is vitally important for shaping the next generation of physicians.

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