The Teaching of Anaesthesia in Singapore

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Abstract

This article describes the development of undergraduate and postgraduate anaesthesia teaching and training in Singapore. Anaesthesia teaching has evolved from art and apprenticeship to become systematic, scientific and evidence-based, while retaining an emphasis on hands-on practical training. Simulator training provides unique advantages, which the University Department of Anaesthesia has utilised in integrated medical student teaching.

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Introduction

The era of modern anaesthesia in Singapore began in 1847, a year after the successful public demonstration of ether anaesthesia in the USA.[1] However, it would be over a century before anaesthesia became established as a specialty in Singapore. From a humble beginning of a single department serving the whole of Singapore, there are now independent departments in each hospital, with a University Department of Anaesthesia based at the National University Hospital. The College of Anaesthesiologists is one of the largest member colleges in the Academy of Medicine of Singapore. This article describes the evolution of anaesthesia training, from ad hoc apprenticeship to a specialty firmly based on scientific foundations, with undergraduate and postgraduate programmes.

Undergraduate Teaching

Historically, medical students have carried heavy anaesthetic responsibilities far beyond their training and experience. Anecdotes abound of surgeons inducing anaesthesia and then leaving the care of anaesthetised patients to students. Even in Singapore, students had "pumping duty", manually ventilating patients.[2] Such learning on the "job" did not follow any syllabus. It was unclear if the students understood the scientific basis of anaesthesia. There was good reason for patients to be satisfied with just surviving their operations.

In the 1950s and 1960s, a single department of anaesthesia based at the Singapore General Hospital was responsible for providing all anaesthesia services on the island. This clinical department was also responsible for teaching medical students about anaesthesia. It is unclear when anaesthesia was first formally taught and when a formal undergraduate curriculum was developed. The University Department of Anaesthesia (UDA) was finally established in 1985.[3] The UDA established a new and systematic undergraduate anaesthesia training programme. Anaesthesia became a compulsory module for fourth-year medical students. Teaching and assessment were centred at the National University Hospital (NUH), where the UDA was based. Students were also rotated to other hospitals, where clinical teachers appointed as part of the clinical faculty scheme were responsible for teaching.

The 3-week anaesthesia module survived the core curriculum purge of 1998, but was reduced to 2 weeks. The current lean and mean module still has lectures, practical training, student presentations, and an assessment. In 1999, training on a computerised human patient simulator (HPS-001, Medical Education Technologies Inc. Sarasota FL) was included in the module. Factual overload has largely been eliminated. Although the scientific foundations of anaesthesia are still taught, their practical relevance is emphasised. Each student is assigned a mentor who oversees the student's progress.

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In 2000, problem-based learning was included in the anaesthesia module. Students direct their own learning, work in teams, and present their work to their colleagues. They explore the perioperative implications and management of coexisting illness such as hypertension, diabetes, ischaemic heart disease and chronic bronchitis.

Despite all the changes and trends in medical education, practical training in the operating room remains the core of anaesthesia teaching. A distinctive feature of the anaesthesia module is the individual "hands-on" training in practical skills that each student receives. All students are required to gain some basic skills in airway management and intravenous cannulation, core skills for competent house officers-to-be. Anaesthetists are in a unique position to teach in their clinical work, using pharmacology to influence physiology and pathophysiology. Onset times, clearance, half-lives, dermatomes and myotomes are no longer mere abstract concepts when students can visualise cardiovascular, respiratory and central nervous system effects in patients in real time.

The anaesthesia module has always focused on essential knowledge and understanding for house officers, rather than specialised anaesthetic knowledge. This is reflected in the continual and Objective Structured Clinical Examination (OSCE) assessments. The module is continually being updated to produce house officers competent in perioperative care, the "end product". Pain relief, fluid balance and resuscitation are emphasised. As part of continuous quality improvement, feedback is obtained from every batch of students to improve the module.

The UDA started the first acupuncture outpatient clinic among the restructured hospitals in 1998, and in 1999, initiated a special study module in acupuncture and elective modules in anaesthesia, to enable students to explore these specialties in some depth. Both NUS and overseas students have participated in these modules. Since 1998, the anaesthesia module lectures and much additional material have been available on the NUS integrated virtual learning environment (IVLE) system. This enables easy access by the medical students at any stage of their training to core anaesthesia knowledge.

Teaching with the Human Patient Simulator

The UDA pioneered the teaching of medical students with a computerised Human Patient Simulator (HPS) in Singapore. The HPS was acquired in 1998 by the NUS Department of Anaesthesia, and is now used in the teaching of preclinical and clinical medical students, postgraduate trainees in anaesthesia, nurses and other paramedical staff.

Simulator teaching required a new set of teaching skills, and the UDA has built up a core group of specialists who have an interest in simulator training. The students and trainees learn at 3 levels with the simulator. Firstly, they can learn individual airway, drug administration and machine procedures. Secondly, they learn to manage the patient as a whole. At the third level, they learn to manage a team.

There are several advantages to simulator teaching that are not possible with traditional teaching methods. The students can learn and gain confidence in a non-threatening environment that is not subject to the uncertainty of available and agreeable patients. Procedures, protocols and scenarios can be repeated without any harm to real patients. Video assessment is used for objective feedback. The simulator patient never complains, never sues, and has limitless lives.

As part of the faculty effort to integrate basics science and clinical teaching, the UDA now conducts simulator teaching for cardiovascular and respiratory physiology for first-year medical students, and pharmacology for third-year students. This provides the clinical context for basic scientific knowledge. Students learn practical physiology and pathophysiology in tailored and adaptable scenarios. The "patient" can have a severe asthmatic attack, or have a pneumothorax, can lose blood or go into septic shock, with the relevant clinical signs. They can see first-hand the effects and side effects of drugs administered to the "patient". Feedback from students about simulator training has been consistently high.[4]

Postgraduate Training

The pioneer batch of anaesthetists was trained in the United Kingdom. The School of Postgraduate Medical Studies (SPGMS) was established in 1969. It was responsible for conducting the training courses and examinations leading to the Master of Medicine (M Med) (Anaesthesia). The first M Med Part I (basics sciences) and part II (clinical) examinations were conducted in 1974 and 1975 respectively. There are modular and intensive examination preparation courses for each of these parts. The M Med (Anaesthesia) was first awarded in 1975. The participation of external examiners from the UK and the Australian and New Zealand College of Anaesthetists helps to maintain high standards.

Postgraduate training is a continuum of a minimum of 6 years. This consists of 3 years of basic specialty training (BST) and 3 years of advance specialty training (AST). The UDA works closely with the Division of Graduate Medical Studies (previously SPGMS) and the Specialist Training Committee for Anaesthesia in organising postgraduate training and examinations. During BST, trainees learn and gain experience of anaesthesia for a full range of surgical specialties. They also study for the M Med examination, which they must complete to progress from BST to AST. During AST, trainees gain further clinical experience, but with greater independence and responsibility, and develop

expertise in a subspecialty. Each year, several AST trainees receive overseas training awards to pursue subspecialty training in overseas centres of excellence.

Most recently, the UDA initiated an AST programme together with the NHG College, based in NUH. This monthly programme aims to prepare registrars to become consultants. This is the only formal AST programme not only in anaesthesia but also among all specialties. The programme includes lectures, clinical case discussions, management case discussions and literature reviews. There is teaching on presentation skills, teaching skills, organising of research projects, risk management, healthcare organisation, technology assessment, ethics, statistics and evidence-based medicine. It is these non-clinical skills that distinguish a consultant, the desired "end product", from technicians.

Research

The heavy and varied anaesthesia caseload in Singapore provides ample research opportunities. The UDA has developed its research capabilities to include basic science and clinical research. One research theme is neuropeptides involved in nociception, and the UDA has developed expertise and facilities for exploring novel peptides, and studying their central nervous system effects.[5,6]

From humble beginnings, the role of anaesthetists in clinical practice and in teaching has expanded widely. The specialty has evolved beyond the administration of anaesthesia in the operating room, to work in intensive care, acute and chronic pain management, analgesia during childbirth, resuscitation, and hospital and risk management. The UDA has not only developed new teaching methodologies but also research themes. Our task now is to find people who can take the research and development of academic anaesthesia to the next level in the genome age.

Acknowledgements

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