

THE UNDERGRADUATE TEACHING OF ANAESTHESIA

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In this country the nature and extent of undergraduate training for the degree of M.B., Ch.B. is largely regulated by rather precise recommendations emanating from the South African Medical and Dental Council, one of whose statutory duties is the supervision of the medical curriculum. In this respect South Africa follows the practice of Great Britain, where the General Medical Council has similar duties.

In February 1947 the General Medical Council of Great Britain added to its list of recommendations concerning instruction in surgery a clause, '(5) A course of theoretical and practical instruction in the administration of anaesthetics'; and the prospectuses of the Examining Board of the Royal Colleges and almost all the Universities reflect this recommendation in their individual prescriptions of the nature and extent of theoretical and practical training in anaesthesia in their medical curricula.

The regulations of the South African Medical and Dental Council that are at present in force require that there shall be special instruction in Anaesthetics and prescribe the following minimum requirements: 'Every student must obtain a certificate that he has personally given 20 general anaesthetics. In addition, he shall receive training in the principles of anaesthesia, including local, spinal, intravenous, rectal and continuous nitrous oxide anaesthesia.' These regulations, however, will be superseded by new regulations which have been adopted by the Medical Council but have yet to be approved by the Minister of Health and gazetted and which, while insisting on instruction in anaesthetics, will not lay down minimum requirements, but will leave the initiative in this matter in the discretion of the universities. The present regulations also prescribe that 'the teaching institution must satisfy itself of the proficiency of the candidates by such certificates of performance or examinations as it deems satisfactory, it being understood that the final examinations may include questions within the scope of these special subjects (which include anaesthetics) in their relationship to medicine, surgery and gynaecology'. When the present regulations are superseded this provision will not be substantially altered.

In May 1957 the General Medical Council (Great Britain) revised its recommendation and erased a very great deal of the detail in its previous recommendations. Specialities and subdivisions of the principal subjects are no longer specified and no attempt is made to indicate precisely the scope of the instruction which should be given in particular branches such as anaesthesia, although a note is appended to the effect that: 'Though instruction in the various specialities in medicine and surgery should be directed in the main to the attainment of sufficient knowledge to ensure familiarity with common conditions, their recognition and treatment, the value of utilizing a speciality to demonstrate general principles should be borne in mind'.

This revision is of particular interest in so far as anaesthesia is concerned, because the structure of the National Health Service and the size and nature of the country make it possible for specialist services to be provided for the bulk of the population as and when they are needed. In consequence there is a body of opinion amongst anaesthetists that maintains that instruction in anaesthesia should be limited to postgraduate students and that anaesthesia should be deleted from the undergraduate curriculum.

GREAT BRITAIN

Medical Practice in Great Britain

The National Health Service has very greatly improved the hospitals and their services to the general public, particularly in the remoter parts of the country. As a result of the improved hospital services and the creation of consultant and specialist-registrar posts, an increasing volume of surgery is being done in peripheral hospitals. One result of this is that the medical schools, particularly those in London, are finding it more and more difficult to ensure an adequate flow of material for undergraduate teaching. Added to this is the attitude that, as the service is entirely paid for by the taxpayer, and as everyone seems to be a taxpayer, the patients are in fact equivalent to private patients and should not be subjected to anaesthetic techniques suitable for students to administer, when more intricate techniques, which can only be used by specialists are available. Although this latter argument is based upon a

false premise, the natural corollary both to it and to the material fact of diminishing teaching material is a diminution in the opportunities for the practical instruction of students in simpler methods of anaesthesia for common surgical operations.

Present Teaching in Great Britain

Touching upon the present practice first, I may say that while adhering to the letter of the General Medical Council recommendations of 1947, the institutions I visited in 1958 (11 in England, 1 in Wales, 2 in Scotland and 1 in Northern Ireland) varied very greatly in the extent to which theoretical and practical training in anaesthesia was carried in the medical curriculum.

Thus at the Middlesex Hospital the students receive 4-6 lectures and during their month as surgical dressers in the wards they come with their patients to the operating theatre and may give a few general anaesthetics; while at Guy's Hospital, after 3 lectures in the pre-clinical period, they receive 24 sessions of clinical instruction during a 3-month period largely devoted to anaesthesia. This is followed, in the final 6 months of their studies, by 6 lectures on advanced aspects of anaesthesia. I had an opportunity here of watching a student at work and, in questioning him, found that students may administer as many as 60-80 anaesthetics in their 3 months' period.

Again, the Liverpool students are encouraged to begin practical anaesthetic training when their clinical studies commence. They are required to write up a description of the various anaesthetics they have given, particularly those they do during a 2-week period in their final year which is devoted entirely to anaesthesia. They are then interviewed by the Reader in Anaesthesia and are not allowed to proceed to their final examination unless in his opinion their practical experience has been adequate. At Edinburgh, on the other hand, the classes are so large that it is not possible to give the students more than a smattering of practical training in anaesthesia. But in the last vacation before writing their final examination all Edinburgh students are required to spend 6 weeks at work in a peripheral hospital where, under supervision, they do all the work done by an intern, including anaesthetics, and all such work must be vouched for by the supervising doctors.

At certain centres, such as Leeds, Liverpool, Newcastle and Cardiff, academic departments of anaesthesia have been created. These are very well staffed and housed but most of their energies are directed to postgraduate teaching and research, as is apparent not only from observation at first hand but by studying the work they report in current journals.

As with any other subject, the degree of theoretical and practical training depends not only upon the facilities available, but even more upon the enthusiasm and vigour of the teachers.

Future Teaching Practice in Great Britain

The revision by the General Medical Council of its recommendations as to the medical curriculum has not been in effect long enough to bear fruit, but obviously some decision will have to be taken sooner or later on the extent of undergraduate teaching in anaesthesia in the British medical schools. This decision will hinge very largely on whether the aim of medical education at undergraduate level is altered. As the Council points out in its Recommendations of 1957, they '... have always sought in their Recommendations to indicate the minimum standards of instruction and examination which should justify admission to the Register. Until recently it was possible for persons to proceed to independent practice immediately after qualification and registration. The Council's Recommendations, and indeed medical education in general, have therefore emphasized vocational training and experience'.

There is, as I have already mentioned, a body of opinion (rather small and confined chiefly to London) which holds that all anaesthetics should be given by consultant anaesthetists or at least by registrars who aspire to consultant status. However, local geography, the English weather and the British character combine to make it necessary, even today, for general practitioners to administer anaesthetics. The nearest hospital may only be 17 miles away, but in winter the roads may be blocked by snow and, even when the weather is kind, such a distance, to an English countryman, is equivalent to at least 170 South African miles. He must go to a

town which may be completely strange to him. His relations will not be able to accompany him, or even visit him with any regularity, and he is therefore loath to seek specialist attention unless it is forced upon him by the gravity of his condition. Should he succumb, the survivors in his community will then be even less willing to take the risk. When this point of view was put to me, by laymen, I was reminded strongly of Pauline Smith's story 'The pain' in *The Little Karroo*. For minor surgery, the patient turns to his general practitioner, and one of these, who was attending a refresher course at Cardiff, told me that although a consultant anaesthetist visits his local hospital 2 or 3 times a week, he himself still gives 6 or 7 anaesthetics each week. Another participant confirmed this, and Dr. John Gillies at Edinburgh reports that the position is similar in Scotland.

Dr. Frankis Evans, Dean of the Faculty of Anaesthetists of the Royal College of Surgeons (England), while admitting that his Faculty had not yet given a lead in undergraduate teaching, expressed the opinion that it must soon do so, since it would be economically and ethically impossible to insist that all anaesthetics in Great Britain be administered by specialists. This view appears to be held by the majority of anaesthetists in teaching hospitals, the notable exceptions being Prof. Sir Robert Macintosh at Oxford and the late Dr. Bernard Johnson at the Middlesex, both of whom would exclude anaesthesia from the undergraduate curriculum. The vast majority of British anaesthetists are in favour of continuing, and even expanding, the undergraduate teaching of anaesthesia.

Most noteworthy, perhaps, is the reason advanced for continuing to teach anaesthesia at the undergraduate level. Practically without exception, those who insist on retaining anaesthesia in the curriculum do so, not in order to teach anaesthetic techniques so that patients may be anaesthetized for surgery, but in order to teach the principles of the care of the unconscious patient. Since this embraces patients unconscious from head injuries, cerebrovascular accidents, infections such as tetanus and poliomyelitis, and metabolic disturbances such as diabetes, it may truthfully be said that the reasons for teaching anaesthesia have moved from surgical to medical grounds.

Two other reasons are advanced for maintaining undergraduate teaching of anaesthesia. Firstly, the subject offers an opportunity for the visible practice of the basic sciences and the integration of these basic sciences with the clinical subjects. Here it falls most aptly into line with the note of the General Medical Council Recommendations quoted earlier. Secondly, if anaesthesia is to become largely a specialist practice based upon postgraduate training, it still remains necessary to expose the largest possible medical population to it, in order to attract recruits. This can be done most conveniently at undergraduate level.

SOUTH AFRICA

Present Teaching in South Africa

As noted earlier, minimum requirements are set down by the Medical and Dental Council. These minima may be exceeded, as for example at Pretoria, where students attend a lecture in anaesthetics every week throughout their 5th-year study; or may be paid lip service only, as was apparent from comments made in reply to a questionnaire submitted to medical practitioners. Many of these indicated that they were given credit for personally administering an anaesthetic under supervision when in fact they had done nothing more than watch, and that not for the entire duration of the anaesthetic.

Towards the end of 1958 the Council decided that interns should be required personally to administer 50 anaesthetics under supervision before they were admitted to the register; but this step falls as much into the field of postgraduate as undergraduate training and its implications need not concern us here.

Future Undergraduate Teaching of Anaesthesia in South Africa

Since the General Medical Council and the South African Medical and Dental Council have both adopted new provisions (those of the South African body still to be promulgated) which leave the requirements in anaesthetics in the medical curriculum to the initiative of the individual examining bodies (although in South Africa instruction will be obligatory), it is important at this time to try and formulate plans which may assist the universities in framing rules for the teaching of anaesthesia.

Future teaching, if any, in South Africa should logically be based upon the requirements of medical practice in this country.

The reasons advanced in Great Britain for retaining anaesthesia in the medical curriculum (care of the unconscious patient; integrated practical use of basic sciences; recruitment for the speciality) are equally valid in South Africa.

At present the aim of the regulations of our Medical Council is to produce a medical practitioner capable of independent practice as a general practitioner after registration.

I have shown in another report that of more than 380,000 anaesthetics administered in South Africa in 1957, at least 250,000 were administered by non-specialists. It is therefore apparent that the need for capable general-practitioner anaesthetists is far greater than it is in Great Britain and will continue to be so for many years.

It is true that at any one time only about 1/5th of the total medical population (excluding specialists) will give anaesthetics, and it is possible to argue that to insist on all medical students studying anaesthesia will be to waste the time of 4/5ths of them. However, probably at least 4/5ths of the total medical population have given anaesthetics at some time or another, and soon, by virtue of the new rule cited above, all medical graduates will be required to give anaesthetics during their internship period.

There is little doubt that the subject of Anaesthesia must remain in the medical curriculum unless a drastic alteration takes place in present medical opinion. The geographical and economic factors in South Africa do not favour any alteration at present. If this is accepted the next decisions to take are: (1) What should the nature of the teaching be? (2) When should it be given? (3) To what extent should it be given?

THE PROBLEM

In an attempt to suit the answers to these questions to conditions in South Africa, members of the profession were questioned on what alterations or improvements they would suggest in the undergraduate teaching of anaesthesia. 414 medical practitioners submitted comment in reply to the invitation.

What should be taught?

There will, I think, be general agreement with the suggestion made by the General Medical Council that instruction in specialities, including anaesthesia, '... should be directed in the main to the attainment of sufficient knowledge to ensure familiarity with common conditions, their recognition and treatment', and that recognition should be accorded to '... the value of utilizing a speciality to demonstrate general principles'. I think too, that the value of anaesthesia in teaching the care of the unconscious patient, from whatever cause his unconsciousness stems, will be acknowledged. But it is evident from the survey of anaesthetic practice (see Table I) that much more must be taught, and it is instructive

TABLE I. SUGGESTIONS ON UNDERGRADUATE TRAINING IN ANAESTHESIA

	Number Commenting	% of Replies
Replies to questions	414	100.0
<i>Subject of Comment</i>		
Practical training	262	63.2
Theoretical training	85	20.5
Anaesthetic machines	41	9.9
Muscle relaxants	45	10.9
Local anaesthesia	91	22.0
Endotracheal intubation	55	13.3
Intravenous anaesthesia	35	8.5
Obstetrical anaesthesia	9	2.2
Intravenous therapy	4	1.0
Compulsory intern training	36	8.7
Open ether and chloroform	74	17.9
<i>Date of graduation of 74 practitioners advocating training in open ether and chloroform</i>		
Before 1940	15	20.3
1940-49	21	28.3
1950-55	38	51.4

to note that 63% of those commenting on undergraduate teaching stressed the need for more and better practical training and experience. Apparently the theoretical training is fairly adequate, for only 20% commented on this and few of these asked for more lectures.

Of those commenting, 22% emphasized the need for adequate instruction in the use of local anaesthetic techniques, particularly for simple dentistry.

Rather remarkably, 18% asked for more and better practical instruction in 'rag and bottle' techniques for open chloroform and open ether anaesthesia. This is obviously related to conditions of practice, particularly in the towns, for 51% of those asking for this type of training had qualified in the 6 years immediately preceding the year (1957) in which information was sought, so that it was the recent graduate, not the old-timer, who recognized the value of these simple techniques. Very few commented on the more complex techniques available in anaesthesia and it would apparently be a reasonable generalization to say that what is needed by the general practitioner is training, specifically practical training, in local anaesthetic and simple inhalational anaesthetic techniques.

When should this be taught?

The basic subjects are basic to anaesthesia as well as to the main streams of medical knowledge. This applies particularly to physics and chemistry, physiology, anatomy and pharmacology. Anaesthesia can supply examples of the application of knowledge in each of these fields and, being a practical art rather than an abstract elucidation of diagnostic problems, is well suited for clinical demonstrations at an early period in the medical curriculum.

It is entirely feasible, and perhaps theoretically most reasonable, to give academic instruction in anaesthesia as early as the third year of study, when the subject could be presented as practical pharmacology. This has been suggested by Dr. Bryce Smith of Oxford, on the basis of his experiences in the USA and Great Britain, and appears to be a step which could easily and profitably be made the basis of an experiment without any upheaval in the present curriculum.

The problem of providing more and better practical instruction is not insuperable but, since constant practice at discreet intervals is far better than concentrated practice over a short period followed by complete neglect, it would appear best to try and provide fairly regular experience over as long a period as possible. Ideally, perhaps, such practical experience might cover all three clinical years, and could do so without encroaching upon the ordinary curriculum in those years.

As an illustration, if there are 100 students in each clinical year there will be 300 students requiring some practical training in any given year. In an ordinary general teaching hospital 60% of anaesthetics are for minor surgery and, if each student administered 10 anaesthetics in a year (or one a month), only 3,000 anaesthetics would be required to provide the necessary student instruction. Since it is a poor general hospital which does less than 10,000 anaesthetics per annum, there will be ample material for the students.

As the anaesthetics are for minor surgery and usually of short duration, a student would not need to spend more than an average of one hour per month to achieve regular contact with the care and treatment of unconscious patients, and practise simple methods of rendering them unconscious.

The creation of special operating sessions to cater for minor surgery gathered from various other sessions (where such surgery is often a nuisance) would make practical training in anaesthesia much simpler, since little time would be wasted by students in waiting for larger, major and (for a student) unsuitable cases to be disposed of.

To what extent should teaching be carried?

As it takes at least 3 years of single-minded application to anaesthesia to achieve reasonable skill and proficiency (*vide* Medical Council Rules for specializing) it is obviously impossible to try and produce a general practitioner who is skilled as an anaesthetist. But to ensure familiarity with common techniques is another matter and one that can be more easily achieved—too easily, perhaps, since familiarity, notoriously, does not always go hand in hand with respect which only great experience instils.

Our own medical practitioners have emphasized that practical experience in local anaesthetic techniques for simple surgery, and simple anaesthetic techniques for more complex surgery, are really all that is required. Only 13% of those commenting thought that endotracheal techniques should be taught. Only 10% asked for training in the use of anaesthetic machines and 10% for training in the use of muscle relaxants.

The answers showed that in one year 30% of those replying did not give any anaesthetics for major surgery, 39% gave between 1 and 50 anaesthetics for major surgery, and the remaining 30% gave between 50 and 250 anaesthetics for major surgery. In contrast, 82% of those replying used local anaesthesia, while local anaesthetic techniques made up 40% of the non-specialist anaesthetic practice in 1957.

If those practitioners who are frequently engaged in giving anaesthetics find that they do not need any detailed training in complex techniques, it is obviously not necessary to provide such training—with this reservation that the absence of comment on the need for instruction in more complex techniques may stem from the fact that such techniques have been adequately taught in the first place. An analysis of the type of surgery undertaken in teaching hospitals suggests that, if complicated techniques are being well taught, they are being used for minor surgery which can be handled as well with much simpler techniques. This, of course, returns us to the false premise I mentioned earlier under the heading 'Medical Practice in Great Britain'.

Examinations

The decision whether to examine the students in anaesthesia or not does not fall within the orbit of my enquiry. I should, however, like to point out that examinations serve 2 purposes. In addition to testing the ability of the students, examinations also test the ability of teachers. This leads back to the point, emphasized earlier, that the degree, and quality, of theoretical training depends upon the enthusiasm and vigour of the teachers.

Undergraduate Teaching Elsewhere

Until 1945 very little advance had been made in the practice of anaesthesia on the continent of Europe and it was not until that year also that anaesthesia as a medical speciality became prominent in the USA. Even today 20% of anaesthetics administered in the USA are given by nurses, and it has been calculated that all the graduates from the medical schools in the USA for the next 7 years would have to specialize in anaesthesia if every anaesthetic in that country had to be given by a specialist. To achieve the same level in the Union would take all the graduates of all our medical schools 4 years.

Nothing like the same degree of specialization has taken place on the Continent.

Because South African medical practice is based four-square on British custom, and because a study of Continental, Canadian and American undergraduate teaching in anaesthesia would be altogether too expensive of time and money, no attempt has been made to compare our own teaching with that in the countries listed.

Epilogue

The example of the development of anaesthesia in the USA is one which could profitably be followed by less developed areas of Africa. In the USA the economic development of the country allowed the nurse anaesthetist to be displaced by better trained but more expensive physician anaesthetists. The nurse anaesthetists did a magnificent job and it is common cause that a nurse constantly practising one or two techniques is usually much safer as an anaesthetist than the general practitioner who gives only 6 or 7 anaesthetics a month. It appears logical, therefore, in countries such as the Protectorates and the Federation of Rhodesia and Nyasaland to use specially trained African anaesthetic technicians, supervised constantly by a specialist anaesthetist, in order to provide a good and relatively cheap service for African patients. There is little doubt that the African population, even in South Africa, presents a tremendous reservoir of major and minor surgical conditions which has been barely touched. But to insist on specialist anaesthetic services at this stage would make the provision of reasonable surgical services quite uneconomic.

If African anaesthetic technicians are introduced, they will in the natural order of things, be displaced by specialist anaesthetists of their own kind when the African medical population has expanded sufficiently to provide them, and the African economy has expanded sufficiently to support them. This interesting facet of anaesthetic training is included here because I feel I ought to touch upon it, and because the training of such African anaesthetic technicians should be on a par with, but over a longer period and with greater intensity than, the training of medical students.