ANAESTHESIA IN THE UNDERGRADUATE MEDICAL CURRICULUM

British Universities and their medical schools, struggling to retain viability in the face of cuts in funding, are aware of the need to rationalize every department involved in the expensive process of teaching medical students. We, the teachers, must be prepared to justify our staffing and educational programmes.

Should anaesthesia be taught to medical students? Currently, in Medical Schools in the U.K., the duration of student attachments to departments of anaesthesia varies from 0 to 4 weeks. Why is there such disparity? Clinical instruction certainly seemed to be essential in the days when the majority of anaesthetics were given by medical students, and yet at that time anaesthetic teaching was minimal. Anaesthesia is now a complex and highly technical subject and tends to be regarded as a postgraduate specialty. If it is accepted that the medical student does not need to be able to give an anaesthetic, what role does the anaesthetist have in teaching undergraduates?

A survey [1] of medical student opinion from three London Medical Schools concerning a number of specialties did not give a very encouraging picture of the importance of anaesthesia in the medical curriculum. The following is an extract from this paper identifying the opinion of anaesthesia:

"Anaesthetics—Compared with the other specialties anaesthetics was seen to be taught in the most boring and irrelevant way; but it was most scientific and precise; anaesthetists were least likely to abuse their power; students taking up anaesthetics training were running away from practising real medicine; anaesthetists got less satisfaction from their work than other doctors; anaesthetics was the least important part of the curriculum; anaesthetics did not allow for the development of rewarding relationships; anaesthetists' patients were the least interesting to work with; anaesthetics was the least fraudulent and hence most effective; yet most medical students report that their anaesthetic training has been valuable".

It is to be hoped that a national survey might reveal a different perspective, reflecting a more enlightened approach to the teaching of anaesthesia in many provincial medical schools.

Certainly, the teaching of anaesthesia per se is the least important aspect of the anaesthetist's contribution to the general training of a good doctor. The subjects ideally taught by our specialty include cardiopulmonary resuscitation, care of the critically ill patient, preoperative evaluation and preparation of the patient for surgery, clinical pharmacology, pain therapy and, last, anaesthesia itself.

Cardiopulmonary resuscitation. As a result of the activities of several enthusiastic societies (the most notable of which are BASICS, and the Resuscitation Council: UK), there is now public awareness of the methods and values of resuscitation. The recommendations of the General Medical Council [2] state that on qualification the graduate should have developed "the professional skills necessary to deal with common medical emergencies". They state that instruction should be given in resuscitation and in the care of the unconscious patient and that "These subjects should be taught by specific periods of instruction and clinical attachment to a department of anaesthesia or in collaboration between anaesthetists and other specialists". Consequently, the arguments that resuscitation is often unsuccessful, inappropriate or provides ethical dilemmas [3, 4], although valid as discussion points, are not an issue in the education of medical students. The present situation is that in newly qualified doctors the public expects and the General Medical Council demands a reasonable level of expertise in resuscitation.
In 1982 it was shown that no more than 50% of newly qualified doctors believed that they could manage an unconscious patient competently, whilst even fewer thought themselves competent in cardiopulmonary resuscitation [5]. After formal testing of newly qualified graduates it was apparent that some of those who thought they were competent merely felt that they would be able to cope when the time came. Studies in the U.S.A. found that only 29% of junior doctors could perform basic life support [6], and in Addenbrookes Hospital, Cambridge, only 8% of junior doctors could manage a cardiopulmonary arrest adequately [7]. Another survey [8] showed that, although 55% of new doctors were able to perform external cardiac massage and mouth-to-mouth ventilation, none would have achieved a pass in the advanced life support examination in the U.S.A. [9]. This led to several leading articles, which revealed a consistent theme that resuscitation equipment must be available widely and doctors must be able to use it [10-12].

The principles of basic life support (mouth-to-mouth, or mouth-to-nose ventilation, and cardiac massage) can be demonstrated well with a simulated model. Such models can be used also to demonstrate advanced life support including cardiac massage, tracheal intubation, i.v. cannulation, recognition of arrhythmias and defibrillation. The models available provide an assessment of the adequacy of the student's performance. Although the models are very good, the anaesthetist can also offer practice in managing i.v. cannulation and airway management in the anaesthetized patient. It is unreasonable to practise mouth-to-mouth ventilation on patients, but the opportunity to master mask inflation, airway control and tracheal intubation is unrivalled. Quiet times in the operating theatre can also be used to reinforce the theoretical basis of resuscitation and the application of defibrillation can be demonstrated in the cardiac surgical theatre. Cardiac surgery is not normally included in the undergraduate curriculum, but a day allocated to the cardiac theatre during an anaesthetic attachment may be the only opportunity that a student has of observing a fibrillating heart and how the defibrillator works. Students should also be encouraged to join the resuscitation team at real cardiac arrests.

Care of the critically ill patient. Care of such patients includes acute emergencies in the casualty department, and those with multiple organ failure in intensive care units. Care of these patients crosses the boundaries of many medical and surgical specialties where the anaesthetist becomes the central co-ordinator of management. Students have the opportunity to become familiar with the priorities of treatment in the acute setting and to obtain an overall view of multiple pathology. Students are introduced to intensive therapy units, locations which are often daunting to (and thus avoided by) preregistration house officers. The recognition and management of acute and chronic ventilatory failure associated with surgery, trauma, chronic lung disease, neurological disease and self-induced poisoning are particularly relevant.

Preoperative evaluation and preparation of the surgical patient. The preparation of surgical patients for anaesthesia and surgery is an important part of the work of preregistration house officers. The most appropriate person to teach the evaluation and perioperative management of co-existing medical conditions is undoubtedly the anaesthetist. The importance of concurrent drug therapy (e.g. antihypertensive and antianginal drugs, hypoglycaemic agents, anticoagulants) and possible drug interactions with agents used during anaesthesia may possibly be overlooked by other disciplines. The relevance of preoperative biochemical and physiological assessment are also important. A knowledge of anaesthesia also allows the house officer to give the patient a more informed explanation of procedures and risks associated with surgery.

Clinical pharmacology. The anaesthetist is fortunate in having at his disposal rapidly acting drugs with actions that the student can instantly observe; thus the teaching of preclinical pharmacology can be reinforced. How better to appreciate the differences between depolarizing and non-depolarizing neuromuscular blocking agents than to observe their clinical effects and highlight them by peripheral nerve stimulation? How better to appreciate the ventilatory depressant properties of opioids than to observe the effect of an i.v. dose? The premise that a student is unlikely to have to give anaesthetics is not borne out in the case of local anaesthetics: although surgeons may describe the appropriate anatomy for a local anaesthetic block, the pharmacology, toxic dosages and treatment of side effects and overdosage are covered more thoroughly by the anaesthetist. The use and dangers of sedative drugs, such as benzodiazepines and their interactions with opioids, can be illustrated before the house officer
uses them, possibly unsupervised. The use of intra-arterial monitoring can be used to illustrate vividly the effects of a variety of drugs, but especially of sympathomimetic amines for inotropic or chronotropic augmentation of cardiac action, and the restoration of arterial pressure and systemic blood flow.

*Pain therapy.* The scope of this subject covers both acute, postoperative pain treatment and the diagnosis and management of chronic pain; all subjects which the General Medical Council considers to be an important part of medical undergraduate education. The anaesthetist is able to give the student the broadest possible view of pain therapy. The advantages and disadvantages of different routes of administration of opioids can be demonstrated and the advantages and disadvantages of regional blockade illustrated. More importantly, the effectiveness and problems of management, and occurrence of side effects can easily be demonstrated to reinforce the student's memory.

*Anaesthesia.* Although we have implied that this is the least important aspect of our teaching role, it is nonetheless sensible that the student has some insight to the intricacies of the specialty, if only to have respect for the drugs used, the procedures undertaken and for the problems encountered. Patients undergoing general anaesthesia provide excellent opportunities for the student to appreciate and apply the management of the unconscious patient. Perhaps surprisingly, skill in communication was highlighted in a prize essay by one of our medical students as an important aspect of her experience of anaesthetic teaching: in addition to good communication with patients in a limited time, she also cited its importance in achieving good rapport with the surgical team to provide optimum outcome for the patient.

Competition for time in the undergraduate medical curriculum is always fierce. An introductory course of lectures complemented by audiovisual aids and practical experience on resuscitation models ensure a theoretical grounding. Personalized programmes, such that a student receives individual tuition from anaesthetists in the operating theatre and on the wards, maximize experience in many practical procedures and illustrate a multitude of physiological, pharmacological and pathological processes. Only one-to-one teaching provides this optimum opportunity for thorough explanations and a full understanding of these processes. This can be achieved only by the unfailing enthusiasm and co-operation of our university and health service colleagues. In our view, it is unrealistic to expect such a course to cover the range of topics and experience outlined above in less than 4 weeks.

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REFERENCES