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ANNALS- SCOTTISH SOCIETY OF ANAESTHETIST
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**THE
ANNALS
OF THE
SCOTTISH
SOCIETY OF
ANAESTHETISTS**

Scottish Society of Anaesthetists

Council for 1993-1994

Office Bearers

President	Dr ABM Telfer, Glasgow
Past-President	Dr J Wilson, Edinburgh
Vice-President	Dr AL Forrest, Dundee
Hon. Secretary	Dr JD McKenzie, Aberdeen
Hon. Treasurer	Dr ID Levack, Aberdeen
Editor of the Annals	Dr WA Chambers, Aberdeen

Regional Representatives

		Retires
Aberdeen	Dr HJ McFarlane	1994
Dundee	Dr T Houston	1994
Highland	Dr JH Spencely	1995
South East	Dr DW McKeown	1994
	Dr RA Bowie	1996
West	Dr B Scorgie	1995
	Dr WJ Kerr	1996

Programme for 1994

Registrars Prize: Entries must be submitted to the Hon Secretary by 28th February.

Annual General Meeting: Peebles Hydro Hotel, 22nd-24th April

Trainee's Meeting: Southern General Hospital, Glasgow - 4th June

Scientific Meeting and Gillies Memorial Lecture: Aberdeen - 18th November

Golf Outing: Royal Burgess Golf Club, Edinburgh - 9th June.

PRESIDENT'S NEWSLETTER



As I write this newsletter in late autumn, under pressure from falling leaves and editorial deadlines, our Society's activities for the year are almost concluded. Several decisions were made at the Annual General Meeting at Peebles in April and to avoid delay in implementation, an additional Council meeting was held in June.

Firstly, members of the Society decided to make a further contribution to the Royal College of Anaesthetists Appeal, and Council allocated £4,000 for this. Our Society has thus contributed a total of £10,000 to the College - a most generous donation to a very worthy cause. Secondly, it was agreed that the Society should purchase a travelling badge for the President and small replica badges for the Past-Presidents. This too has been done and by the time you read this, the Past Presidents will have received their badges and the travelling badge will have been worn on at least two occasions. Thirdly, the Society agreed to sponsor a visiting fellow from Eastern Europe. Dr Krystyna Zdziechowska, a young consultant from Warsaw arrived in mid October and stayed until mid December. Her visit is described elsewhere in the Annals. The choice of Poland for our first visiting fellow renews the Society's historical links with that country, which extend back to the very successful visit by members to Warsaw in 1970.

In September, the Association of Anaesthetists of Great Britain and Ireland held its Annual Scientific Meeting in Scotland - at the Scottish Exhibition Centre in Glasgow. This was a joint meeting with the Canadian Anaesthetists Society and it was a particular pleasure that it was held in Scotland. We jointly sponsored the social event in the Art Gallery on the first evening and I was able to welcome the visitors on behalf of all Scottish anaesthetists. Later in the week my wife and I were amongst the guests at the Association's Annual Dinner - a very pleasant occasion at which we were proud to represent the Society.

The Registrars' meeting was held in Edinburgh in June and was most ably organised by Iain Armstrong. The scientific programme was of a high standard but the attendance was disappointing and Council has this matter under active review. We are aware of increasing problems in the release of junior staff to attend scientific meetings both with regard to time off and payment of expenses, and we are conscious of the need to ensure that our meetings are of the highest standard and prove attractive to Clinical Directors responsible for releasing junior staff to attend.



The President's Travelling Badge

Several possibilities are under discussion including changing the title of the meeting, changing the location to Central Scotland instead of moving round the centres, changing the proportion of junior/senior presentations, and making some of the content of a more strictly instructional nature involving the use of invited guest speakers. These matters will be discussed at the Annual General Meeting next April but Council has already decided to implement one change, namely that the Registrars' Prize Paper Presentation will be transferred to the Registrars' Meeting (if it still has that title) and the Saturday afternoon at Peebles will therefore be contracted into one session consisting of two addresses - one by the President, the other by the Guest Speaker. I am happy to confirm that the Registrar Prize winner will still be the guest of the Society at Peebles - without the need to speak, so that should be an even greater incentive to compete.

In contrast, the Scientific Meeting at Paisley in November was very well attended with over 100 registrants. Drs Barbara Scorgie and Brian Stuart put a vast amount of work into the organisation, and the result was universally considered to be outstanding. The scientific presentations, the catering and the trade exhibition were all excellent and the environment was ideal for the purpose. The meeting concluded, as usual, with the Gillies' Memorial Lecture delivered this year by Dr Michael Tunstall of Aberdeen. In an eloquent address he gave a fascinating look into the future of pre-mixed gases and demonstrated once again his originality of thought.

Having now been retired for over eighteen months my access to the 'grapevine' is withering. I hear however that we have some good news. Aberdeen University have made an appointment to a new Chair of Anaesthesia and Intensive Care and Dundee University have agreed to establish a Chair of Anaesthesia which is to be funded by the Trust. The establishment of a third academic department in Scotland must be a real feather

in the cap for the granite city and the prospect of a fourth in Dundee will be widely welcomed.

Mostly my information comes from the newspapers and some journals and I cannot say that I am encouraged by what I read. Management and money predominate and standards of practice, attitudes to patients and provision of facilities seem to come second. It is the responsibility of members of Societies such as ours to do their utmost to uphold professional standards and to constantly oppose their erosion in favour of greater productivity. In last year's newsletter, Dr Wilson predicted the spread of NHS Trusts throughout Scotland and as this trend develops so our responsibility to maintain standards must surely increase.

As I was about to post this to the Editor, the New Years Honour List was published and it was with great pleasure that I noted the award of a knighthood to Professor Donald Campbell, CBE, a Past-President of our society. Professor Campbell's contribution to medicine in general and anaesthesia in particular has been immense. His current presidency of the Royal College of Physicians and Surgeons of Glasgow is unique - he is the first anaesthetist to hold this office - and he was only the second anaesthetist to be a vice-president of the Royal College of Surgeons of England. The latest honour makes him a worthy addition to a small group - six I think - of distinguished British anaesthetists who have been knighted - stretching as far back as Sir Frederick Hewitt in 1911. We would all wish to applaud this recognition of an outstanding member of our profession and we send our warmest congratulations to him and his family.

In closing it is a pleasure to pay tribute to the office-bearers and other members of Council. John McKenzie, Iain Levack and Alastair Chambers do all the work, know all the answers and are models of tact and efficiency. They have made my year as President both easy and enjoyable.

EDITORIAL

It is over fifty years since Sir Robert McIntosh was appointed to the first Chair of Anaesthesia in the United Kingdom and progress towards the establishment of Academic Departments of Anaesthesia in all four Scottish Universities has been slow. The news that Aberdeen have recently established a department and appointed a professor and that Dundee have identified funding and obtained the necessary consents should be welcome to all in the specialty. This achievement does not, however, signal the time for self congratulation and resting upon laurels. Several universities in the UK have indicated that they may not reappoint their chair of anaesthesia and if this occurs there could be a serious erosion of the academic base of the specialty in this country. Those who have been involved in persuading various authorities to establish a new chair will be well versed in the arguments which can be put forward in support and we should all be aware of these and ensure that we realise what it is that we as anaesthetists wish to achieve. It is also wise for us to consider why universities may not wish to reappoint chairs when they fall vacant.

There can be no doubt that the practice of anaesthesia must be firmly founded on a scientific basis if we are to remain as professionals rather than merely act as technicians. An appreciation of the intricacies of research, clinical or laboratory, is an essential component in the training of specialists and the presence of academic departments with secure core funding is necessary for the continuation of organised scientific research. Teaching is a skill which should be learned and practiced during training and thereafter, and formal attention needs to be paid to this rather than just leaving a list of lectures for the senior registrars to divide up amongst themselves. Needless to say teaching and research are not mutually exclusive and it will be interesting to see what developments are made in educational methods in the next few years. The development of computer assisted learning

projects and simulation of clinical scenarios will require careful thought and an accurate assessment or audit of outcome.

Those who have worked in Aberdeen or Dundee will be aware of many individuals who have made significant contributions to research or undertaken the organisation of teaching over the years, often at considerable personal expense in time and effort. It is not good enough to hope that there will be sufficient interest and goodwill from individual clinicians to maintain an academic base in a teaching hospital. If anything the recent changes in the organisation of the Health Service are likely to increase pressures on consultants and leave them less professional freedom to undertake activities which are perhaps of less immediate appeal to a manager trying to balance the books. In any sphere of activity excellence is achieved not just when individuals work conscientiously but when they also are willing to devote time and effort well in excess of their contractual requirement. It should also be obvious that the presence of a firm academic base is likely to encourage individuals whose primary responsibility is to clinical rather than academic affairs to continue to develop the latter. The enormous contribution made by several Health Service consultants who were granted 'academic sessions' with a corresponding reduction in clinical work is testament to this.

If we as anaesthetists accept the arguments for academic departments how should we convince others, some of whom may support the concept for entirely different reasons. Some of the funds for the new chairs in Aberdeen and Dundee are being provided by Trust Hospitals. Managers may be persuaded that the presence of an academic department in the hospital will improve standards of teaching and research and make recruitment and retention of staff easier. Hopefully no-one will think that with academics in post, clinicians do not need to continue to take part in these activities. One only has to look at the News

from the Regions over the last few editions of this publication to realise that consultants are moving post much more frequently than formerly and difficulties in filling new or replacement posts are common. Most managers are aware that without anaesthetists, surgical workload ceases! However, even if a Trust is willing for these or other reasons to provide financial support it is unlikely to be sufficient to provide a viable department and funds from other sources are necessary to supplement these. It is essential that permanent provision is made for dedicated support staff and although attracting research funding will always be necessary, the core must reach critical mass for long term success to be likely. When staff are paid with external funding, one of the major problems is ensuring continuity of employment and the availability of bridging funds to cover gaps between grants, or even just to assure employment while the result of an application is awaited, can prove an invaluable asset

University authorities will view a Chair of Anaesthesia in a different light. Always complaining of shortage of cash and unable to provide much in the way of funds they may nevertheless be willing to take money raised from other sources and establish a department. Many would argue that it is essential for the University to demonstrate tangible evidence of their commitment and provide at least some of the funding. Universities are under a variety of pressures, not least of which is their performance in the Research Assessment Exercise which grades institutions according to their research output. Given the funds to establish a new department or to continue an existing one, they might well prefer to appoint to a chair an individual who will attract large research grants, particularly in the field of basic science and could even contemplate appointing a non-medical graduate. Co-operation between clinicians and basic scientists could provide a good stimulus to research but care would have to be taken to ensure that clinical aspects of teaching and research did not suffer.

We must keep the arguments which we have assembled firmly in mind and ensure that efforts to retain academic departments are not side tracked by others with different motives. In the rapidly changing times in which we live many freedoms are under threat and we would not wish the academic freedom of universities to be jeopardised. However the old adage that he who pays the piper calls the tune still holds true and Trusts who provide funds may wish to have a considerably greater say in exactly how these are disbursed.

COMMUNICATION IN ANAESTHESIA

The Scottish Society of Anaesthetists was founded in 1914 to provide a forum for communication between its members. Communication lies at the very heart of our existence and it forms the basis of our professional lives, of business life and of domestic and family life. Failure of communication is frequently the cause of legal action, of bankruptcy and of divorce. It therefore seems appropriate to examine the role of communication as it affects anaesthetists.

Communication begins in the womb, between mother and foetus, and should continue within the family throughout childhood and schooldays. Students may receive formal instruction in how to communicate, depending on which Medical school they attend, and will be introduced to the doctor-patient relationship. This is the one to one form of verbal and visual communication, including body language, which is so essential to the successful practice of medicine.

Junior house officers have to deal with patients' relatives - often more difficult than dealing with patients - and at this stage communication skills generally leave a great deal to be desired. All too often the imparting of important and sensitive information is left to the resident, who is ill-equipped, through immaturity and lack of training, for the task. For the trainee anaesthetist the pre-operative visit is the first example of the need for good communication with the patient, and working in the Intensive Care Unit provides the opportunity for the development of good communication skills when dealing with relatives.

In the television series, *Doctors to Be*, screened in the Autumn of 1992, a ward sister said of the newly arrived medical students: *There is great skill in communicating with patients and it takes ages to learn. They come on the ward after years at school and college and are expected to be able to talk to patients and they can not do it.* One of the students said: *Coming here, you realise with a shock that the science is secondary and that people are the main thing.* In her Presidential Address to this Society in 1962 Dr Margaret Muir said: *There is a tendency nowadays in the pursuit of greater skill to lose sight of the human being.*

The University of Glasgow was the first in the United Kingdom to introduce the teaching of communication skills to medical undergraduates, closely followed by Cambridge, and by St Mary's in London. This was in the 1980s and some clinicians of the time were convinced that communication could not be taught and that students were either good or bad at talking to patients. The students in the television programme felt that they had benefited from their short course of video interviews, in which actors behaved like difficult patients, and the interview was followed by a debriefing and critique from a clinician, a psychologist and their fellow students. However the students pointed out that they were never subsequently assessed on how well they had communicated with the patients.

The Health Secretary, Mrs Virginia Bottomley, in an interview with Hospital Doctor in 1992, said: *The James Robertson Justice character now belongs in the past. Modern doctors work in a team, are patient centred, and have good communication and managerial capabilities. Above all we need doctors who see patients as people.*

One of the aims of medical education as recommended by the General Medical Council is to teach medical undergraduates how to deal with patients and relatives. Future changes in the undergraduate curriculum should reduce much of the factual load currently imposed and leave more time for topics such as communication skills.

Where communication fails there may be a price to be paid. Between 90% and 95% of all medical negligence cases result from poor communication - often because patients are not told what is going to be done to them, or not warned of the risks. Whether an action comes to court or not the General Medical Council still receives about 1000 complaints every year about doctors. Some 600 of these relate to aspects of medical care and treatment, but the other 400 relate to doctors' personal conduct. In 1991 just over 200 of these were concerned with doctors' behaviour towards patients, and they included 49 cases of rudeness and 12 cases of violence - surely the ultimate failure of communication. Civility costs nothing. Lack of it can be very expensive, and doctors must communicate or face complaint.

Stella Lowry, writing in the *British Medical Journal* in 1992 on Medical Education stated that evidence is emerging that those doctors who are most well-rounded as individuals may also be best at empathising and communicating with patients, and it has been suggested that survival of the fittest may not mean survival of the best. This strikes at the heart of the current selection process for medical students demanding as it does the highest academic qualification. But does it give us the kind of medical students and produce the kind of doctors that we want?

As far as anaesthesia is concerned it would seem to support the case for post-registration experience before starting anaesthesia and perhaps even for a broader and less rigid training programme in the speciality. Anaesthetists have to communicate with many different people in the course of their work. These include patients, relatives, the public and other anaesthetists. They also obviously have to communicate with surgeons, nurses and management, but limitation on time does not permit me to include them in this paper.

Patients

The pre-operative visit in the ward is hopefully the first time that the patient meets the anaesthetist, and much has been written about it. It merited an Editorial in *Anaesthesia* in August 1992, when concern was expressed about the increasing tendency for theatre nurses to visit patients in the ward pre-operatively, and the potential for conflict of interest and misinterpretation by management. There is also the potential for confusion with communication.

In 1991, Lonsdale and Hutchison surveyed patients' desire for information about their anaesthetic at the pre-operative visit. The patients gave the highest priority to the fact that the anaesthetist visited them at all, and they were much more interested in when they could eat and drink afterwards than in hearing about the possible complications of anaesthesia and surgery. In 1992 Nightingale and his colleagues surveyed 132 patients and concluded that the major reason for the pre-operative visit was that patients appreciated it, rather than it being medically necessary. Most importantly 39% of them could not remember what they had been asked. Presumably, although the authors do not say so, they would

also not remember what they had been told. The medico-legal implications of this are obvious. Reference was made earlier to the fact that 90-95% of all medical negligence cases result from poor communication and if more than one-third of the patients do not remember what they have been told, then clearly there can be problems. Lavelle-Jones and colleagues, writing in the *British Medical Journal* in April 1993 confirmed and indeed increased this concern over patients' poor ability to recall information. They concluded that at 4-6 weeks after discharge 60% of patients had poor recall of what they had been told on admission, and at six months the figure was 84%.

Poor communication includes failure to discuss the risks of commonly occurring complications of the proposed procedure, an aspect of pre-operative communication which is becoming increasingly important. It is essential to write in the casenotes that these matters have been discussed with the patients. They must be given sufficient information to enable them to make their own judgement and then to give informed consent. Non-disclosure of a risk may result in a legal action if something goes wrong, though that does not mean to say that the action will be successful. An example might be failure to explain and obtain consent for a regional technique such as an epidural or brachial plexus block to be given in association with a general anaesthetic.

All of this is far away from earlier writings about the pre-operative visit. For example in Dr Bain's Presidential Address to this Society in 1961 he said that patients were greatly comforted by a preview of the doctor in whose hands they feel they are placing their lives. This is the generally accepted view - the modern word would be image - and we must do our utmost to ensure that the preview does indeed comfort the patient by portraying the right image.

How do we do this? Do we shake them by the hand, make good eye contact, sit on the bed, call them by their Christian name or use some other form of endearment? Does it matter what we wear? It would seem not. Hennessy concluded that it was not very important, although most patients did not like the anaesthetist turning up in jeans and trainers, and with long hair and earrings. No two patients are the same, and no two anaesthetists are the same. Whatever we do, it must succeed.

Theatre

In contrast to the pre-operative visit, in theatre communication between the anaesthetist and a patient under general anaesthesia is essentially electronic, via the monitors. There is one aspect of this which troubles me, and that is the comparative absence of integrated alarm systems. Not alarms. Alarm systems. At present we have a collection of different alarms from different monitors, making different noises at different volumes and having to compete with bleeps and cordless telephones. Alarm systems first appeared in the Journals in 1986 with an Editorial by John Kerr in Anaesthesia highlighting the problem and advocating that attention be given to the design of integrated alarm systems in this country, something which had already begun in the United States. To date progress has been slow but the latest monitor systems are tackling the problem.

For many years the aircraft industry has used the concept of a central annunciator panel with one audible signal alerting the crew to look at a display of lights which tells them where the fault is. This audible signal can become louder and faster and the lights can change colour and flash to indicate varying degrees of urgency. Developments along these lines would constitute a significant advance in communication between the monitors and the anaesthetists, but it requires much closer co-operation and communication between manufacturers. Modern aircraft have gone a step further and display details of the fault in full text form on a miniature television screen in the cockpit to the accompaniment of a suitable audible alarm. The latest equipment also instructs the pilot what action to take in response to the fault.

Post-operative visit

In contrast to the pre-operative visit very little has been written about the post-operative visit. In January 1993 a patient in a major London teaching hospital wrote of her experiences. She had been a patient in the same hospital 12 years before. She wrote: *I spent 15 days marvelling at the apparently extraordinary progress in anaesthetic, operative and pain control techniques, and lamenting the apparent decline in all other elements of post-operative communication. I concluded that her anaesthetist had communicated with her but that no-one else had.*

However returning to the medico-legal theme, something may have gone wrong during the procedure, and this is when good communication becomes vital. Perhaps the patient was aware or sustained peripheral nerve damage, or ended up in the Intensive Care Unit for one of any number of reasons. The lack of information provided to patients and relatives when a post operative complication or iatrogenic problem occurs is always construed by them as evasion, and when things do go wrong there always seems to be a breakdown of communication which compounds the relatives' distress. In every case a full and frank disclosure of the facts is essential. Things must not be rushed and adequate time must be made available to discuss the matter fully and to answer the patient's questions. It may be helpful to have the surgeon present, but it is essential to ensure that he is fully briefed and does not get there before the anaesthetist and present a different story. It is the experience of one of the few Professors of Communication in Britain that surgeons are amongst the worst communicators in medicine.

Intensive Care

In the Intensive Care Unit new problems arise when trying to communicate with patients. The staff may be uncertain if the patients can hear them or see them. Worst of all is if the patient can hear and the attendants think otherwise. The assumption is generally made that they can and therefore they are constantly spoken to, although care must be taken if speaking about a patient to stay out of earshot. Sometimes they can see and hear perfectly but can not talk - they may for example be fully conscious with a tracheostomy. In this situation lip-reading is a most useful skill. Of course many patients can write - but some cannot do that either and various forms of graphical and mechanical communication aids have been designed for those situations.

Pain Clinics

Here the anaesthetist meets the patient face to face across a desk instead of having the psychological superiority of standing by a bed. I have no doubt that my colleagues who work in these clinics are well attuned to this and are excellent communicators, but I have no experience in this field.

Relatives

There are two situations where anaesthetists are particularly involved with relatives - in Paediatric work and in the Intensive Care Unit. It would seem to me that the anxious child with an even more anxious mother in the anaesthetic room with the anaesthetist is a situation where communication has to be at its very best, and where a combination of sympathy, tact and occasional firmness will be required. I am not qualified to say more.

It is perhaps in the Intensive Care Unit that the anaesthetist will most commonly and predictably have to deal with relatives. The information to be imparted to them is often of a predictive nature, sometimes the news is bad, or the patient may have died and organ donation may be an issue. A clumsy, uninformed or insensitive approach is disastrous. One should begin by asking **them** how they see the situation, what **they** think is going to happen, and let them form their own agenda for the discussion. Then, if bad news has to be put over, it should be done gradually and progressively. In the acute phase after admission the relatives are frequently severely upset and they remain under great strain as the days pass. Communicating with them is an important and time consuming task for the ITU staff and the consultants should make themselves readily available to do it and to teach it.

In 1984 Sir John Walton wrote: *Communicating well is not particularly difficult but it requires to be thought about, in general, and in each particular instance.* A consultant should take time to teach it and to help his juniors to acquire the skills.

In his Frederick Hewitt Lecture to the College of Anaesthetists in 1991 the Bishop of Durham recalled visiting a renal dialysis unit with a patient's relatives. It was clear that they should see the consultant. The Senior Sister replied that the consultant was unlikely to be available for the conversation that was needed. She said that when pastoral or personal problems built up he always found something wrong with one of the machines which took him off with one of the technicians to experiment in glass blowing. The Bishop concluded that it is clearly easier to tackle technical and technological problems than to face up to the human anxieties, fears and difficulties which exercise us all at different levels.

The Public

It is well known within the profession that anaesthesia has a low profile in the public eye. It is undervalued by the lay public. Dr Macrae, in his first editorial as President of the Association of Anaesthetists wrote ... *there continues to be a great dearth of knowledge on the part of the public as to what we actually do and indeed even who we are.* Every anaesthetist has a responsibility to overcome this problem. It is therefore essential that anaesthetists communicate with the public.

Last year, in his Presidential Address to the Glasgow and West of Scotland Society of Anaesthetists, Dr John Vance reported the results of a survey of some 160 pre-operative patients in the West of Scotland. Almost a quarter of them said that the impending anaesthetic was their greatest worry, two-thirds thought that the anaesthetist's task finished after induction, and virtually none of them had any idea of our involvement in ITU, obstetric analgesia, or pain clinics. These findings amply confirmed Dr Macrae's editorial.

Bad news always makes the headlines. The public may read in the press of some catastrophic incident related to anaesthesia which is devastating to the family, luridly reported and does nothing for the image of the specialty. Fortunately this is rare.

Both the College and the Association have produced and published material suitable for the education of the public. For example, the College Appeal Document contains much informative material about the activities of anaesthetists, and it may well be that the letters FRCAnaes. would have had more impact with the lay public than the recently granted FRCA.

The Association has recently produced an updated version of its well known booklet **Your Anaesthetic**. The new one is called **A Patient's Guide**, and is for use by individual Health Authorities. Although perhaps for a more restricted readership, the results of studies such as National CEPOD are available and of interest to many outwith anaesthesia. Sometimes there is a newspaper article devoted to anaesthesia - as on October 5th 1992 on the occasion of the celebration of the grant of the Royal Charter to the College of Anaesthetists.

As individuals we must take every opportunity to educate the public. It is guaranteed to stop the dinner table bore if you tell him that while he was eating his smoked salmon you were all the time assessing him for ease or difficulty of anaesthesia. It is certain he will not have been thinking about that. This led to publication of the following letter in the correspondence columns of the Times on July 10th 1991.

From Mrs Louise N Telfer.

Sir,

At social gatherings, my husband, who is a consultant anaesthetist, says it is second nature to him to assess the assembled company for ease or otherwise of anaesthesia.

Large and fat, small and thin,
Florid-faced or full of gin,
Golden crowns in fallen chins,
They all present a challenge.

This was our way of trying to educate the public - the anaesthetic version of *tae see oorsels as ithers see us*.

Anaesthetic Colleagues

We communicate with our fellow anaesthetists in many different ways; through our various organisations, and via books, papers, meetings, examinations and socialising. I have had to omit teaching, an important form of communication which transmits learning but there is time to make reference to writing, which preserves learning.

Organisations

In addition to the Royal College of Anaesthetists, the Association of Anaesthetists of Great Britain and Ireland, and the Section of Anaesthetics of the Royal Society of Medicine, which are national and all encompassing, there are no less than 20 specialist societies, 17 regional societies and 2 national societies listed in the 1992 edition of the Handbook of British Anaesthesia. They communicate with their members by holding meetings and by publishing newsletters, reports, memo-

randa, recommendations, guidelines, handbooks, pamphlets, directories and checklists, as well as scientific journals.

Members of this Society have held high office in many of these organisations, and continue to do so. Professor Sir Gordon Robson was Dean of the Faculty from 1973-76, Professor Donald Campbell from 1982-85 and Professor Alastair Spence is the first President of the Royal College of Anaesthetists. We have had two past Presidents of the Association - Dr Gillies from 1947-50, Dr Pinkerton from 1965-67 and Dr Macrae is the current President. There have been three Scottish Presidents of the Section of Anaesthetics of the Royal Society of Medicine. Dr Henry Fairlie in 1933-34, Dr John Gillies in 1951-52, and Professor Alex Forrester in 1967-68. In addition, Professor J D Robertson was Vice-President in 1977-79.

It is therefore a matter of considerable pride to the Scottish Society of Anaesthetists that in 1993 - its 79th year - it can count amongst its members both the President of our Association, and the President of our Royal College and also the President of the Royal College of Physicians and Surgeons of Glasgow. Professor Donald Campbell is the first anaesthetist to be elected to this office - a unique honour.

Our members also hold or have held office in several of the specialist societies, including the Obstetrical Anaesthetists' Association, the Association of Paediatric Anaesthetists, the Intensive Care Society and the Neuroanaesthetists Travelling Club. In addition, one of our London based members, Dr Douglas Howat, is President of the History of Anaesthesia Society.

Looking further afield into Europe, although we do not yet appear to have penetrated the Academy at the highest level, we do have the Treasurer of the European Society for Regional Analgesia, Dr Wildsmith, and the Secretary of the European Section of the World Federation of Societies of Anaesthesiology, Dr Baird.

Publications

Some of our members are authors of books, chapters and papers. One of the oldest books is the **Handbook of Anaesthetics** by J Stuart Ross and

H P Fairlie which was published in 1935. It was the forerunner of the well known Minnett and Gillies **Textbook of Anaesthetics**. Dr Fairlie was a founder member of this Society and its President in 1924 and 1933. Slightly more recent is **Practical Anaesthetics** by J Ross McKenzie of Aberdeen, published in 1944. Dr McKenzie was President in 1929 and it is of interest to note that both these gentlemen were on the first Council of the Association of Anaesthetists when it was formed in 1932. In 1965 Norris and Campbell published their best selling textbook **Anaesthetics, Resuscitation and Intensive Care** now in its 5th edition and by Campbell and Spence. One of the most recent books published by our members is **Conduction Blockade for Post-operative Analgesia** by Wildsmith and McClure of Edinburgh, published in 1991.

We therefore remain active. It is the same with papers. Dr McKenzie's Presidential Address was published in the *Lancet* in 1929 and he had several other publications in the *British Journal of Anaesthesia* as far back as 1926. In 1932 he published an article in that journal describing an anaesthetic technique combining regional and general anaesthesia for thoracoplasty.

Sixty years later, in the last issue of *Anaesthesia* in 1992 we find papers by members from Dundee, Edinburgh and Glasgow on such diverse topics as thoracoscopic pleurectomy, oxygen consumption in septic shock, and how children behave when they have a general anaesthetic at the dentist.

Meetings

We also communicate by holding meetings. These range from departmental seminars to World Congresses. They can be all work and no play or vice-versa. It does not augur well if the slides are upside down and the wrong way round, the projector breaks down, the public address system is a mystery, and the audience are asleep anyway. If the accompanying persons programme goes wrong as well - the bus does not turn up, the museums are closed and so are the shops, then this is really bad organisation.

There are however many of our colleagues who, sadly, are unfamiliar with these problems. This is because they never go to meetings. The advent of Continuing Medical Education (CME) will change

this. It is already well established in the United States and will make an impact in this country in the near future.

Examinations

This is perhaps the most traumatic exercise in communication that our trainees have to cope with, and it can be traumatic for the examiners too.

So often the candidates have the facts but can not get them over. They fail to display logical thought in their presentation. They also fail to prioritise. Anaesthesia is all about getting your priorities right, and this is true of examinations as well as in the clinical situation.

Socialising

In contrast to the examination scenario this should be the least traumatic exercise in communication. We should be relaxed and not stressed by surgeons, buzzers, bleeps or telephones, and communication should be easy. It's not what you say - it's the way that you say it. It's not what you do, it's the way that you do it, whether it is drinking, dancing, golfing or fishing.

I have tried to look, rather superficially and latterly perhaps slightly facetiously at some aspects of communication in anaesthesia.

Communication lies at the heart of image portrayal. The image of the doctor is vital for the patient, the image of anaesthesia is vital for the public. It is not what we are but what we appear to others to be.

I have no doubt that in the future our Society will continue to play its full part, as it has done in the past in ensuring that we as anaesthetists communicate effectively with our patients, with the public and with each other.

The author would like to acknowledge the help he received in the preparation of the audio-visual material for this address from Mr W Paterson, Director of Medical Illustration Services, Glasgow Royal Infirmary and to thank Ms Sheena Sandeman for typing the manuscript.



At the inauguration of this Society in 1914, fourteen doctors assembled for dinner in the Balmoral Hotel in Edinburgh. They resolved that promoting the study of the science and practice of anaesthetics, the proper teaching thereof, and the conservation in the advancement of the interests of anaesthetists would be the foundation of the Scottish Society of Anaesthetists. How many of those 14 gentlemen at dinner that evening realised that within four months there would be an incident in a town called Sarajevo, the assassination of Archduke Ferdinand, leading to the start of the First World War. I am sure we all hope that we are not following a similar time course with Sarajevo figuring in the world news so prominently at the present time.

Let us return again to 1914 and look at what else was going on in the medical world and the type of medical problems those 14 gentlemen were probably discussing. I wonder if any of them had noted the death some four years earlier of Florence Nightingale. She was the founder of the modern ward system. What she brought into ward nursing was the basis of cleanliness and the separation of patients to minimise infection. It was this which has provided the modern standards of health practice throughout the world. Some two years later in 1912, a very famous Scottish gentleman, Lord Lister died. He founded the concept of antisepsis within medicine. The idea of wearing a hat, a mask and a gown, for surgery and the sterilisation of instruments must have seemed very strange 80 years ago. Furthermore, were any of our 14 gentlemen taking notice of the role of infection and

antisepsis in modern medicine.

Returning to today, some 81 years on, I am going to try to make you think along these same lines, the role of infection in modern day medicine. What I would like to discuss with you in this presentation is a report originally written in 1988 and redesigned and updated twice called **HIV and other Blood Born Viruses**. I am mainly going to concentrate on the Human Immuno Deficiency Virus or HIV, its role both actual and perceived in modern anaesthetic practice.

What is HIV? HIV or HIV₁ is a retro virus of the lentii series. The retro virus has the ability to convert RNA of the virus genome into a DNA copy which can be inserted into the nuclear DNA of an infected cell. It uses the important enzyme, reverse transcriptase to do this.

HIV has a glyco-protein coat. This glyco-protein coat binds to a specific surface cell receptor molecule, the CD4 antigen. The virus then sheds its protein coat leaving the two single strands of RNA and the enzyme reverse transcriptase exposed to the intracellular cytoplasm. This reverse transcriptase or by its proper name, RNA dependent DNA polymerase, transcribes the RNA into DNA. It is at this point the virus structure becomes integrated into the cell nucleus as a double stranded DNA. It does this in a circular format.

The viral DNA having been integrated becomes part of the host cell genome by another of the viral enzymes, viral integrase. This integrated viral genome is what we have to worry about. It is called the provirus. The provirus remains dormant until the cell is activated. This is the stage which all the HIV positive tested patients have reached. The provirus carries the dormant infection within the cell nucleus. The important point to realise is that this disease is carried as an intracellular, intra-nuclear virus. That is why treating and curing this disease is so difficult unless you destroy the cell. If you destroy the cell, you are destroying all the cells in the body. Therefore in simple terms once you are infected with this virus you have got it for life. There is certainly, at the present time, and very unlikely to be in the foreseeable future, any specific cure for the infection but only treatments to delay the onset of activation of the dormant virus or the palliation of

symptoms of the active disease. On activation the DNA is transcribed into messenger RNA. The messenger RNA is translated to form viral proteins and these viral proteins together with the genomic RNA congregate at the cell membrane to form the new HIV particles. The active HIV particles bud off the cell membrane and reactivate the disease process.

You don't want this disease. It's a nasty disease. If you become infected with the virus and it progresses to AIDS, you can end up with all types of tertiary diseases. Pneumocystis, Cerebral Toxoplasmosis, Oral and Oesophageal candidiasis, Herpes Simplex, Varicella Zoster, Tuberculosis, Cryptococcosis, Enteric Bacteraemia and tumours such as Kaposi's Sarcoma. You can develop an HIV Encephalopathy as a terminal stage. Despite the horrific nature of this incurable disease people seem to ignore it and the recommendations preventing the spread of the disease by iatrogenic cross infection. They dismiss it as something that doesn't affect them.

The World Health Organisation has forecasted the predicted number of cases for up to the year 2000. The virus was discovered in 1982 and was isolated in the Pasteur Institute in Paris. The numbers of reported cases of AIDS have gradually and steadily grown according to these World Health Organisation figures. What is of concern is not what we know is coming from Africa but what is now seen to be coming from Asia. This is the completely unknown and less predictable Eastern Third World factor. We do not know exactly how many HIV cases there are. It is still not a disease that is widely recognised or recorded in that part of the world.

The World Health Organisation figures are considered over-estimates by some. For the purpose of this lecture they illustrate the types of numbers that we should be planning to deal with in the foreseeable future. For Adult HIV, some 25 - 30 million individuals. All of these people with adult HIV will eventually develop the AIDS disease or the AIDS complex syndrome. 7 - 10 million people are predicted as having Adult AIDS. More distressing and what is often forgotten is that paediatric HIV does exist. We are looking at something between 5 and 10 million paediatric HIV cases in the year 2000 and 4 - 8 million cases of paediatric AIDS. The bottom line must be those who are orphaned as a result of parents with

AIDS; an estimated 10 - 15 million children. So no matter whether you think these figures are accurate or not, this last group is a problem which must cause considerable concern for the future of the world as a whole.

How is the virus transmitted? It is not only a homosexual disease as many believe but is also transmitted by heterosexual intercourse. It can infect male and female. The main transmission mediums are blood and blood products. We must ensure we deal with all blood and its products very, very, carefully. There are long lists of at risk fluids such as cerebral spinal fluid, peritoneal fluid, pleural fluid, pericardial fluid, synovial fluid, amniotic fluid, semen and vaginal secretion. All are considered to be fluids at risk of viral transfer. Any body fluid which contains visible blood can become a transmission medium. Saliva is not considered an at risk fluid unless it contains visible blood. Therefore saliva is a risk if it is associated with trauma or a traumatic process, such as dentistry. Finally, let me reassure you, you do not catch HIV from handshaking or eating from utensils etc. which an HIV or AIDS patient has used. It is not transmitted by insects.

Life is never simple. I would like to put to you an interesting paradox which I am currently faced with. I am consulted by many sports medicine bodies especially in relation first aid, resuscitation and safety procedures. One of the groups I am particularly involved with is rowing. Any of you who row know that oarsmen end up with bleeding or serous oozing blisters on their hands especially if they are rowing at senior or national level. It is not unusual, with the expensive equipment used in rowing. That the crew will row with rough handled oars for an hour to an hour and a half. The handle of the oar has to be rough so that it does not slip through the oarsman's hands during the stroke. At the end of an outing the crew get out of the boat and immediately another crew get in and, with open blisters on their hands, continue to row with the same oars. Therefore there is a possibility of serum or blood on the oar handles contaminating an open wound. Blood or serum on the handle of these oars is not always obvious, but the hands of the recipient oarsman leave little to the imagination with regard to infection. Who would ever believe that a heterosexual, let alone a known homosexual oarsman could have picked up HIV from the handle of an oar? On the other hand who would ever believe that you, the professional medic contracted HIV from handling blood or

from stabbing yourself with an infected needle?

Examining the figures that are quoted for HIV positive cases at the present time, we find that the actual number of HIV positive cases is unknown as random or routine testing is not widely advocated. It must be remembered that there is a variable three month window between infection and the change to an HIV positive status, during which time the virus is replicating and the subject is, to all intent and purpose, positive. These are at risk patients but they have not yet been identified because of this three month negative window status. The estimated number, which is believed to be an over-estimate for certain areas and an under-estimate for others, is approximately 50,000 HIV positive individuals in the U.K. Considering this virus was not seen before 1982 you can see why there is concern and why it is called an epidemic. As of 1992 the figures quoted recently in the British Medical Journal were for just over 19,000 reported known HIV cases. 13% of those were acquired through heterosexual intercourse. Of the 2,500 reported percutaneous injury exposures there have been nine sero-conversions which gives us an infection rate for people like you and me of 0.37%. It is a small risk, some would say an insignificant one, but it is there and as such it cannot be ignored. By comparison the same statistic as quoted for Hepatitis sero-conversion is 20 - 30%.

And so to the actual disease itself, AIDS. In the Western World AIDS cases are counted quite accurately. 611,589 cases were reported globally as of December 1992. 1.2% of those, some 7,195 cases were reported in the United Kingdom according to the national literature for April 1993. In the previously reported United Kingdom figures there was a reported death rate of 60% (5,894 cases). 24% of the AIDS cases were reported in heterosexual adults. The statistic which surprises people, because they forget that there is a paediatric problem, is that 69 AIDS cases have been reported in children of which 31 (45%) have already died. This figure does include a number of cases which have been infected by a transfusion of contaminated blood products, for example Factor VIII as given to haemophiliacs, but these do not represent a significant proportion. So there is a recognised transmission rate for AIDS even in children. We can not exclude children as non-HIV carriers just because of their age. A group of old-age pensioners in Europe who are HIV positive were recently described.

All these numbers are very interesting and put the problems of HIV and AIDS in perspective but the real problem is not numbers. The problem is that people perceive the risk of HIV and AIDS in many different ways. Let us now examine the risk of HIV infection to the medical profession and how this is related to people outside this room, the general public, and how they perceive it. Unfortunately it would appear that our profession rather than listening to the experts and reading the peer reviewed literature take their medical knowledge of this disease from the daily newspaper.

In 1990 Ornato looked at the perceived risk of HIV infection by questioning 5,823 American Heart Association Instructors. These instructors included doctors, nurses, paramedical personnel and lay persons. 58% of the instructors believed that there was a direct risk of contracting HIV infection from the resuscitation training mannequin. Experts proclaim that there is no risk from saliva and therefore there is no risk from performing mouth-to-mouth ventilation on the resuscitation mannequin. Further confirmation that there is no risk from saliva in mouth-to-mouth ventilation comes from an American survey of carried out on fire service officers who had performed mouth-to-mouth resuscitation. In the last 20 years there have been no reported cases of Hepatitis or HIV passed on through mouth-to-mouth resuscitation. Returning to Ornato's study, 40% of the instructors reported that they would hesitate to perform mouth-to-mouth resuscitation and 71% of them reported a change in attitude to performing mouth-to-mouth resuscitation on a stranger. If these are the people who are teaching resuscitation, one can only wonder what their pupils are actually learning. It takes very little to realise how incorrect perceptions can be generated, seeded and multiply; probably faster than the virus itself.

Ornato then asked the simple question: *Would you perform mouth-to-mouth resuscitation on one of the following groups?*

- a four year old child
- a heroin addict
- a male on a San Francisco bus
- a male at a New York City football game
- a female college student
- a haemophiliac

- For the four year old child 97% of those asked

said they would perform mouth-to-mouth resuscitation, 2% said they might and some 1% said they would not. I have already indicated there is a known incidence of HIV amongst children. So were they mistaken? Have they got their views right or were they actually reflecting what we have just said? The answer is that there is no risk from mouth-to-mouth resuscitation.

A heroin addict. 10% said they would do resuscitation. I would actually say that they were probably quite brave considering that this is a high risk group. There may be blood in the saliva as they often have mouth ulcers and oral lesions. 44% said they might and 46% said they would not. An understandable reticence despite expert reassurances, but was this reticence built on a fear of HIV or on the more rational fear of the more potent Hepatitis virus.

A male on a San Francisco bus. 18% said they would do resuscitation, 52% said that they might and 30% said that they would not. Compare this group with the next group; the male in a New York City football ground. The New York male was perceived differently to the male in San Francisco as was reflected in the response that 29% said that they would do resuscitation and 53% said that they might. Both San Francisco and New York have a high incidence of reported HIV positive and AIDS patients. In relation to mouth-to-mouth resuscitation, should this have lead to any difference in the response of the instructors?

When we turn to the female student, 54% of them said they would have a go. Yet we already know that this is a heterosexual disease and there is no male to female bias in reality.

The last group were the haemophiliacs. 35% said they would and 52% said that they might. But this is the one group, certainly in the United Kingdom which would cause people understandable concern. This is the one group where there may be visible blood in the saliva. This is the one group where we know they may well be HIV positive and probably the only group where there may be genuine concern. Again, I will repeat the expert view, there is no risk of HIV infection from mouth-to-mouth resuscitation. If there was horizontal family transmission then I am sure we would find that most haemophilic families were HIV positive. No survey has shown this.

Obviously despite the expert reassurances there

has had to be some rethinking about performing mouth-to-mouth resuscitation. Nothing should delay the initiation of resuscitation especially the fear of performing rescue breathing. It is now recommended that rescuers/resuscitators are taught to use mouth pieces or filter devices, for example the pocket mask or viral filter. The proviso is that the device works as a viral barrier and still allows adequate ventilation.

There have been three reports published in the United Kingdom between 1988 and 1992 dealing with precautions to be taken against cross-infection and defining procedures specifically for anaesthetists. The first was published by the Association of Anaesthetists in 1988. The second by the Department of Health, entitled Guidance for Clinical Health Care Workers and the most recent HIV and other Blood Borne Viruses - a Guideline for Anaesthetists, again from the Association of Anaesthetists. There has been a fourth document which deals with the management of the HIV infected doctor. This is entitled AIDS, HIV Infected Health Care Workers - a Guide on Management of Infected Health Care Workers.

The first three reports came out with a series of simple recommendations. In fact all the recommendations were described in the original 1988 document. For hepatitis, they recommended that all doctors, nurses and paramedical personnel associated with anaesthesia should be tested for and immunised against Hepatitis B. Having been immunised they emphasised the importance of having personal antibody levels checked at regular intervals to maintain an effective level of immunisation against hepatitis.

All three reports recommended that when performing invasive procedures, all anaesthetists should wear gloves, mask, eye protection and an apron. Lord Lister made those same recommendations some 81 years ago to doctors performing surgically associated skills. Some of our colleagues complain that they cannot wear gloves when they work as these interfere with their technical ability. I am sure that I am echoing Lord Lister when I reply then you must re-learn your techniques.

The reports advise that you should not re-sheath needles, they advocate the proper and formal decontamination of blood spills, not just wiping them off the floor with a piece of tissue and disposing of it in the bin. They also advocate the

formal decontamination of equipment. Not reusing it, before it has been decontaminated and washed properly. I can only wonder how many hospitals are sterilising laryngoscope blades or formally decontaminating internal temperature probes before reuse.

O'Donnell and Asbury from Glasgow published a paper in November 1992 in *Anaesthesia* looking at the adherence to the recommendations of these three reports. They sampled two and a half thousand anaesthetists of various grades of service by postal survey and reported on a response rate of 79%. They questioned the practice of the wearing of gloves for invasive procedures. Only 13.1% of consultants and 19.4% of trainees wore gloves. This confirmed the belief that the vast majority of anaesthetists do not wear gloves for invasive procedures despite the recommendations of their professional body. O'Donnell and Asbury reported that the incidence of wearing gloves decreases with increasing age. Between the ages of 20 and 29, 17.7% wore gloves; aged 30 to 39, 19.7%; aged 40 to 49, 12.7% and over the age of 50 only 7.9%. Either our elders and betters believe that they carry an unrecognised protection from blood borne viral infection or they would seem to be less well informed than their younger professional colleagues.

They asked about the practice of resheathing needles. Approximately 35% of anaesthetists still resheath needles. Personally I cannot see any reason at all to resheath needles. Resheathing of needles has been reported as one of the most common cause of sharp injury. Once a sharp has been exposed it becomes the responsibility of the operator and it must be disposed of directly into the sharp's bin. Even our surgical colleagues have begun to learn to modify their practice to a safe technique. They do not put their knives down onto the operating table. Instead they put the knife into a tray which can be handled safely by the scrub nurse and disposed of without risk to anyone else.

O'Donnell and Asbury reported a 22.4% incidence of needle-stick injury by consultants and 27.3% by trainees. This was a significant difference of level of needle-stick injuries between the two groups. There was no difference in needle stick injuries between those wearing or not wearing gloves.

All three reports recommended the wearing of gloves and not to resheath needles. Furthermore,

they highlighted the importance of reporting needle stick injuries. 80% of the sharp's injuries were not reported. From a simple medicolegal risk management viewpoint, it would seem logical to follow the simple advice of reporting the injury at the time of the accident, rather than becoming involved in a complicated legal argument some time after the event when cross infection has been established by a change in antibody status.

I have already expressed my concern over how the profession and the public view the risks of blood borne virus infection. I think the next question confirms my concern about the understanding by our profession for the risk of hepatitis and HIV infection. O'Donnell & Asbury asked: *Would you delay routine surgery for a suspected Hepatitis or suspected HIV case to be confirmed by antibody test?* For routine surgery approximately 60% of both consultants and trainees said they would delay surgery. That may not be surprising, but what was surprising were the answers in relation to the same question asked for emergency surgery. For emergency surgery in a possible hepatitis positive, or HIV positive patient, 20% would delay emergency surgery and await for a confirmatory test for hepatitis or HIV. This is an apparent anomaly between the need for emergency surgery (within two hours) and the medical perception of personal risk. Even more confusing was that only 18% of all the doctors surveyed actually took a relevant history as to whether these patients could be in the hepatitis or HIV risk group. Specifically, less than 20% actually bothered to find out anything about the sexual or drug habits of their patients, yet they would cancel or delay surgery and rely on a blood test to confirm the history. This is a complete nonsense, if you do not ask the patient the relevant history then when do you know when to perform a blood test. Furthermore, apart from many other factors, the patient may be in the false negative three month window and may not show a positive HIV test.

Professor Jeffries, Professor of Virology at St. Bartholomew's Hospital, London and who advises the Association of Anaesthetists, has commented that it would be simpler if we treat all patients as if they are HIV or HBV positive. This may not be too harsh advise. Local figures from the Accident and Emergency Department in Edinburgh, show one in one hundred of all adult males aged 18-35 are HIV positive and one in two hundred and fifty of all adult females in the same age group are HIV positive. They estimate that of the major trauma seen in the young 2 - 3% are HIV positive. In

their practice they do not differentiate between patients with the disease and without the disease. They treat all the patients with the same caution. I am sure we should follow their example.

Finally, from the O'Donnell and Asbury paper let us examine the figures relating to immunisation. 64.0% of consultants and 76.4% of trainees considered themselves at risk of Hepatitis infection. Interestingly, the number considering themselves at risk decreased with age, 75.8% in the 20-29 age group to 64.9% in the 50+ age group. The figures are very similar, but slightly higher for the risk of HIV infection. Again why this fall off with age and seniority? Is the answer here that hepatitis and HIV positive cases are left to the end of the operating list when the senior anaesthetists may have departed.

Anaesthesia as a profession has the largest number of doctors, senior as well as junior, who are Hepatitis immunised. In O'Donnell and Asbury's population 86% of those surveyed were immunised. Unfortunately only 63% knew what their current level of immunisation status was. In approximately 5-10% of individuals the immunisation does not take, therefore a confirmation of the level of Hepatitis status is important. The bottom line is that it is not enough just to have the course of immunisation injections, it is just as important to have regular tests to confirm the level of hepatitis immunisation activity present.

Finally a few words about the drug which was originally hoped to be the miracle cure-all for AIDS, AZT or Zidovudine. To understand the problems that have occurred with AZT you need to know how it works. AZT inhibits the enzyme reverse transcriptase. It acts as though it is an analogue of the natural nucleoside thymidine, with a Hydroxyl group replaced by an Azido group (N3 group). This azido end group cannot form a 5' - 3' phosphodiester linkage, and therefore it acts as the chain terminator for DNA synthesis.

AZT therefore works intracellularly but only when the virus, its RNA and enzymes, are already present inside the cell. The drug is designed to work on the multiplying virus in the very ill symptomatic patient by slowing virus replication and the progression of the disease. Unfortunately this only occurs for a limited amount of time. More recently, the preliminary report of the Concorde study has cast doubt on the effectiveness of AZT. The Concorde study was started in

1988 and examined the results of treatment on 1,749 patients who had asymptomatic AIDS. These patients were HIV positive and were developing the disease but at the time of commencement of treatment were asymptomatic. The study found that those who had taken AZT were no better off than those who had not been given the drug. AZT did not delay the onset of AIDS symptoms. Therefore the Concorde study in its preliminary report has examined the effectiveness of preventing the symptoms of AIDS. Although this drug has a proven effectiveness in established AIDS it would seem from this data that AZT has limited value in delaying the onset of AIDS in the already HIV positive patient. Nevertheless I must emphasise that this was a preliminary report and the final results have yet to be peer reviewed.

Despite this most occupational health departments still recommend taking AZT following an infection incident. AZT may not be the drug which you just want to swallow when you get a needlestick injury. The Concorde study results may make you think again. AZT does have a recorded incidence of haematological toxicity and can cause very severe anaemias. There is a tolerance of the virus to AZT which occurs at about six months. This tolerance may make you consider more carefully whether you wish to take the drug at the time of the incident or wait to use its effects at a later stage. Therefore you may take AZT to limit the effect of an infected needlestick injury, but you may have submitted yourself to the AZT associated pharmacological problems unnecessarily, especially if you do not sero convert. The expert evidence would lead us to believe that you should wait. Only careful and considered counselling on each individual case can decide whether or not to commence a course of the drug AZT.

Mr. President, Ladies and Gentlemen, I will finish by quoting Lord Tomlin. *The repetition of a practice which is unsound will not elevate it to the status of a practice which is sound.* If we, as a professional group, wish to be taken seriously about our concerns for viral cross-infection and, furthermore, to receive due consideration, both professionally and financially for those unfortunate enough to become infected with a serious blood borne viral infection, we must elevate our standards of practice. If we do not change our methods of practice or worse still continue to display a lack of knowledge in these matters, then we will be widely criticised and we may end up with the saddest scenario where it affects you, your family or worst of all the patients you treat.

Registrars Prize Essay Competition First Prize

Percutaneous Tracheostomy

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This paper describes a one year follow up of percutaneous tracheostomies which were performed in the Intensive Care unit of the Royal Infirmary of Edinburgh and the design of a training programme to reduce the learning curve associated with this technique.

Historical Background

Accounts of tracheostomy extend back to Egyptian times 3500 years ago and it is alleged that Alexander the Great saved one of his soldiers from suffocation by creating a tracheal opening with the tip of his sword. Accounts through history variously describe it as semi-slaughter and a suitable punishment for a sinner in the depths of hell, or as the foremost operation by which man is delivered from death to a sudden repossession of life. It was used in the 18th and 19th century in the treatment of diphtheria, and other stenosing conditions of the larynx such as syphilis and tuberculosis. In 1718 the term bronchotomy was replaced by tracheotomy, which in turn was replaced by tracheostomy in 1938.

The classic description of the standard surgical technique used today was published in 1909 by Chevalier Jackson, Professor of Laryngology in Pennsylvania, and he reviewed the practice in 1921. He quite emphatically criticised high tracheostomy and described the poor standards of cleanliness at that time. Any tracheostomy then performed

required division of the tracheal rings at the chosen level, and infection was an ever present complication. It is not surprising that subglottic stenosis was a frequent complication.

In 1943 tracheostomy was described in the management of polio victims receiving negative pressure ventilation as a means of controlling tracheal secretions. In 1969 a dilational technique was described which used a dilator with an incorporated cutting blade but failed to attract much interest. In 1976, Grow, a cardiothoracic surgeon in Denver, who had been a student of Chevalier Jackson, started using cricothyroidotomy because he wanted a rapid safe method of tracheostomy isolated from the median sternotomy. He used dilating forceps and scissors to open the trachea. In 1982 he reviewed his technique reporting an unacceptable incidence of subglottic stenosis. In 1984 the Mitracheostomy was introduced in Birmingham, UK. In 1985 Ciaglia, Firsching and Syniec, New York Thoracic Surgeons, described the method of dilational percutaneous tracheostomy which is the technique now widely practiced. They initially used a modified dilational nephrostomy kit which was being introduced at the time. In 1989 an alternative style of percutaneous tracheostomy was described from Israel. It was a device designed for urgent tracheal access in war situations. Like the Ciaglia method it involved the introduction of a guide wire into the trachea, but rather than a progressive series of dilators, a sharp coned forceps device was inserted into the trachea over the guide wire and an orifice was created by opening the jaws of the forceps through which the tracheostomy tube could be placed. This has been used electively and is also described as a dilational technique in published data. It is therefore important to determine what method is being discussed as the complications do differ.

Anatomy

The trachea commences at the larynx and terminates at the level of the fourth thoracic vertebra, where it divides into the two main bronchi. It is approximately 15 cm long, with one third above and two thirds below the suprasternal notch. The tracheal architecture consists of a number of horizontal 'C' shaped cartilages which are joined posteriorly by the trachealis muscles. Vertically these cartilages are joined to each other by fibroelastic tissue. It has a diameter of 1.5 to 2.5 cm. The isthmus of the thy-

roid gland runs across the trachea at the level of the second and third tracheal rings. The oesophagus lies posteriorly and the recurrent laryngeal nerves run laterally in both tracheo-oesophageal grooves. At the suprasternal notch the trachea enters the superior mediastinum. Anterior relations include the inferior thyroid veins, the thymus, the aortic arch, and the innominate and left common carotid arteries.

Reported Studies and Cases

Including Ciaglia's original paper there have been 11 reports of series involving 573 patients and several case reports describing complications associated with the Ciaglia method of insertion. There have also been three reports of series involving 161 patients and seven case reports of percutaneous tracheostomy performed using the Rapitrach method. Analysis of all these papers is difficult because they each look at different aspects of the technique and related complications, some reporting on the procedure itself and others reporting on the longer term outcome of patients surviving to decannulation. Other papers report specific incidents and complications without detailing overall experience with the technique. Further confounding an overall assessment of the technique is the lack of standard definitions of what actually constitutes bleeding, infection and difficulty in insertion. However the complications encountered can at least be listed.

Reported Complications of the Ciaglia Method

Most of the reported studies have shown very few complications and these come from individual case reports and from one particular series which reported difficulty with dilation, excessive bleeding, false passage and death resulting from misplacement in a total of seven cases. These were performed in a teaching situation and it seems that less than adequate training or supervision was provided before embarking on this new technique. Therefore although it concluded that this technique should be relegated to the wastepile with the many other failed puncture techniques for tracheostomy, it seems more likely that it is the unprepared introduction of a new technique which should be condemned to the wastepile.

Reported Complications of the Rapitrach Method.

The major criticism of the Rapitrach method is the use of a sharp-coned dilating device with the potential to cause significant trauma to the trachea and

related structures. In addition the dilating forceps have been shown to cause pressure damage and tracheal ring fracture in a series of cadavers and animal models. In up to 20% of reported cases the cuff has ruptured on insertion of the tube between the sharp jaws of the dilating forceps. In contrast to the recommendations for the Ciaglia method, the potential for rapid insertion in an emergency situation does exist, although needle cricothyroidotomy is still the accepted method of urgent airway access. Because of the potential for traumatic insertion, this device is much less popular today than the Ciaglia method.

Advantages of Percutaneous Tracheostomy

Percutaneous tracheostomy is a procedure which can be performed in the intensive therapy unit without exposing the patient to the hazards of transfer to an operating theatre. There is less organisation of surgical, theatre, nursing and anaesthetic time required. Bleeding is reduced by the absence of sharp dissection and by the tamponading effect of the dilators and tracheostomy tube once in place. Because of the reduced area of exposed tissue, infection is also less of a problem than in surgical tracheostomy. The cartilagenous structure of the trachea is maintained and this should result in less long-term problems. With an appropriate amount of training it is a relatively easy technique to learn.

Follow-up of Percutaneous Tracheostomies

The hospital notes of all patients who had a percutaneous tracheostomy performed in the Intensive Care Unit at the Royal Infirmary of Edinburgh prior to 31st December 1992 were reviewed. Note was made of the duration of endotracheal intubation before tracheostomy was performed, the duration the tracheostomy was in place before decannulation, any complications related to the tracheostomy at any stage and the final discharge destination. Those surviving to hospital discharge were further reviewed by contacting the general practitioner for information on general outcome and any tracheostomy related problems, and then each surviving patient was personally contacted by telephone. Three patients could not be contacted because they did not have a home telephone, but each one had been seen by their general practitioner and no complications reported. Each patient was asked several questions relating to the tracheostomy as shown below. All 18 patients surviving on 20th February 1993 have been followed up and the results of this one year follow-up are reported in this paper.

Patient Telephone Questionnaire

Confirm Identity

- 1 Have you had to consult any medical person with a problem related to your neck?
- 2 Any problems with the wound?
- 3 How do you find the appearance of the wound?
- 4 Have you had any problems with sore throats?
- 5 Any problems with swallowing?
- 6 Any hoarseness, or voice changes?
- 7 Any other comments about your neck in relation to your stay in hospital?

Results

The first percutaneous tracheostomy was performed on 13th December 1991. Thirty-one further percutaneous tracheostomies were performed in the Intensive Therapy Unit by the end of 1992. During this period only one tracheostomy was performed on an ITU patient in theatre using a standard surgical approach. Of the 32 percutaneous tracheostomies performed, 13 patients died with the tracheostomy in place, 10 patients while still in ITU and 3 patients in a hospital ward after discharge from ITU. 19 patients survived to discharge home. Of these 19 patients, 18 patients were decannulated. One of these patients died at home two months after decannulation, with no reported complication related to the tracheostomy. No patient died at any stage of a complication related to percutaneous tracheostomy.

Of the 18 patients still alive today one patient had the percutaneous tracheostomy changed for a standard surgical tracheostomy and still has this in place; one patient required formal surgical tracheostomy three weeks after decannulation and still has this in place and the remaining 16 patients are decannulated and alive.

The mean duration of endotracheal intubation before percutaneous tracheostomy was performed in all 32 patients was 7.2 days (range: 1 - 22 days). In the 13 patients who died in hospital before decannulation it was 8 days (1 - 22 days), and in the 18 who were still alive it was 6.6 days (2 - 13 days). The patient who died at home after decannulation was intubated for 3

days before tracheostomy was performed. The mean duration the tracheostomy was in place, in the patients who survived to decannulation, was 30.5 days (3 - 122 days). In the 10 patients who died in ITU before decannulation the mean duration from insertion to death was 5.6 days (2 - 10 days), and in the 3 dying in the ward it was 13 days (10 - 16 days). Seven patients who were decannulated and are still alive had the tracheostomy in place for more than 22 days (23, 25, 28, 30, 35, 99, 122 days). None of these patients have had any complications related to the percutaneous tracheostomy. The average age of patients having percutaneous tracheostomy was 56 years (25 - 79 years). Of the 512 patients admitted to ITU during the study period, exactly 256 were admitted and 16 percutaneous tracheostomies were performed in each six month period. The first 16 patients were intubated for an average of 6.6 days and the second 16 patients for an average of 7.8 days before tracheostomy was performed.

Complications

No patient died as a result of percutaneous tracheostomy being performed. Minor difficulties with insertion technique were not recorded. During one procedure the guide wire was displaced, but was reinserted easily with no associated complications. One patient had a serious complication related to percutaneous tracheostomy, one patient required surgical tracheostomy after discharge home, although it is doubtful if percutaneous tracheostomy was responsible, and another three patients have come into contact with ENT surgeons with problems unrelated to the tracheostomy. These will be discussed in more detail.

Excluding the five patients who had ENT review, no patient contacted their general practitioner with any problem related to their neck. Of those patients contacted at home one patient described slight difficulty swallowing on discharge home although this has now completely resolved; one patient occasionally gets a 'husky' voice; two patients had slight hoarseness after decannulation which has completely resolved; and one patient described the wound taking approximately three weeks to heal properly with a slight yellow discharge, although no antibiotic treatment was required. No patient found the wound unsightly or had any pain at the stoma site. No patient offered any additional adverse comment about the tracheostomy site. The most serious complication encountered was a patient who developed subglottic stenosis. This was in a 63 year old female

non insulin dependent diabetic who had the 26th percutaneous tracheostomy performed in our unit. She was admitted with acute left ventricular failure, requiring artificial ventilation through an oral endotracheal tube, inotropic support, and insertion of a pacing line for complete heart block. She was extubated after two days ventilation but developed an upper airway obstruction of unknown aetiology and required rapid reintubation. The cords were noted to be swollen. A percutaneous tracheostomy was performed by an anaesthetic senior registrar, with some difficulty inserting the dilators. Over the following four days she was again weaned from the ventilator. Subsequent decannulation of her tracheostomy resulted in acute upper airway obstruction requiring uncomplicated reinsertion of the tracheostomy tube. Again the cords were noted to be swollen possibly with associated vocal cord granulomata. No infection was noted at the stomal site. She was discharged from ITU into the care of the ENT surgeons. It remained impossible to remove the tracheostomy tube and on review 23 days after insertion, subglottic granulation was noted on indirect laryngoscopy. The percutaneous tracheostomy was replaced with a standard tracheostomy through a vertical incision at the third and fourth tracheal ring, 39 days after initial insertion. Unfortunately haemorrhage at the stomal site occurred postoperatively requiring re-exploration and ligation of arterial bleeding. Her medical course was complicated over the ensuing weeks with episodes of left ventricular failure. She was eventually allowed home with the tracheostomy in place and was reviewed by direct laryngoscopy three months after the initial percutaneous tracheostomy was performed. This revealed a collapsed cricoid cartilage. The anterior part of the arch of the cricoid had disappeared and the two arms of the arch had triangulated, producing the subglottic stenosis. At the moment she is capping off the tracheostomy tube for increasing periods and it is hoped she will eventually be successfully decannulated. The thirteenth percutaneous tracheostomy in our series was in a 30 year old male involved in a road traffic accident resulting in a severe chest injury with ten fractured ribs and a flail segment on the left side, with an associated haemopneumothorax. He required artificial ventilation through an oral endotracheal tube and percutaneous tracheostomy was performed after thirteen days ventilation with no associated difficulties or complications. Decannulation was possible after seven days and the patient discharged home from a general ward after another four days. Three weeks later he was admitted as an emergency with increasing stridor after a history of increasing shortness of

breath since discharge home. He had relatively fixed and immobile vocal cords and he was unable to clear secretions. A standard uncomplicated surgical tracheostomy was performed under the care of the ENT surgeons. Although he has made an otherwise good recovery he still has the tracheostomy in place with little recovery of vocal cord function. This complication was almost certainly not caused by the percutaneous tracheostomy and probably resulted from the initial traumatic insult.

A 62 year old male requiring percutaneous tracheostomy after twelve days oral endotracheal intubation, with the tracheostomy in place for twenty five days, consulted an ENT surgeon for a check up of his laryngeal function. He was an opera singer and although he had no symptoms related to his tracheostomy he required reassurance that no laryngeal damage had occurred. Laryngeal video showed normal function and no stenosis, with good healing of the tracheostomy site.

A 76 year old male ventilated for ten days after emergency repair of a ruptured abdominal aortic aneurysm developed stridor on extubation of the oral endotracheal tube and required reintubation and subsequent percutaneous tracheostomy. He had developed a granuloma on each cord and these were surgically removed. His tracheostomy was quickly removed after this and on recent review he remains well with normal cords and subglottic region,

A 27 year old female with a three week history of sore throat presented with acute supraglottic oedema, the epiglottis slightly red but not grossly inflamed or swollen. She required oral intubation and because of an extremely irritable airway had a percutaneous tracheostomy performed after three days. This remained in place for four days and after decannulation she made a good recovery. No organism was ever identified. She had no associated complications related to the tracheostomy. However six months later she presented to ITU with the same problem and again required oral intubation. On this occasion formal surgical tracheostomy was performed by an ENT surgeon. After decannulation she required antibiotics for a stomal wound infection. She still gets sore throats, has difficulty swallowing hard boluses, is hoarse and gets repeated episodes of laryngitis. The second scar is more noticeable and she feels mild cutaneous numbness round the stomal site. Thus although several patients presented for otolaryngological review after percutaneous tracheostomy had been performed, only one patient had

a significant complication likely to be attributable to the procedure. This highlights the importance of formal follow up of these patients to establish actual rather than perceived complications.

Discussion

Percutaneous tracheostomy is a recently introduced alternative to standard surgical tracheostomy. The method used in our unit was introduced by Ciaglia and his colleagues in 1985. Since its introduction it has been reviewed and reported on by many authors. These have in the main described a successful technique but include complications occurring as a result of the procedure. In addition several case reports of associated complications have been published. Such complications include bleeding, tube misplacement, infection and pneumothorax. As with any new technique these reports are important in evaluating its place in clinical medicine and its safety.

The most important concern associated with a technique which involves a relatively high approach to the trachea is the incidence of subglottic stenosis. Since standard surgical tracheostomy was described in 1909 by Chevalier Jackson, which involves corruption of the integral tracheal structure by division of the tracheal rings, and a significant incidence of subglottic stenosis, high tracheostomy at the sub-crioid or first inter-tracheal ring space has been strongly avoided by the surgical world. However with the introduction of a dilational technique with maintenance of the basic tracheal structure this is now being advocated as the method of choice for tracheostomy in intensive care patients. There have been very few reports of subglottic stenosis in this population of patients. However very few follow-up studies have been reported which specifically look at this complication. Recently Ciaglia reported a long term follow up of his series of percutaneous tracheostomies performed between 1982 and 1990. He reported no case of subglottic stenosis in 32 patients surviving to decannulation and still alive at the time of his report. He is, perhaps not surprisingly, much enthused by his technique and suggests that not only is this likely to become the technique of choice but that perhaps consideration should be given to earlier performance in ITU patients as an alternative to trans-laryngeal intubation into the second week of intensive care.

This may produce a significant change in the approach to ventilation and weaning from ventilation in intensive care patients, and whether it may actu-

ally lead to earlier discharge from intensive care will certainly require future audit.

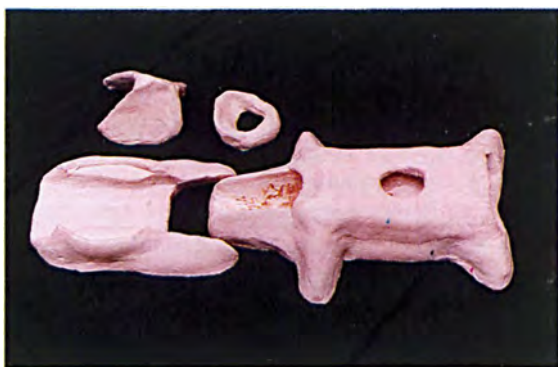
The Introduction of a New Technique

When any new technique is introduced to practice there is an initial learning phase where only experienced personnel undergo careful training in the new technique and careful thought is given to patient selection. As they become more familiar with the technique and encounter the initial associated problems, they become experienced in the technique and hopefully have survived this learning curve without major complication. The seriousness of these complications will depend on the particular procedure and the potential for critical incidents in the learning process. In time the technique may become accepted in a unit and if it appears to be relatively simple the potential serious nature of complications may be forgotten. New operators are trained in the technique, and there is then the potential for relatively inexperienced operators training other operators. In intensive care there is the potential for many trainees to each spend relatively short periods on the unit. In a training situation there is always a tendency to let every trainee try as many procedures as possible. There is then the potential for the situation of see one, do one, teach one developing. In this way there is the potential for the new technique never quite getting beyond the learning curve phase and both minor and major complications will still occur.

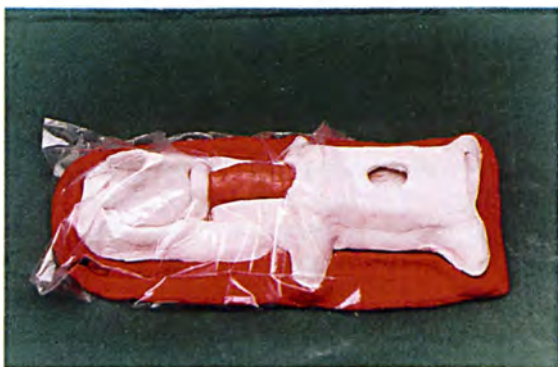
Because the technique of percutaneous tracheostomy has the potential for acute disaster and also long term disabling morbidity this aspect of training may have important consequences. If the technique can be taught in such a way that it reduces the risk to the patient during the learning phase, the overall technique should be made safer. Identifying personnel best suited to either learn or perform the technique will concentrate the experience in fewer hands and again hopefully lead to a safer procedure. It is also important that the difficulties with insertion, complications associated with, and longer term morbidity be recorded to allow effective feed-back and an improvement in the overall standard of the procedure.

The Training Programme

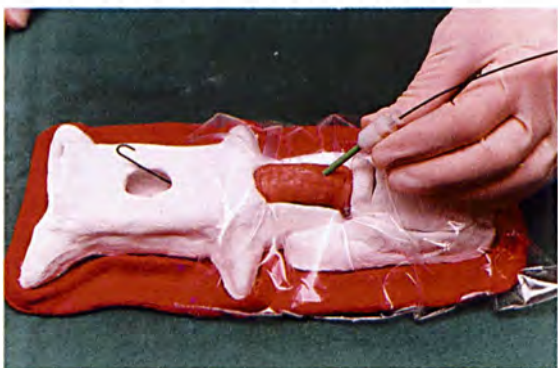
The training programme is primarily aimed at those clinicians who will be performing percutaneous tra-



The model base which is made out of hard clay and covered with waterproof paint



The model with a sheep's trachea in place and covered with several layers of polythene to represent overlying skin and subcutaneous tissue.



A short Teflon 11FG dilator has been advanced over a guide wire to make an initial dilation in the tracheal wall.

cheostomy on a regular basis. This includes intensive therapy unit consultants who have no previous experience of the technique, senior registrars in anaesthetics who fulfil a senior commitment to the unit and who are likely to go on to work in an intensive therapy setting, and registrars with a particular interest in intensive care. In a training setting all juniors should be exposed to as wide a range of procedures as possible, but in this situation the substitution of practice on a patient with training on a model

would offer a safe alternative. In addition the technique requires anaesthetic assistance in management of the airway during the procedure. This is an area which a more junior trainee would perhaps be more commonly involved in and is included in the programme.

Therefore all potential practitioners of the technique would be required to complete the training programme with two successful percutaneous tracheostomies performed on the model. In addition they should have been present on two occasions at the insertion of tracheostomy by an experienced operator. The actual number of procedures which they then perform on a patient, under senior supervision before being regarded as experienced varies depending on the practical skills of the trainee, but a minimum of five cases would be regarded as satisfactory. Therefore it is not suggested that a training model can be used as a substitute for learning in a clinical situation, but rather that it acts to reduce the initial learning curve associated with using new equipment in a new situation, and forms part of a structured training in that technique. A tutorial slide presentation with a commentary by the author on various aspects of the procedure, including illustrations of it being performed in a clinical setting is studied prior to practice on the model.

By creating a training model it is possible to gain hands on experience before exposure to a patient. It allows demonstration of potential technical problems and complications, and can reveal problems not yet encountered or reported. The aim of the model is to provide similar landmarks and a realistic feel of tracheal penetration. A sheep's trachea has provided a realistic impression of tracheal puncture. To represent the overlying skin and subcutaneous tissue several layers of polythene are used to provide resistance to introduction of the dilators.

The model base is made out of hard clay with a waterproof paint covering. The tracheas obtained from the local abattoir sometimes have an intact larynx, but often this is damaged, and the model therefore incorporates an artificial thyroid and cricoid cartilage to provide realistic landmarks. The tracheas are frozen for storage and defrosted as training sessions take place.

All our percutaneous tracheostomies are performed under deepened sedation usually with muscle relaxation in ventilated patients. The inspired oxygen is increased to 100% for the duration of the procedure.

The anaesthetist responsible for the patient's airway and general clinical status needs to be prepared for minor complications with the technique. In the course of the procedure the cuff is sometimes ruptured leading to a loss of airway seal. The effect this has on minute ventilation and oxygen saturation can be anticipated by performing a trial of cuff deflation before starting the procedure and determining the required increase in minute volume required. Because the insertion point is higher than standard tracheostomy the endotracheal tube must be withdrawn further, to a point where the cuff can be seen at the vocal cords. This is best performed under direct vision to avoid tube displacement. During dilation of the trachea, a significant air leak may occur through the dilated orifice and this also may require adjustment of ventilation. After insertion of the tracheostomy tube adequate ventilation must be confirmed and the facilities to immediately reintubate orally must be available if there is difficulty with this.

The cricoid cartilage is palpated and the first inter-tracheal-ring space is identified. The overlying skin is infiltrated with lignocaine and adrenaline and a small horizontal skin incision is made with a scalpel. While stabilising the trachea with one hand the introducing needle, with saline filled syringe attached, is inserted into the trachea. Entry into the lumen is identified by free aspiration of air which can be seen bubbling into the syringe. At this stage the endotracheal tube can be moved up and down to exclude needle impalement of the tube. Sometime difficulty is experienced in identifying the lumen, usually as a result of being off the midline. Flexible bronchoscopy can help visualise the needle in the midline, and is advocated as a useful method of confirming correct position. In addition transillumination can identify the position of the trachea in an anatomically distorted situation.

Aspiration is performed through the introducing needle and air bubbles back. A plastic cannula is advanced over the needle and again air is aspirated to confirm continued intratracheal placement. Care must be taken not to kink the cannula because any kink in the lumen may obstruct introduction of the guide wire. The flexible 'J' end of a wire is inserted through the introducing cannula into the trachea and the cannula is removed to leave the wire in place. A short Teflon 11FG dilator is advanced over the guide wire to make an initial dilation in the tracheal wall through which a guiding catheter can be inserted. The short Teflon dilator is removed and the guiding

catheter is advanced over the guide wire into the tracheal lumen. The guiding catheter has one black mark at one end and two black marks at the other. The end with two black marks is inserted into the trachea such that the marks lie at the skin edge. On the guide wire is a solder mark and this is aligned with the end of the guide catheter. In this way the wire and guide catheter can be kept in constant relationship with each other and act as a single unit during subsequent manipulations. This prevents the wire being pulled back in the guiding catheter such that a small sharp tip to the guide unit is created. The aim is to have an introducing unit which will not kink if the dilators are deflected by a tracheal ring, and whose position can be determined at all times. The dilators (12, 18, 21, 24, 28 and 32 FR) are serially introduced over the guide unit and produce a progressively bigger hole in the anterior trachea. The dilator is positioned on the guide unit such that the non-dilating end of the dilator is aligned with the single mark on the guiding catheter. This means that the guide wire, introducing catheter and dilator form one unit and are all advanced together into the trachea. This maintains the protective function of the flexible guide wire in the trachea, and because the dilators are not being slid down the wire, kinking of the wire is avoided. The unit is advanced as far as the black mark on the dilator. Generous lubrication helps the advance of each dilator in turn. The actual angle of insertion is nearly 90 degrees to skin, and the natural curve of the dilator directs the tip caudally. Significant pressure is sometimes required to introduce the dilator, and this is helped by holding each dilator as near the skin edge as possible. An appropriately sized tracheostomy tube is positioned on the closest fitting dilator, the cuff actively deflated and the whole unit of tracheostomy tube, dilator, guiding catheter and guide wire is advanced into the trachea. Sometimes the trachea needs to be overdilated to allow the tracheostomy tube to pass easily into the trachea as the 'lip' between the dilator and tube can cause some resistance to introduction. The guides and dilators are then removed, the cuff inflated and adequate ventilation confirmed. The dilators, guiding catheter and wire are removed. Ventilation is confirmed and the endotracheal tube is removed.

At the end of the tutorial and practical hands-on experience using the model the trainee should be better equipped to perform the procedure in a clinical setting. This would still be under supervision but simple operator dexterity should be significantly improved and learning-curve morbidity reduced.

REGISTRARS' PRIZE ESSAY COMPETITION

Second Prize

Post-operative hypoxaemia following total knee replacement under spinal and general anaesthesia

AL. Ronald, Senior Registrar
Aberdeen Royal Hospitals.

Post-operative hypoxaemia is a frequent, although usually, silent complication of surgery and anaesthesia. Until recently its incidence was unknown, but with the advent of postoperative pulse oximetry monitoring it is now increasingly recognised. Intraoperative and post-operative factors contribute to the development of hypoxaemia following surgery, and it may contribute to major post-operative morbidity. Many studies have been carried out to identify patients at greatest risk of developing hypoxaemia after general anaesthesia.

After induction of general anaesthesia there is a reduction in the Functional Residual Capacity of the lungs (FRC). This effect continues into the postoperative period and in the first 24 hours the FRC may be reduced by as much as 40%, recovering only slowly over 7-10 days. In addition, within 15 minutes of induction there is an increase in pulmonary ventilation/perfusion (V/Q) mismatch. These alterations in pulmonary mechanics may produce some degree of background hypoxaemia post-operatively which can be exacerbated by the administration of opioid analgesics. Opioids given following surgery have been shown to interfere with sleep and respiratory control producing abnormal sleep patterns, obstructive apnoeic episodes, and hypoxaemia. Spinal and epidural anaesthesia also alter respiratory physiology, although possibly not to the same degree as general anaesthesia. Lundh et al have shown that the

V/Q mismatch which occurs with general anaesthesia does not occur with epidural anaesthesia. However, a study by Hedenstierna et al has reported that FRC falls during spinal anaesthesia in the same way as it does with general anaesthesia. A study was designed to identify and compare patterns of postoperative hypoxaemia in patients following general or subarachnoid anaesthesia. Twelve patients who were scheduled for elective total knee replacement surgery were randomised to receive either a standardised general or subarachnoid anaesthetic technique. Oximetry data was collected both preoperatively and postoperatively using a computerised data collection/analysis system and the data was displayed graphically as a compressed spectral array to allow identification of patterns of oxygenation and hypoxaemia. All patients in both groups received postoperative morphine via a Patient-Controlled Analgesia (PCA) System to facilitate comparison of postoperative opioid requirements.

Oxygen saturations in both patient groups tended to be lower in the initial postoperative period compared to the preoperative (control) period. However, patients whose surgery was performed under general anaesthesia appeared much more likely to develop severe and unstable hypoxaemic oximetry patterns postoperatively than those who received a subarachnoid block. These differences could not be explained on the basis of varying analgesic requirements. Patients who have elective knee replacement surgery under general anaesthesia appear to be more likely to develop significant hypoxaemia in the postoperative period compared to those who have spinal anaesthesia for the procedure.

Third prize

Tracheal intubation without muscle relaxants in children

Michael P Steyn, Senior Registrar,
Aberdeen Royal Hospitals

Eighty healthy children undergoing elective adenotonsillectomy were studied to compare the use of alfentanil or suxamethonium to facilitate endotracheal intubation. After premedication with EMLA cream anaesthesia was induced with propofol and either alfentanil (15microgms/kg) or suxamethonium (1.5 microgms/kg) was administered. Ease of laryngoscopy, vocal cord position and coughing were assessed on a score from 1 to 4. A record was also kept of jaw relaxation, limb movement, heart rate, mean arterial pressure and oxygen saturation.

Intubation was achieved in all patients. Acceptable conditions were found in 32 out of the 40 who received alfentanil and 35 of those who received suxamethonium. There were no significant differences between the groups for ease of laryngoscopy or vocal cord position but the incidence of coughing was significantly lower in the suxamethonium group. More patients had limb movements during intubation in the alfentanil group. The heart rate increased significantly after intubation in the suxamethonium group but remained virtually unchanged in the alfentanil group. Mean arterial pressure increased significantly after induction and after intubation in the suxamethonium group but decreased after induction in the alfentanil group with a return to preinduction values after intubation.

REGISTRARS' MEETING WESTERN GENERAL HOSPITAL, EDINBURGH

The Annual Registrar's Meeting was held at the Western General Hospital, Edinburgh on the 4th of June 1993. The meeting was opened by the President, Dr Telfer and a varied programme was presented. The audience responded enthusiastically to the simulated Morbidity and Mortality meeting where their participation was actively encouraged. The past-president, Dr J Wilson, in closing the meeting paid tribute to the efforts of the organisers and speakers in producing an interesting and stimulating meeting.

Obstetric Morbidity and Mortality

Dr John McClure, Consultant Anaesthetist,
Royal Infirmary of Edinburgh

Maternal death in pregnancy, childbirth or the immediate postnatal period is now a rare event in the developed world. The introduction of antibiotics and the reduced virulence of the haemolytic streptococcus probably had the greatest influence in the 1930's. Since then there has been a continued steady decline in maternal mortality rate as assessed by the Confidential Enquiries in the UK over consecutive three year periods (triennia). The most recent report on Confidential Enquiries into Maternal Deaths in the United Kingdom, 1985 to 1987, shows that pulmonary embolism and hypertensive disorders of pregnancy are still the most common causes of maternal death.

Anaesthesia now accounts for fewer deaths than previously which probably reflects the increased resource directed towards the specialty in Obstetric practice. In the triennium 1985 to 1987 there were 139 direct maternal deaths. Of these, there were a total of six deaths, plus two late deaths (more than six weeks post partum) directly attributable to anaesthesia. This is for a population of 60 million, an annual birth rate of approximately 750,000 with anaesthesia or epidural analgesia being used in approximately 30% of all births.

The deaths due to anaesthesia were all considered to be due to substandard care and there is still room for improvement. Six of the eight anaesthetic deaths were due to problems with tracheal tubes most commonly because of oesophageal misplacement which was not recognised until too late. One death was due to acid aspiration and another was due to cardiovascular collapse secondary to epidural anaesthesia for a Caesarean section in a mother with severe aortic valve incompetence.

The increasing use of regional anaesthesia, the insistence on skilled anaesthetic assistance and sophisticated monitoring including routine capnography and pulse oximetry should reduce this mortality rate further. Most obstetric units in the UK now use routine

H₂ receptor blockers in labour and infrequently resort to emergency Caesarean section conducted under a hurried and risky general anaesthetic. These factors will have influenced the incidence of acid aspiration.

However, safety is not the only consideration in maternity care and there is increasing consumer demand to provide a more friendly and caring homely environment rather than the high technology offered in maternity hospitals in the UK today. 94% of deliveries currently occur in maternity units under the care of a consultant obstetrician. National figures for Caesarean section are 15% and for epidurals range between 12 and 33 % (mean 17%). There is strong consumer reaction against the cascade effect of induction or augmentation of labour, increased pain, epidural analgesia and forceps delivery or caesarean section. Our obstetric colleagues are significantly influenced by the fear of poor neonatal outcome and subsequent litigation. Unfortunately the techniques of intrapartum foetal monitoring by cardiotocograph and foetal blood sampling are relatively crude and are poor predictors of foetal outcome.

Recent articles have highlighted the problem of long term maternal backache after epidural analgesia in labour. These surveys may be criticised and although there would appear to be an association it may not be causal.

There are two goals in intrapartum care. One is to provide a safe environment for the birth of a healthy child to a healthy mother. This is currently the case in the vast majority of deliveries. The other is to provide a happy and friendly environment in which the mother is neither depersonalised or frightened and remains in control during the life enhancing experience of childbirth.

The increasing incidence of medical intervention may be jeopardising the latter objective and it is evident that there is current dissatisfaction with the style of maternity care in the UK. We as anaesthetists should examine our practice as we must be able to demonstrate that our techniques cause minimal morbidity in terms of increasing the likelihood of operative delivery or maternal disability. Progress has been achieved in terms of reducing maternal and perinatal mortality and we must now address the consumer view that all mothers have paid an unacceptable price in terms of increasing intervention, morbidity and loss of control of the birth experience.

Thromboelastography

Dr Colin McFarlane, Research Fellow,
Scottish Liver Transplantation Unit

The thromboelastograph is a device designed to study

blood coagulation. It differs from standard laboratory coagulation tests in that it monitors not only the time to the onset of clotting, but also the speed of clot formation, the strength of the clot and the degree of fibrinolysis. The principle is not new, but the introduction of a computerised system and disposable parts has made it much easier to use. It is now a device which can be used by anaesthetists in theatre to provide a continuous profile of coagulation. It is particularly useful in situations where clotting may continuously and sometimes rapidly change, and for this reason it has proved useful during liver transplantation.

When a blood vessel is injured, platelets adhere to the damaged endothelium and form a plug. At the same time the coagulation cascade is activated, the more rapid but less amplified extrinsic system by endothelial thromboplastin, and the slower but more important intrinsic system by exposure to non endothelial tissues. The resulting fibrin mesh strengthens the platelet plug. Simultaneously the fibrinolytic system is activated, and plasmin acts to limit excess clot formation and eventually break down the clot. Thus clotting is a dynamic process involving several mechanisms, each dependent on the other. Standard laboratory clotting tests tend to examine each of these aspects in isolation, and although knowledge about the coagulation cascade, fibrinogen levels, and platelet count will indicate areas of clotting deficiency, they do not look at the functional efficiency of the system. Thromboelastography allows the examination of this dynamic process.

The principle of this method involves lowering a plastic pin into a small cup containing a standard volume of whole blood. The pin is suspended on a transducer wire which detects any rotation of the pin and produces a graphical display. The cup with the blood is rotated through an arc of 4.5 degrees. While the blood is still liquid there is no rotational link between the blood and the pin, but as clotting starts the pin is gripped by the blood and also starts to rotate. The graph obtained indicates when clotting actually started, the speed of clot formation and its maximum strength. In addition fibrinolytic breakdown of the clot leads to a reduced link between the pin and the blood and this is recorded on the graph.

The presence of a clotting abnormality can be determined within ten to fifteen minutes. The device has four channels and serial sampling allows a regular clotting update. In addition there are characteristic graphs associated with specific abnormalities. Low platelet count, or function, shows a reduced amplitude trace; reduced clotting factor level shows delayed onset of the graph; reduced levels of fibrinogen shows a slow formation of clot, and excess fibrinolysis shows a reducing amplitude of clot strength over one

hour. All these abnormalities occur during liver transplantation and the thromboelastograph guides the appropriate use of fresh frozen plasma, cryoprecipitate and platelet concentrate.

The simplicity of operation and automatic software analysis of results makes this a useful tool in the management of coagulation abnormalities. It will not replace standard laboratory tests, but rather it allows a rapid, dynamic assessment of coagulation to guide replacement therapy and an indicator of the need for more formal analysis.

Gastric intramucosal pH (pHi) monitoring

Dr Alasdair McKenzie, Clinical Fellow, Intensive Therapy Unit, Western General Hospital, Edinburgh

Over the past decade or so much attention has been focused on the measurement of global haemodynamics and global oxygen transport variables in critically ill patients with treatment directed at certain goals for these measurements. The main problem with this approach is that one does not know what is happening in the various regional circulations. For example, Dahn demonstrated with hepatic venous and pulmonary artery catheters, that patients with sepsis can show a satisfactory global picture while simultaneously having splanchnic hypoperfusion as indicated by a low hepatic venous saturation.

The splanchnic circulation is an important regional circulation as the potential consequences of inadequate splanchnic blood flow, from shock of any aetiology, are gut mucosal ischaemia and acidosis. This gut barrier failure allows translocation of microorganisms and endotoxin into the circulation leading to stimulation of inflammatory cells and release of cytokines and other mediators causing the haemodynamic and microcirculatory changes and multiple organ failure commonly seen in sepsis.

The potential benefits of early detection of gut mucosal ischaemia in preventing this sequence of events can readily be appreciated. The gastric tonometer is a relatively new and non-invasive method of determining intramucosal pH (pHi) and hence assessing adequacy of gut perfusion. A gastric tonometer consists of a nasogastric tube with a separate channel to a gas-permeable balloon near the tip. Saline is inserted into the balloon and at equilibrium the pCO_2 of the saline approximates that of the superficial layers of stomach mucosa. The arterial bicarbonate is assumed to equal the mucosal bicarbonate. Application of the Henderson-Hasselbach equation to the simultaneous tonometric method has been validated by simultaneously measuring mucosal pH using microprobes inserted in a submucosal tunnel. Doglio has shown that the presence of a gastric

mucosal acidosis, on admission to ITU and over the next twelve hours, is highly predictive of outcome. Maynard also demonstrated the association between splanchnic ischaemia and non-survival in ITU patients and the poor predictive power of global haemodynamic and oxygen transport variables. Gutierrez, in a prospective randomised study, looked at the issue of whether or not pH_i guided resuscitation improved survival and found that in a group of critically ill ITU patients such management did produce significantly more survivors.

Fiddian-Green has shown that a low pH_i during and after aortic surgery was the best predictor for the development of ischaemic colitis and likewise in cardiac surgical patients a low pH_i postoperatively was the most sensitive of life threatening complications. More recently Mythen measured pH_i in 51 patients undergoing major surgery with interesting results. Postoperatively 32 patients developed a low pH_i and in this group there were 14 major complications and 6 deaths compared with only 1 major complication in the 19 patients with a normal pH_i.

The gastric tonometer has allowed investigation of the effect of vasoactive drugs on the splanchnic circulation. In critically ill patients with a low pH_i, dopexamine produced significant increases in pH_i while dopamine did not. In hyperdynamic septic shock, nor-adrenaline to achieve a mean arterial pressure of 80mmHg restored lactate and pH_i levels to normal indicating that splanchnic blood flow depends on an adequate pressure as well as circulating volume and cardiac output.

In conclusion, splanchnic ischaemia is now believed to play a key role in the pathogenesis of sepsis and multiple organ failure. Tonometrically determined pH_i looks to be a sensitive and relatively non invasive prognostic indicator of complications resulting from gut ischaemia and affords the possibility of instituting appropriate early therapy to prevent these complications developing with consequent improvement in outcome.



Endotoxins, Cytokines and Sepsis

Dr Anne Goldie, Research Fellow, Scottish Sepsis Intervention Group

Almost 50% of ITU patients with the Sepsis Syndrome die, a mortality rate which has remained high despite advances in supportive therapy. Advances in medical practice may have contributed to the lack of change in mortality, as an increasing number of patients with underlying disease are now treated. Sepsis is now the 13th leading cause of death reported in the United States and has an estimated annual incidence in Europe of 500,000 cases.

In the last decade our understanding of the pathogenesis of sepsis has increased considerably. Gram-negative sepsis has been studied in greatest depth and endotoxin, a component of the Gram negative bacterial cell wall, is believed to be an important initiator of the sepsis response. Endotoxaemia prompts the release of endogenous protein mediators, the cytokines. Their actions result in tissue damage, organ failure and death. Tumour Necrosis Factor (TNF) and Interleukin 1 (IL-1) have an early and central role in the development of the sepsis response. These cytokines are produced mainly by monocytes and macrophages. Numerous other cytokines and related proteins are involved, interacting to form a complex network. Serum cytokine levels have been reported to correlate with outcome but results are inconsistent. Endotoxin has generated much interest as a therapeutic target. Structurally, it is a lipopolysaccharide. The majority of antibodies produced in response to endotoxaemia are directed against the outer polysaccharide region, the O antigen. These antibodies are type specific, offering no cross-protection. The core region of endotoxin, which includes Lipid A (considered to be the toxic moiety), shows much less structural variation. Theoretically then, anti-core antibodies could be used in the treatment of sepsis before a precise bacteriological diagnosis is made. Endotoxaemia is frequently detected in sepsis, often in the absence of proven Gram-negative infection. Higher levels of endotoxaemia have been reported in non survivors of sepsis, however the SSIG study was unable to confirm this. Several new options for treatment have been developed recently. To date, anti-endotoxin and anti-TNF monoclonal antibodies and recombinant IL-1 receptor antagonist have undergone placebo-controlled trials. A platelet activating factor antagonist has reached a similar stage. None of these trials has been able to demonstrate a reduction in overall mortality in the group of patients studied. Only retrospective analysis has allowed identification of sub-groups of patients in whom the trial drug reduced mortality. Three of these immunotherapies are undergoing further clinical study in more narrowly defined patient groups. It remains to be seen if these will provide definitive evidence of efficacy.

Although some progress has been made in understanding the mechanisms involved in sepsis much remains to be elucidated. The network of cytokines involved is extremely complex, and the idea that a single immunotherapeutic agent will prove to be a magic bullet in the treatment of sepsis seems naive. It is more probable that if immunotherapy is going to prove efficacious at all, several agents will have to be used in combination.

A Question of Anaesthesia - what happened next?

Dr Dermot McKeown, Consultant Anaesthetist, Royal Infirmary of Edinburgh

'Mortality and Morbidity' meetings are seen as an essential part of post-graduate medical education and ongoing quality assurance within a department of anaesthesia. There is little doubt that they can play an important part in these functions provided they achieve maximum exposure and that appropriate cases are presented. Cases may not be presented because the meeting is seen, correctly or not, as a kangaroo court where a poor unfortunate presents a case to the thinly veiled derision of colleagues who now have the benefit of hindsight in considering management. Such a scenario is not conducive to presentation and acts as a form of negative reinforcement to all present - they will certainly do anything they can to avoid presenting cases or contributing to discussion.

Attention to principles of adult learning and prior preparation, by both presenter of the case and moderator of subsequent discussion, may allow a more valuable learning experience to be achieved. In our department we have found it of value to choose cases which are perhaps less exciting but which cover basic points of anaesthesia and post-operative care. The meeting is run as a discussion, with an ordered presentation of points of the case in chronological sequence. The presentation will be halted at a number of points and discussion of options available at that time is allowed. Often this leads to the audience making decisions which are very similar, if not identical, to those made by the presenter at the time of anaesthesia. Where dissent or argument results it can be controlled by the discussion moderator, and protection of more junior colleagues is achieved.

Since introducing this system our Morbidity and Mortality meetings have become more popular amongst trainees and permanent staff, and we feel that it is a non-threatening environment in which colleagues of all grades are willing to participate in open discussion on patient management.

To illustrate these points two videos of unstaged incidents in anaesthesia were viewed and a case was presented by Dr Colin McFarlane which he had previ-

ously presented to our local meeting. A lively discussion followed at which a number of learning points, which had been identified earlier by Dr McFarlane and myself, were adequately covered. Those present certainly seemed to enjoy the discussion and participated well.

CPR - Saving lives or saving face?

Dr Colin Robertson, Chairman, UK Resuscitation Council

Sudden cardiac arrest is the single commonest cause of death in the UK. These events are generally unheralded with the vast majority occurring in the community. The most frequent (and fortunately the most amenable to treatment) primary arrhythmias are ventricular fibrillation or pulseless ventricular tachycardia which occur in 70-85% of cases. Asystole and electromechanical dissociation account for the remainder. The Resuscitation Council (UK) in association with the European Resuscitation Council launched guidelines for both basic and advanced life support in November 1992. These have been disseminated in over 15 countries and give clear, concise guidelines and algorithms for the management of patients with cardiac arrest.

The overwhelming message is that a rapid response is paramount. In particular, there is emphasis on the earliest possible use of defibrillation for ventricular fibrillation and pulseless VT. Although basic life support can extend the window of opportunity, bystander CPR is performed in less than 25% of cardiac arrests in the community. Other advanced life support techniques, such as airway management with intubation and positive pressure ventilation and drug therapy, particularly with the use of adrenaline, may be of benefit, but nothing should impede the use of defibrillation. The introduction of automatic and semi-automatic defibrillators within the Scottish Ambulance Service has been a major initiative and has resulted in doubling the numbers of survivors from out of hospital cardiac arrest. In Edinburgh, for example, 26% of patients will be discharged to lead an independent existence following out-of hospital ventricular fibrillation.

Medical, nursing and paramedical staff frequently find the management of cardiac arrest stressful and, as a consequence, it is frequently poorly performed. To address this problem, the Resuscitation Council (UK) has established a nationwide network of Advanced Life Support (ALS) Courses to remedy this situation. These, together with the widest possible dissemination of the guidelines are already showing benefits in terms of patient survival for this common situation.

ANNUAL SCIENTIFIC MEETING - ROYAL ALEXANDRA HOSPITAL PAISLEY

The Annual Scientific Meeting was held on the 11th of November 1993 in the Royal Alexandra Hospital Paisley and attracted an audience of over one hundred. The meeting was very well organised and the speakers delivered a scientific programme of high quality which was well received by an appreciative audience. The Annual Gillies Memorial Lecture was delivered by Dr Michael Tunstall of Aberdeen and his text is reproduced in full after the abstracts of the other speakers.

Anaesthesia and Heart Transplantation

Dr Alex Colquhoun, Consultant Anaesthetist, Glasgow Royal Infirmary

Although few anaesthetists will ever be involved with anaesthesia for cardiopulmonary transplantation, many practitioners may participate in the management of potential donors. As some 450 cardiopulmonary transplants are now annually performed in the UK, anaesthetists require an acquaintance with management principles for the increasing number of recipients who will come for subsequent non cardiac surgery.

The Scottish Cardiopulmonary Transplant Unit opened on the 1st of January, 1992 in the Royal Infirmary, Glasgow. The following day a 55 year old male with a severe cardiomyopathy had a heart transplant performed by Mr Richens and Professor Wheatley, the anaesthetic being given by Dr Maule. The Glasgow Unit together with another in Birmingham, represent the latest additions to the United Kingdom's 9 Regional Cardiopulmonary Transplant Centres.

Donor Management: Brainstem dead patients less than 50 years of age who have no evidence of heart problems should be considered potential heart donors. Care in the pre-salvage period should maintain haemodynamic stability, systolic BP > 80mmHg, CVP < 15cm H₂O and inotropic support should be minimised. Parenteral pitressin 10iu may be useful if diabetes insipidus is present. Hb should be kept above 9g/dl. Adequate fluid replacement including possible transfusion during a multiorgan harvesting procedure is often necessary. Preservation of the isolated donor heart

is ensured by induction of asystolic arrest with cold crystalloid cardioplegia just prior to separation from the donor patient. Transport in saline flush for reimplantation within a total ischaemic time of four hours is current practice.

Recipient Management: Patients under 60 years of age with end stage cardiac disease, who do not have severe irreversible pulmonary hypertension i.e. transpulmonary gradient (mean PA - wedge) < 14 mmHg, are considered for heart transplantation. They should have no evidence of infection, malignancy, or irreversible renal or liver dysfunction. Any commonly used cardiac anaesthetic technique is acceptable, though logistic co-ordination is of utmost importance: the patient being ready for implantation at the estimated time of organ arrival. Immunosuppressive regimes, AV sequential pacing, isoprenaline and renal dose dopamine infusions have been used perioperatively together with additional vasodilator and inotropic infusions as required. To date, pulmonary artery catheters have not been used at our centre.

During the first 22 months of Heart Transplantation at Glasgow Royal Infirmary, 41 procedures have been performed in 35 males and 6 females: 66% having end stage ischaemic disease and 29% cardiomyopathies. Common complications include infection, rejection, malignancy and coronary occlusive disease. At time of writing, three patients (7%) have died, two as a consequence of infection, one of lymphoma.

Subsequent Surgery: A transplanted heart has essentially normal contractility, and a higher basal rate, approximately 100/min, reflecting autonomy from the nervous system. Reinnervation does not occur, even in the medium term. Cardiac output can quickly respond to volume loading by the Frank-Starling mechanism, while after a few minutes increases in rate and contractility will occur in response to elevated circulating catecholamine levels. Aseptic technique, steroid cover, adequate fluid loading and availability of a directly acting inotrope such as adrenaline should be the cornerstone of anaesthetic management. Advice can be easily obtained from the transplant co-ordina-

tor or medical staff of the parent unit and surgery performed at the local hospital. .

Today heart transplant recipients expect approximately a 70% chance of 5 year survival. Lung transplantation is increasing albeit at the expense of combined heart-lung procedures. All centres are experiencing restraints imposed by limited organ supply. Maximising the quality and quantity of donor organ tissue, exploration of other potential organ sources together with the problems of long term immunosuppression and accelerated coronary occlusive disease represent challenges for the future.

Anaesthesia and Liver Transplantation

Dr Alistair Lee, Consultant Anaesthetist, Royal Infirmary of Edinburgh

The Scottish Liver Transplantation programme commenced at the Royal Infirmary of Edinburgh on the 10th of November 1992 and 33 liver transplants were performed on 30 patients up to 6th December 1993. 8 patients in fulminant hepatic failure have been transplanted and of these 5 are alive and well. 22 patients have undergone elective transplantation for a variety of problems, not commonly primary biliary cirrhosis or sclerosing cholangitis and in this group 18 patients are alive and well. It is intended that 50 transplants will be performed annually by 1995.

Matching of donor and recipient is less of a problem with liver transplantation than some other solid organs and patients are matched for ABO blood group, CMV status and size only. It is possible to achieve good results even when there is mismatching of blood group and CMV status and this may be necessary in the patient with fulminant hepatic failure who can only be supported for a limited period of time. The introduction of University of Wisconsin solution has markedly improved liver preservation and the liver is second only to the kidney in the duration of acceptable cold ischaemic preservation time, 24 hours being the upper limit. This means that liver transplantation is commonly a semi-elective procedure commencing around 6.30 a.m. in our unit. Transplantation at night is necessary if an organ becomes available for a patient who has very limited short term survival prospects rather than

because the time limit for organ preservation is approaching.

The choice of anaesthetic agents is not critical. We commonly use an alfentanil and midazolam infusion supplemented by isoflurane in oxygen enriched air, paralysis being achieved with an atracurium infusion. Gut distension secondary to nitrous oxide can make surgery more difficult and is a major factor in the avoidance of this agent. The duration of the operation, the possibility of a further long operation in the early post-operative period and the general debility of these patients may mean that methionine synthetase inhibition is of importance. There is also the potential for air embolism intraoperatively and these are further reasons to use a volatile in air technique.

Other major considerations are the management of massive blood loss, prevention of coagulopathy and maintenance of acceptable biochemical parameters and body temperature. Twenty units of blood are available in theatre before surgery commences and we communicate directly with the Blood Transfusion Service supply department if further blood or products are required. All fluids are replaced using Level One warming systems. One system is attached to each side of the patient using a large bore central line. This permits infusion of up to one litre per minute of blood which is warmed from 4°C to 36°C. Coagulation factors and platelets are replaced as indicated by thromboelastography, in theatre prothrombin and activated partial thromboplastin time measurements and occasional formal coagulation screens. Maintenance of body temperature is important in the prevention of coagulopathy. Aprotinin is administered routinely to reduce fibrinolysis and our early results confirm that this drug appears to be effective. Arterial blood gases, sodium, potassium, ionised calcium, lactate and glucose are measured at thirty minute intervals and corrected if necessary. Body temperature is maintained by wrapping the patient's limbs in polythene, warming all fluids and by the use of an efficient warming mattress and condenser humidifier. It is commonly the case that these measures are excessive and require to be reduced in order to prevent overwarming.

Liver transplantation is no longer an experimen-

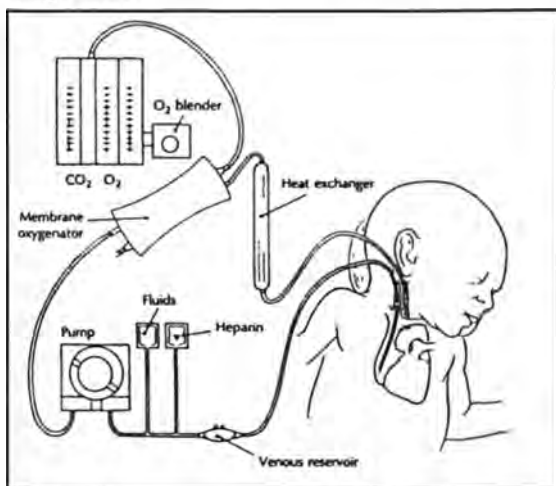
tal procedure. Most deaths occur in the early post-operative period and survival rates on 80% at one year are well maintained in the longer term. It is essential that transplantation is available as an option for patients with fulminant hepatic failure and survival rates in excess of 60% are reported. The cost of liver transplantation compares very favourably with the cost of maintaining a patient in chronic liver failure and allows those who do well to resume a functioning place in society.

ECMO - An Anaesthetic Perspective

Dr Andrew Wolf, Consultant Anaesthetist, Royal Hospital for Sick Children

The first experiments with heart lung support began in the 1930's but did not achieve sustained success until the advent of silicone based membrane oxygenators in the late 1950's. This technology is still used today and forms the essential component of extracorporeal membrane oxygenation (ECMO).

Two forms of ECMO are available. Veno-arterial ECMO is the most widely used. This is in effect a modified long term cardiopulmonary assist device working in parallel with the patient's circulation and can take over heart and lung function. The application of veno-venous ECMO has been increasingly successful in patients who have retained good cardiac function in the presence of lung failure.



The standard circuit for veno-arterial extra-corporeal membrane oxygenation

Early experiences with adults were disappointing due to lack of experience and inappropriate case selection, but recent results with neonatal lung failure have been impressive. Survival rates of 93% for meconium aspiration syndrome have been claimed, although doubts about selection criteria have been raised.

Key issues for the anaesthetist considering ECMO are early referral and understanding of the strict inclusion and exclusion criteria applied by the treatment centres. Patients on ECMO may require anaesthesia and surgery. During the early ECMO phase the lungs cannot be used at all for gas exchange. Opioid requirements increase dramatically during ECMO due to changes in pharmacokinetics and pharmacodynamics. Heparinisation is run at critical levels and can cause problems during surgery. Platelet infusions are required at regular intervals due to sequestration by the ECMO membrane.

Awareness on Bypass

Dr Gavin Kenny, Senior Lecturer in Anaesthesia, University of Glasgow

General anaesthesia is a process of reversible depression of the central nervous system which should produce amnesia of events during surgery and a lack of response to stimulation. Five separate states have been defined:

1. conscious awareness with no amnesia where the patient can respond during operation and can recall events afterwards (explicit recall)
2. conscious awareness with amnesia where the patient obeys commands during anaesthesia but afterwards has no recall of events
3. dreaming
4. subconscious awareness with amnesia (implicit recall)
5. no awareness

Explicit memory is characterised by a conscious recall of events whereas implicit memory recalls unconsciously. Implicit recall of intraoperative auditory information has been suggested to occur in up to 30% of patients. Awareness during surgery may not be identifiable from cardiovascular data and apart from the mental trauma

which results during surgery, may produce longer term effects such as mental depression, personality transformation and sleep disturbances with dreams and nightmares.

Opioids were introduced for the provision of anaesthesia in cardiac patients about 25 years ago but patients undergoing cardiac surgery then tended to have little cardiovascular reserve and opioids were found to cause minimal cardiac depression. Nowadays, the majority of patients who are anaesthetised for cardiac surgery undergo coronary artery bypass grafting and are usually fitter with better myocardial function and older techniques may result in hypertension and tachycardia. The frequency of awareness in paralysed patients undergoing general surgical procedures has been reported to be about 1% but there have been few systematic studies of awareness during cardiac surgery. Benzodiazepines, which have marked amnesic properties, are frequently used as part of the anaesthetic technique and, in addition, patients may confuse being sedated in the ICU with being aware in the operating theatre. However, one study has reported that 23% of patients recalled intraoperative events towards the end of bypass after they had been rewarmed to 37° C.

There is no accepted standard for measuring anaesthetic depth but the auditory evoked response (AER) appears to fulfil most of the requirements as a measurement technique. The AER has been incorporated into a closed-loop anaesthesia system which controls the automatic administration of propofol. The use of this system has indicated that requirements for anaesthesia appear to decline markedly during hypothermic cardiac bypass. When the patient is re-warmed, the dose of anaesthetic administered must be increased but even after full re-warming, anaesthetic requirements do not return to pre-bypass values. With the greater use of normothermic bypass in an attempt to decrease the time spent in the intensive care unit, it may be necessary to provide an increased dose of anaesthetic to prevent awareness.

The National Spinal Injuries Unit - the first year

Dr James Borthwick, Consultant Anaesthetist, Southern General Hospital, Glasgow

The National Spinal Injuries Unit opened at the

Southern General Hospital in September 1992. This was the result of the amalgamation of two spinal injuries units within Scotland - one at Edenhall Hospital, Musselburgh on the east coast and the other at Philipshill Hospital near East Kilbride in the west. A purpose built unit was designed and consists of two wards - Edenhall to manage the acutely ill patients and Philipshill to deal with rehabilitation. Most of the workload involves rehabilitation and visitors will observe a wide variety of activities especially in the sporting field as many patients are young previously fit males. The aim of the unit is to enable patients to return to as active and fulfilling a life as possible. Retraining to aid enhance employment prospects is important.

Patients arrive by road or air, and facilities for helicopter landing are available at the hospital. During the first year there were 129 new patient admissions, 78% of which were male. Cervical injuries accounted for 52%, thoracic 29% and lumbar 16%. 3% of admissions were for other problems. Of the cervical injuries, 16% were complete and 84% either incomplete or suffered no neurological damage. 57% of the thoracic injuries and 29% of the lumbar injuries were complete. 7 of the 129 patients required ventilation for periods varying from one day to indefinitely.

Not all patients with spinal injuries require surgery. 16 patients with cervical spine injuries (24%) were operated on in the Institute of Neurological Sciences by Mr Robin Johnston. Anterior fixations were carried out in five patients and posterior fixations in eleven. Six other procedures were carried out in theatre including intubation, tracheostomy and insertion of a scissor device.

For thoraco-lumbar injuries, 25 underwent surgery, approximately 43% of the total. About two thirds of these underwent PSF pedicle screw fixation, the other third, Hartshill spinal fixations. There were various other orthopaedic trauma operations and two patients received more than three general anaesthetics for trauma management. This involved a total of 35 theatre episodes after the patients were admitted to the National Spinal Injuries Unit.

Another site of anaesthetic input to these patients is the Surgical Intensive Care Unit. 20 patients from the Spinal Injuries Unit were admitted to surgical ITU, the majority (65%) for post-operative management of spinal fixation. However, five were admitted following gastrointestinal bleeding or peritonitis, one due to respiratory failure and one after a tracheostomy.

The old downstairs neurosurgical theatre was upgraded in order to function as a theatre for the spinal injuries unit. This theatre was not functional for a considerable part of the first year. Statistics about its use may be misleading, but 56 procedures have been undertaken. About 65% of these required general anaesthesia or sedation and 35% were performed without an anaesthetic or with the use of local anaesthesia by the surgeon. The majority of these have been wound debridements or electro-ejaculations for fertility treatment. Other cases have been orthopaedic, urological or minor general surgical.

From the patient mix that has appeared during the first year, it is clear that many of these patients are extremely ill and many become extremely ill. It is my opinion that recently traumatised patients with a spinal injury should be stabilised at their base hospital, prior to transfer to the National Spinal Injuries Unit. They should also be assessed at the Accident and Emergency Department at the Southern General Hospital prior to admission to the unit. This would allow further assessment of any other injuries. If a head injury is present, the patient is usually referred directly to the Neurosurgical Unit. It may be advisable due to restraints of the present staffing levels that patients with unstable respiratory problems should be managed in the Surgical Intensive Care Unit, rather than in the Spinal Injuries High Dependency Unit. Those who have had tracheostomies and are reasonably stable, may be adequately cared for in the HDU.

Patients with spinal injuries may suffer from a variety of problems, some well outwith the understanding and/or abilities of the medical staff caring for the acute problem. This can include pain management and the psychological stress of accepting the consequences of the injury. Considerable support may be required and this is best provided by a multi-disciplinary approach.

The manpower required to provide a modern high quality service may easily be underestimated.

Day Surgery - Evolution or Revolution

Dr Graham Gillies, Consultant Anaesthetist, Victoria Infirmary, Glasgow

The distinguished surgeon James Nicoll of the Royal Hospital for Sick Children in Glasgow is widely recognised as the founding father of Day Surgery. In 1909 he reported a series of 8,988 children operated on as out-patients. He highlighted the advantages of out-patient treatment but stressed the need for discrimination in the choice of cases.

In 1918 Ralph Waters described the Down-Town Anaesthesia Clinic, a modest dental and minor surgical facility which amounted to a small day surgery unit in Sioux City, Iowa. He offered good business advice advocating high standards but not economising on either gases or fees. He said: *the future for such a venture, I believe, is bright.* A further milestone in day surgery was provided by another Scot in 1955 when the eminent surgeon Eric Farquharson of Edinburgh reported a series of 485 inguinal hernia repairs performed on adults under local anaesthetic as day cases. He described the benefits of such treatment in reducing waiting lists and releasing beds for other surgical patients.

In the United States in the 1960s, purpose built units were being developed amid reports of good results and substantial savings. Two anaesthetists Drs. Reed and Ford opened a free standing surgicentre in Phoenix, Arizona in 1970. Freestanding Ambulatory Surgery Centres (FASCs) have since become popular and there are now over 1600 such units in America. In 1980, in the USA, Day Surgery accounted for 16% of all surgery. By 1990 this had increased to over 50% and the trend is continuing.

This trend has been encouraged by new techniques, technology and drugs but the real driving force appears to be cost. Health Care Insurance Companies seeking value combined with the free market health system there has provided a strong competitive impetus. That such rapid progress

has been possible in such a litigation conscious society attests to the high standards of care achieved.

In the UK in 1991, 15% of surgery was performed on a day basis with a wide variation between hospitals. In recent years there has been an increasing awareness of day surgery with reports produced by the Royal College of Surgeons of England, the Audit Commission and the NHS Value for Money Unit.

In 1990 the British Association of Day Surgery was founded. It has an annual scientific meeting and issues a quarterly journal. This year the AAGBI has a working party on Day Surgery. Day Surgery undoubtedly offers potential cost advantages and is being widely promoted to increase surgical throughput with a static or reducing bed complement. The challenge for anaesthetists is to maintain and improve quality of care as day surgery expands.

Lightning Does Strike Twice - A report of 2 cases of Amniotic Fluid Embolism

Dr Tom Ireland, Consultant Anaesthetist, Royal Alexandra Hospital Paisley

Amniotic Fluid Embolism (AFE) is an uncommon obstetric complication which carries a high mortality. Estimates of incidence vary from 1/8000 to 1/80,000 pregnancies - the former almost certainly an overestimate. Around 2,500 deliveries take place each year at Paisley Maternity Hospital and two cases of AFE were encountered within a 6 month period in remarkably similar circumstances.

Both cases occurred at delivery by Caesarean Section under general anaesthesia, presenting with cardiovascular collapse and profound cyanosis. Both patients survived the initial collapse but after a brief period developed Disseminated Intravascular Coagulation and severe post partum haemorrhage. Unfortunately the first patient died approximately four hours after the onset of symptoms. Post-mortem evidence was scanty but the case was eventually accepted as one of AFE after review of the histology. The second patient survived despite a prolonged period of abnormal coagulation and mas-

sive transfusion of red cells, fresh frozen plasma and platelet concentrates.

First described in 1926, the mechanisms causing cardiovascular changes and coagulopathy are poorly understood. Animal models have produced widely varying results which often do not reproduce the appearances in human patients. It is believed that many of the effects can be explained by circulating vaso-active substances. The prostaglandins and other metabolites of arachidonic acid have profound effects on smooth muscle, vascular tone and platelet aggregation and may in part be responsible. The diagnosis has classically been made only at post-mortem but material of foetal origin has been demonstrated in blood drawn from the right side of the heart in suspected cases. However with increased use of pulmonary artery flotation catheters in critically-ill obstetric patients has come the realisation that small numbers of cells of foetal origin may be detected in women who exhibit none of the features of AFE.

There is an obvious danger in over-diagnosing this very uncommon condition but successful management can only take place if the diagnosis is considered early enough. The diagnosis of AFE must therefore be made on clinical grounds.



Speakers at the Annual Scientific Meeting

Isonox

It is an honour and a pleasure to give a lecture to the memory of John Gillies. When I reviewed previous Gillies Memorial Lectures and read his papers, in Anaesthesia, in the Proceedings of the Royal Society of Medicine, in the Annals of the Royal College of Surgeons of England and in the Newsletter of the Scottish Society of Anaesthetists, it was clear that he was an anaesthetist of great calibre. His paper in Anaesthesia in 1948 on thoraco-lumbar splanchnicectomy and sympathectomy, where a key part of the anaesthetic technique was total spinal analgesia, was fascinating to read. He showed what an anaesthetist could do with his hands and eyes when caring for a patient in whom the pulse was not palpable. His paper was also a lesson on venous return. It was controlled by posture and, as ever, it determined the welfare of the patient.

John Gillies, apart from being a great anaesthetist, was a man who had a vital influence on the development and promotion of the specialty as we know it today. He commanded respect at every level. He encouraged his colleagues to pursue and develop their own particular interests in various aspects of anaesthetics. I had the privilege of meeting John Gillies in his retirement and I was impressed by his approachability and his kindly interest in those about him and in their activities. Dr John Gillies died in 1976 at the age of 81. Were he alive today I am sure that he would be supporting advances in anaesthesia and attention to safety and that he would approve any attempt to widen the scope of pain relief, particularly in childbirth, as long as safety was paramount.

There is nothing new in the use of volatile anaesthetic agents in subanaesthetic doses for the relief of pain. It became respectable when Queen Victoria had her eighth child. Various inhalational agents have been tried for more than 100 years, but in this country it is relatively recently that it has been suggested that providing a volatile agent as an additive to nitrous oxide might have a place in obstetric analgesia supervised by midwives. Relevant to the idea of adding a volatile agent to nitrous oxide for pain relief is an interesting observation from the Textbook of Anaesthetics, Sixth Edition, by Minnitt and Gillies in 1944. Though it was in relation to delivery

more than anything else, it was about the addition of trichloroethylene to gas and air for the relief of pain. They wrote: *Analgesia is rapidly procured, and can be converted into anaesthesia by a gradual increase in the strength of the vapour. In the majority of cases this is not necessary as the absence of pain can be obtained by gas-air-trilene mixture without loss of consciousness.*

We are still looking for an inhalational agent or mixture which will produce absence of pain without loss of consciousness. At the same time it should be manageable as a self administered mixture and suitable for prolonged intermittent use in obstetrics without unwanted or uncontrollable side effects. A step has been taken in that direction. Because it is disadvantageous either to increase nitrous oxide above 50%, or to use volatile agents alone, a combination of 50% nitrous oxide with a low concentration of a suitable volatile agent would appear to be worth consideration. This lecture is concerned with premixed isoflurane, nitrous oxide and oxygen. But first we need to remind ourselves about the behaviour of premixed nitrous oxide and oxygen by itself. The economical filling pressure for medical gases is 137 bar (which is 13,700 kPa or 1,987 lbs force/inch²). The pressure unit, 1 bar, is convenient in gas technology as it is near to average atmospheric pressure. Before 1961 it was not thought possible to store oxygen and nitrous oxide together at the economical filling pressure of 137 bar. The condensing pressure of nitrous oxide is 44.9 bars at 15°C. Allowing for the enhancement of the vapour pressure of liquid nitrous oxide by high pressure oxygen would theoretically allow storage at 100 bars, but not below 15°C, when mixed 50/50 in a single gas phase. For practical purposes a cooling of medical gases down to 0°C must be allowable without phase separation occurring.

Testing to see what would happen to nitrous oxide under pressure with oxygen was undertaken in 1961. Subsequent events led to the marketing of premixed nitrous oxide and oxygen in a 50/50 mixture under the name of Entonox. In 1965 it displaced nitrous oxide and air which up to then had been used by midwives on their own responsibility since 1936. At the same time trichloroethylene and air which was also available to midwives seemed to be abandoned by them quite

spontaneously, presumably because of its cumulative effects.

Analgesic medication for the relief of pain in labour is broadly confined to three methods:

- narcotic analgesics by intramuscular injection.
- self administered inhalational analgesia using Entonox.
- regional analgesia by epidural injection.

The first two are administered by midwives on their own responsibility. Although Entonox is variously estimated to have good effect in only about 50% of mothers, it does in fact help a greater proportion to cope with their labours. This form of medication is under the control of the mother as well as the midwife and its effects can be initiated or terminated immediately. No elaboration is needed on the great effectiveness of epidurals in providing total pain relief but not every mother wishes this for her labour. Many would prefer to be able to cope with less invasive help. Furthermore some units are not able to provide this service on a 24 hour basis. There are some mothers who only agree to have an epidural during labour when they feel that their pains are becoming unbearable and that they can no longer cope. There is clearly a need for something more powerful than Entonox, but without unwanted side effects. Two recent papers, one in the *International Journal of Obstetric Anesthesia* in 1992, and one this year in *Anaesthesia*, have shown that adding isoflurane in low concentrations to Entonox might meet this need.

It was shown that the addition of isoflurane to Entonox provided more pain relief than Entonox alone. This is not a surprising result. What is important is that unwanted side effects have not so far appeared to have been much of a problem. Isoflurane in the above two studies was added to Entonox by inserting a vaporiser in series with the breathing hose. If on the other hand isoflurane was to be premixed inside the Entonox cylinder the advantages which were originally outlined for premixing nitrous oxide and oxygen would then also apply. They were safety, simplicity, portability, accuracy and economy. To these can be added that it is labour-saving and unaffected by tilt.

These seven points of advantage are self explanatory but two of them benefit from elaboration.

Firstly under 'labour-saving':- If a midwife in a normally busy and short staffed unit has to find somebody else who has the drug cupboard key in order to fetch the isoflurane to top-up a vaporiser, and if a second person has to check the filling, a subconscious incentive to forget the vaporiser will be created. Furthermore where a vaporiser is attached to a free standing cylinder neither are likely to empty at the same time, so that replacement activity will be asynchronous. Alternatively both might be replaced at the same time when one or other still has contents left so that there will be waste. Portability is of course no advantage if the gases are piped. However some mothers nowadays wish to deliver away from the piped outlet e.g. on a mattress on the floor, or under water in a waterbirth tank. Having yards of breathing hose running along the floor would not be a good idea.

The problem of premixing is temperature related. Premixed nitrous oxide and oxygen without the addition of isoflurane has a cooling problem. Cooling may be due to external cold or to rapid emptying and phase separation takes place at -7°C . Energy is required for single phase reconstitution - external heat, followed by mechanical mixing movement if rapid reconstitution is required.

A most important factor is that a single phase gas mixture is not restored immediately by rewarming. The phase separated dense layer of nitrous oxide at the bottom of an upright cylinder takes days to re-enter an evenly mixed gas phase with oxygen unless mechanically agitated. A test cylinder filled with Entonox (at 137 bar at room temperature) was placed in a deep freeze cabinet for 24 hours and then taken out and stood upright for over 24 hours in a room which remained between 15° and 20°C . Gas samples were taken via a needle valve attached to the cylinder head and measured for oxygen concentration. The first sample was 77% oxygen. The cylinder was then inverted and a second sample yielded 28% oxygen. Oxygen concentrations of samples are plotted according to whether they were taken in the upright or inverted cylinder position. A total of seven inversions was made and the final reading for oxygen was 54% which was close to the original 51% when the cylinder was filled. It required all this amount of mechanical agitation to get back close to an even gas mixture, even after rewarming! It had always been thought that three inversions would be enough.

The printed care label on commercial Entonox cylinders includes the simple statement - *Store cylinder above 10°C for 24 hours before use.* Storage position and mechanical movement is not mentioned. This must assume that the cylinders have never been exposed to phase separating conditions, which is a tribute to our mild and pleasant climate all the year round. The 10°C recommendation is of course important in that it should prevent the use of cylinders already below 10°C. Otherwise it is quite possible that heavy use or rapid inadvertent excessive loss of gas could take the cylinder contents below -7°C, which is the separation (or pseudocritical) temperature of nitrous oxide 50% in oxygen.

A second experiment investigated placing cylinders horizontally for recovery at room temperature. The first sample was taken with a cylinder still horizontal and before it was moved. The second sample was taken in the inverted position where it shows a much higher oxygen concentration than in the first experiment and this confirmed what is already known, namely, recovery to a single phase state is more rapid if the interface of separated layers has a greater surface area, in this case produced by the horizontal position.

Domiciliary midwives are allowed to warm their small portable Entonox cylinders in water up to 37°C for five minutes if the cylinders have been exposed to cold. They then have to invert them three times. In the laboratory I warm my cold-exposed or phase separated test cylinders in buckets of water at 60°C, until the shoulder is warm to touch, but I keep an eye on the pressure gauge.

A third recovery experiment on Entonox involved removing the cylinder from the deep freeze and then immediately placing the lower half of the cylinder in a bucket of hot water which was replenished until the shoulder of the cylinder became distinctively warm to touch. From other experiments this is known to be sufficient for adequate rewarming inside. Six inversions were insufficient for restoration.

This experiment was then repeated with the cylinder placed on a mechanical roller at 30 revs/min for 12 minutes instead of undertaking inversion manoeuvres. This was sufficient to restore a single phase but I have not yet worked out the minimum rolling time necessary.

ISONOX

When Isoflurane is mixed with Entonox it is called Isonox. Before investigations of Isonox are described, a visual break will be taken by showing a series of slides illustrating the facilities provided in the Hyperbaric Research Unit of the Department of Environmental and Occupational Medicine of the University of Aberdeen. These were set up by Dr. John Ross who is a Senior Lecturer in the department as well as Honorary Consultant Anaesthetist to Aberdeen Royal Hospitals. He is of course, also my boss!

To prepare Isonox a measured quantity of isoflurane is aspirated into the vacuum evacuated cylinder from a glass syringe via a 26 gauge steel spinal needle inserted through a diaphragm on the connector assembly. The diaphragm is then isolated and the cylinders placed on the weighing scale. The readout is for tare weight and the filling sequence is commenced from the bank of cylinders. The weight of Entonox decanted into the cylinder is recorded to the nearest gram, and the cylinder is then hoisted into the deep freeze cabinet. This manoeuvre is part of the filling cycle. I have used some of my old sailing dinghy pulleys to avoid the strain of heaving cylinders in and out of the cabinet and thereby save my back!

During overnight freezing the internal temperature of the gas space within the cylinder reaches a valley plateau of -35°C in 10 hours. This has been confirmed with a thermistor inside one of the cylinders. According to the amount in the bank cylinders and according to the size of the test cylinder the first filling usually manages to achieve 2,000 - 2,500 gms of Entonox. When the test cylinder is taken out of the deep freeze its pressure is down to about 55 bar according to how much went into the first filling. It is then immediately connected to the manifold and the second filling takes place and a predetermined weight of Entonox is allowed to flow in. After the warming and rolling procedure the cylinder contents are analysed for isoflurane and oxygen concentrations, both in the upright and in the inverted positions, to check for evenness of the mixture and a record is made of the concentrations of isoflurane and oxygen. The samples are checked with a Datex Normac TM analyser for isoflurane and with a Servomex for oxygen. The outputs are fed into the Rikadenki three channel recorder. The

width of recording space on the paper is 25 cms and on it are marked 100 divisions. Each 1/100th of the full range is adjusted for 1% oxygen and for 0.01% isoflurane. Changes are made when necessary to accommodate full paper width deflections for 5% isoflurane, the limit of the analyser. The third channel is used to record temperature when required.

There is now a cylinder attachment which has been newly acquired for placing a thermistor inside the cylinder. When thermistors are used outside the cylinder they are screened with polystyrene, closed cell neoprene from an old wet suit and foil from a space blanket.

Pump evacuation experiments were undertaken using a Morgan sinusoidal pump as an artificial patient, a bag-in-a-bottle and wide-bore breathing hose plus unidirectional valves. A Harvard dry gas meter is attached. The pump is connected by a standard breathing hose to the Entonox valve. Adjacent to the Entonox valve is the gas sampling point which is at the commencement of the breathing hose. Positioning cylinders upside down required an old oxygen cylinder trolley rescued from replacement oblivion. It was sprung apart with a car jack to accommodate the somewhat fatter Faber cylinders. The base of the trolley is easily lifted up for the inversion manoeuvre. When inverted a simple rope sling around the neck of the cylinder stops it bouncing the sampling assembly on to the floor. It should be pointed out that the fill/freeze/fill cycle enables one to fill a test cylinder with Entonox at a pressure (when room temperature is restored) well above the 137 bar of any full supplying cylinder in the bank.

Premixed isoflurane, nitrous oxide and oxygen is called Isonox. A prefix number refers to the percentage of isoflurane vapour and a postfix number refers to the percentage concentration of oxygen. When Entonox without added oxygen is used to make Isonox the postfix of 50 is applied. The actual percentage is often about 51% oxygen.

Cooling experiments with Isonox -

A full cylinder of 0.31% Isonox 50 was deep frozen for 24 hours and was allowed to recover at room temperature, just as in the Entonox experiments described earlier. Reversion to a single

phase was almost complete after seven inversions. Note that the cylinder was inverted six times before taking a sample in inversion otherwise a very high concentration of isoflurane would have squirted out through the needle valve and would have been wasted. A second experiment confirmed that 24 hour recovery in the horizontal storage position allows a quicker recovery. In this case the second sample taken which was in the inverted position was not so high a concentration of isoflurane that it would have been wasteful.

The next set of experiments was with 0.29% Isonox 71 and recovery is again quicker when the cylinder is stored at room temperature in the horizontal position. Note also that the figures show that recovery to a single phase is more rapid when the nitrous oxide concentration is lower. However once separation of nitrous oxide and isoflurane has been allowed to occur any difference between different compositions with regard to oxygen in the amount of mechanical mixing required after rewarming is not of great practical importance. If phase separation has occurred all Isonox and Entonox cylinders should be treated the same way after rewarming by any method i.e. that they should be mechanically rolled for a set period of minutes.

Preliminary investigation of mixtures of nitrous oxide, oxygen and isoflurane under pressure had been carried out by Dr Colin Rodgers when he was a Senior Registrar in our Department and Clinical Lecturer in the University of Aberdeen and who is now a Consultant Anaesthetist in Carlisle. He studied pressures up to about 76 bar. His experiments showed that difficulties would arise if the concentration of isoflurane was to go above 0.4%. These preliminary experiments led the way to present investigations of the mixtures at 137 bar or above.

Separation of isoflurane will occur if a cylinder of 0.41% Isonox 50 is cooled overnight in a refrigerator with a temperature nadir of 1°C. Shortly after removal from the refrigerator continuous sampling at 2 litres/min was commenced with the cylinder upright. Because gas is aspirated from the sampling reservoir via the Datex Normac at 200 mls/min and then pushed on to the Servomex analyser it takes at least two minutes before the recording pen for oxygen nears its plateau level. Initial sampling percentage of isoflurane with the

cylinder upright and then horizontal was 0.28%. When the cylinder was inverted the isoflurane percentage jumped beyond the measuring capacity of the analyser. Some of the isoflurane had liquefied and settled in the dependent part of the cylinder. Reversion to the horizontal and then the upright position caused the isoflurane percentage to become lower again. The isoflurane was now issuing with a small sputter. The split in the isoflurane percentage curve into two parts marks the upper and lower limits of the sputter. Sputter is explained later. In this experiment the needle valve was not connected directly to the cylinder as an Endurance regulator had been interposed. At 10.5 minutes from the initial sample the needle valve and then the cylinder were closed so that some gas mixture was trapped in the regulator assembly behind the needle valve. When the needle valve was opened at 16 minutes to release the trapped gas remnant a 2.0% isoflurane spike was briefly recorded. This spike was due to revaporization of isoflurane condensate in the sampling assembly. The whole experiment was repeated with 0.4 1% isoflurane in oxygen only. This time, under exactly the same temperature conditions, there was no phase separation of isoflurane and the mixture remained even throughout.

These and other experiments enable the following statement to be made: Isoflurane premixed with nitrous oxide and oxygen at 137 bar at a given temperature will remain in a single phase at a higher concentration the higher the oxygen percentage is.

Conversely the higher the nitrous oxide concentration is the lower is the achievable isoflurane concentration that can be maintained in a single phase mixture at a given temperature. Experimental work so far has shown that the phase separation temperature as detected via a dip tube, in a full cylinder of 0.25% Isonox 50 lies between -3 and -4°C for isoflurane. The phase separation temperature or pseudocritical temperature for nitrous oxide remains in the region of -7°C unless future experiments show otherwise.

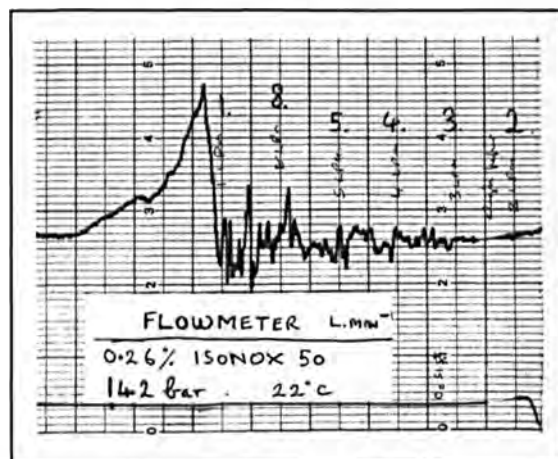
In addition to the phase separation problems associated with Entonox, Isonox has additional cooling problems.

- Valve Sputter
- Revaporization peaks
- A more complex condition for phase separation

Valve Sputter. When Isonox flows across the point in a valve from a high pressure storage source to a low pressure area there is intense cooling at that point. This causes condensation of isoflurane immediately downstream. The condensate is revaporized as it is pushed forward by continuing gas flow. This condensation revaporization cycle appears as sputter on the output recorded from the analyser. Sputter is increased if flow is increased or if the pressure drop is greater. It is decreased when the oxygen percentage is higher.

Figure 1 shows the effect of different flow rates. A needle valve was attached directly to a cylinder of 0.26% Isonox 50 at 142 bar in a room with a mid air temperature of 22°C. The recording paper speed is 1 cm/min. When the flow is increased to 3 litres/min a distinct sputter appears. It becomes quite marked as 8 litres/min is reached. The sputter ceases when the flow is reduced to 1 litre/min. The slide also demonstrates the revaporization peak from the condensate distal to the needle valve because the gas is now being expelled slowly. In this case the peak reaches 0.47% isoflurane for a short period.

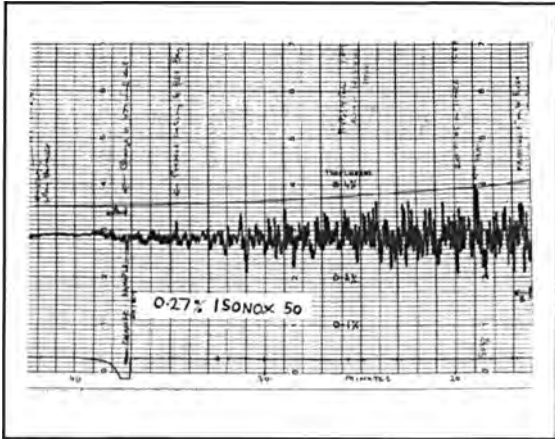
The effect of increasing Isonox flow rate on isoflurane sputter.



The record runs from right to left. Note high supply pressure. Each major row represents 0.1% isoflurane. Paper speed is one small column per minute. Hand written numbers 2 to 8 and 1 indicate Isonox flow rate in litres per minute. Note the revaporization peak when the flow is dropped from 8 to 1 litre per minute.

When a full cylinder is demand evacuated via an Entonox valve by a Morgan sinusoidal pump with a tidal volume of 2 litres at a rate of 16 cycles/min, sputter is more marked at the beginning and is shown in figure 2. Sputter virtually ceases when the cylinder pressure is down to about 55 bar. Sputter is increased if the source under pressure cools towards separation temperature. Sputter ceases at higher pressure e.g. about 82 bar in the case of 0.28% Isonox 70 as the oxygen percentage is higher. Sputter is not important if the mean isoflurane concentration inhaled is the same as the supply concentration, and this is in fact the case during clinical use.

Decline in isoflurane sputter during demand evacuation of a full cylinder of Isonox

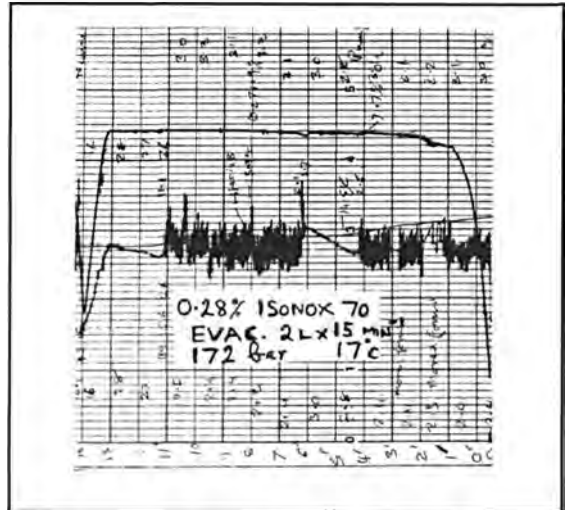


The record runs from right to left. Each major row represents 0.1% isoflurane. Paper speed is one small column per minute. Sputtering ceased at 39 minutes when the cylinder pressure had fallen to 55 bar.

The next consideration is the revaporization peak. Inhalational analgesia is intermittent. There is condensate in the first stage pressure reduction chamber of the Entonox regulator. This is at about 13 bar for the cylinder type regulator. When the patient inhales after a rest period there is a revaporization peak but it becomes sufficiently attenuated by the first breath that it is not noticed by the patient. Our experience to date with over 47 mothers in labour who have used 0.25% Isonox 50 confirms this. The revaporization peak is shown figure 3 from a pump evacuation experi-

ment. Paper speed is 1 cm/min. The pump is switched off first for two minutes and then again for three minutes, reading from right to left. During the pause the line to the analyser remains connected to the breathing hose adjacent to the demand regulator. The pump end, that is the patient end, of the breathing hose is disconnected to allow the analyser to aspirate gas at a rate of 200 ml/min back along the hose. When the pump is turned on there is a brief revaporization spike from the condensate remaining in the regulator.

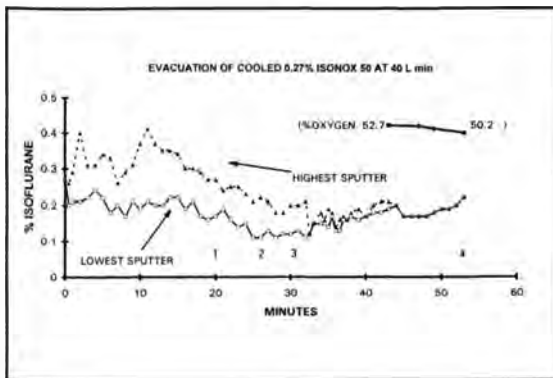
Isoflurane revaporization peaks following pauses during demand evacuation of Isonox.



The record runs from right to left. Each major row represents 0.10% isoflurane. Paper speed is one small column per minute. For each of the two pauses shown the Morgan pump was stopped. At the same time the breathing hose was disconnected at the pump end to allow unobstructed continuous sampling by the analyser from the Entonox regulator end. The decline in isoflurane concentration when the second pause was run for a third minute is due to the breathing hose being emptied. Both pauses are followed by revaporization peaks when the hose is reconnected and the pump restarted.

Both sputter and revaporization peaks have not been a clinical problem. Any cooling due to heavy clinical use in the labour room has not been a problem either. Even though there can be very

heavy demand during a contraction the demand is not sustained as contractions are intermittent. Therefore the cooling effect is not sustained. Nevertheless it was thought worthwhile to undertake an experiment with the Morgan pump beyond clinically possible limits; just to see to what extent the contents could be made dangerous in composition. This is illustrated in figure 4.



Isoflurane concentration during demand evacuation of a cooled full cylinder of Isonox is shown. Pump stroke volume is 2 litres. Data points for upper and lower traces are the highest and lowest spikes of isoflurane concentration recorded for every one minute period on the original trace. Independent numerals 1 to 4 correspond to written entries on the original trace as follows

- 1) *Surface of Entonox regulator and yoke frosted all over;*
- 2) *Frosting has extended half way along the breathing hose;*
- 3) *Whole surface of cylinder covered by frost;*
- 4) *Pump labouring on empty cylinder. Pump stopped. This was a beyond clinically possible limits experiment.*

The highest and lowest peaks in one minute segments of the original record tracing are the data points for the upper and lower curves. The full cylinder of 0.27% Isonox 50 had been overnight in a refrigerator which had fallen to 4°C. At the start of the experiment screened thermistors on the surface of the cylinder read between 7.4 and 9.3°C. The Morgan sinusoidal pump was set to a tidal volume of 2 litres and at a rate of 20 cycles/min. The cylinder was evacuated continuously

via the Entonox demand regulator. The chart shows a marked sputter range. During this fast emptying the contents inside the cylinder would have reached well below freezing as the cylinder became very frosted all over. Some isoflurane would clearly have condensed and fallen to the dependent part of the cylinder. The pump was stopped when the demand regulator was labouring and the pump was producing marked negative pressure swings due to the cylinder approaching empty. At no time was a hypoxic mixture delivered. Neither was the mean inspired concentration of isoflurane beyond 0.27%. At the end of the experiment the cylinder was disconnected and heated to expand the remaining gases. Sampling at the cylinder valve with the cylinder upright revealed an isoflurane concentration over 5% and an oxygen concentration of 43.7%. Lessons from this and similar experiments could be expanded but one is that a vertically standing cylinder should be left vertically standing in use and during pause periods. Premixed gas cylinders may be used while placed horizontally but not of course inverted during cold conditions.

To draw attention to interesting things that can be done with gas cylinders I have a theatre anecdote. I once needed to make some nitrous oxide snow for a plastic surgeon as the carbon dioxide machine wasn't working. This was done by opening up a full cylinder of nitrous oxide in an inverted position and catching the blast in a sterile towel. This was done some years ago because nowadays it would break too many rules. Unfortunately when the cylinder started to freeze under the arm of the operating department assistant it caused a certain amount of dancing about, and the noise of the escaping gas and the widespread excitement also upset the general surgeon in the other theatre next door.

Experience of use of 0.25% Isonox 50 in the labour ward indicates that -

- Sputter is not discernible by the patient
- Revaporization peaks cause no problem
- Phase separation temperatures are not reached
- The existing Entonox demand regulator may be used.

There is no indication to reduce the concentration of nitrous oxide for labour ward use but there could be a need in painful procedure situations where inhalation for more than a few minutes would demand this. If that is the case the following factors may be advantageous particularly in outdoor accidents in winter. Decreasing the nitrous oxide concentration will result in a lower separation temperature for isoflurane in Isonox, decreased valve sputter and decreased re-vaporization peaks.

At this point the opportunity can be taken to provide a reminder of the limitations of nitrous oxide. 50% nitrous oxide cannot be breathed continuously by most subjects without their becoming inaccessible to communication. The findings illustrated are those in volunteer American medical students. For optimum pain relief for the 80% who were normal reactors, a continuous inhalation of 30% nitrous oxide is sufficient. At 50% they would become amnesic and inaccessible after several minutes. The only reason that 50% nitrous oxide works without too many problems in the relief of pain in labour is that its inhalation is intermittent and not sustained. At the same time if sometimes it doesn't work outside the labour ward situation it is often because its uptake, action and excretion is not understood and there is a general failure in good inhalation technique. With regard to labour ward use a recurrence of the pains promotes a steep learning curve, even if inhalation technique is not very good to start with.

In summary: 50% nitrous oxide produces analgesia of rapid onset with no accumulation and the maintenance of consciousness. Isoflurane 0.2-0.25% produces analgesia of fairly rapid onset with mild accumulation and the maintenance of consciousness. Isonox produces more analgesia but with maintenance of maternal co-operation, uterine contractility and the activity of the baby at birth. It gives another choice for mother and midwife and may lead to a reduction in demand for epidurals.

The investigations of Isonox outlined and illustrated in this talk have been concerned with whether it is possible; whether it is safe; and what conditions make it unsafe. Isonox is certainly possible. The conditions required to keep

it in a safe condition are practicable. Safety in use is helped by the fact that it is self administered and also that the midwife can remove it or can replace it with Entonox at will. It is difficult to say whether anything will come of Isonox. Entonox used properly serves most people well. Even if nothing does come out of Isonox it remains a manifestation of the constant search for improvement in our specialty. Searching for improvements in anaesthesia in all its aspects was the hallmark of Dr John Gillies to whom this lecture is dedicated.

I would like to acknowledge the facilities granted to me by the University of Aberdeen and the Aberdeen Royal Hospitals NHS Trust. I have had help from individuals too numerous to mention but I would like to make mention of the technical help without which no University can function:- firstly from Mr George Henderson of the Department of Environmental and Occupational Medicine and secondly from Mr Edward Stevenson and his colleagues in the mechanical workshop of the Department of Biomedical Engineering and Biomedical Physics.

I have a special thank you for my wife, Anne, who thought I was supposed to have retired



THE NORMAN ROLLASON MEMORIAL LECTURE

The North East Society of Anaesthetists has established a Norman Rollason Lecture to be given annually at the all day meeting of the Society which is held in Ballater in May. The inaugural lecture was given by Professor Alastair Spence and the text of this is reproduced in full below.

STANDARDS IN ANAESTHESIA

ALASTAIR A. SPENCE

CBE, MD, FRCA, FRCP Glas & Edin, FRCSEd
PROFESSOR OF ANAESTHETICS,
UNIVERSITY OF EDINBURGH

Norman Rollason belonged to a distinguished group of Scottish anaesthetists who, together and separately, in the post war years developed the emerging discipline of anaesthesia within the National Health Service. They did this, of course, through teaching and practice, and achieved that end through building anaesthetic departments, a concept which is so familiar to all of us now that we may forget that they were very much a creation of the 1950's and 60's. The route to a career in anaesthesia throughout that time, and since, has been through apprenticeship in which the primary reason for employment was to assist in the delivery of health care within the hospital. It is a matter of common acceptance that our National Health Service has been for many years over dependent on the trainee grades to sustain service. Indeed we are so uncritical of that that any attempt to reduce trainee numbers, as is being done at the moment, induces genuine anxiety in the minds of consultant and other career grades. It is worth stating now that such heavy dependence on trainees for the provision of clinical services is unique to the United Kingdom. In almost no other country of the developed world would the present NHS service provision be acceptable to either doctors or patients.

Norman Rollason and his contemporaries did much to set standards within their departments to bring conformity in training. In modern day parlance they might be said to have introduced "guidelines" for the teaching of anaesthetic methods. They also set a standard - often against considerable opposition - for the creation of some type of academic ambience: the departmental meeting or seminar, encouragement in research

and development, and so on.

The formation of the Faculty of Anaesthetists of The Royal College of Surgeons of England, in 1948, provided a national framework for establishing standards within the British medical collegiate system. Admittedly, the devices for quality assurance were slow to emerge and amounted in the first instance to the Fellowship examination based on the FRCS. Nevertheless it was a start, building on the DA qualification which had been introduced before the war by the Conjoint Board. It is curious now to realise that none of the medical Royal Colleges felt the need to establish anything more substantial such as tuition, recognition of posts for training etc. That process did not really start effectively until 1968 when the Royal Commission chaired by the late Lord Todd, a Glaswegian, chastised the Colleges for their relative inertia in relation to quality in education for doctors. It was from this point that continuing programmes of education were developed by Colleges together with an intensification of the arrangements for the recognition of training posts. The systems that we have in place nowadays through the Royal College of Anaesthetists Examination Committee, the Hospital Recognition Committee and the Joint Committee for Higher Training of Anaesthetists are all derived from these 1960s developments.

In June 1992 the United Kingdom Departments of Health convened a meeting of College Presidents with leading officers of the General Medical Council and the BMA to consider the way forward in the light of infraction proceedings that had been brought against the UK Government by the European Community. The problem, which had attracted considerable public attention through various attempts at litigation, related to the fact that within EC law, a doctor who is designated as a specialist of the European Community should be regarded as academically equipped to apply for a specialist position in any country of the community. In most if not all specialties of the United Kingdom the ethos had not been followed. For example, in anaesthesia the Faculty and then the College was prepared to indicate to the General Medical Council that someone who had passed the Fellowship examination and had fulfilled one year of further training in a hospital recognised for

Higher Training (although the doctor did not have to be in a Higher Training programme) could be regarded as a specialist for EC purposes. Of course, the published educational requirement for appointment to the consultant grade in the United Kingdom is the possession of a certificate of Higher Training or the equivalent. Thus we set a lower standard for Europe than we expected in this country. The corollary was that doctors from Europe with the specialist designation were not regarded by Advisory Appointments Committees as being of an acceptable standard; this was clear infringement of Community law.

The first British problem was that we had never used the term "specialist" within the medical career structure, although it was commonly used in lay conversation. Second, there was no clear definition of what had to be done to become a specialist should the term be introduced in Britain. In the course of discussions it became clear that many of the Royal Colleges, including our own, were well advanced in addressing the issues of streamlining training. In our case there was much concern on the part of the Council of The Royal College of Anaesthetists that many people regarded the training period of anaesthesia as being very much longer than the minimum requirements set in guidelines would require. There was also an almost universal problems of the "post-fellowship period", the gap between completing the Fellowship examination and securing a senior registrar post so that Higher Training might proceed. With the passage of time this period had become institutionalised with doctors planning and seeking advice for a programme of post-fellowship activity in research or experience overseas. While many gain benefit from these activities it is a period not defined in length and without any structured content. Perhaps worst of all the Royal College as the quality assurance agency, had almost no means of assessing the worth of what had been done.

In September 1992 informal discussion ended in the belief that there was a feasible structure for solving the "European" problem and the Secretary of State for Health set up a committee chaired by Dr Kenneth Calman the Chief Medical Officer for England and Wales, to examine the issues of specialist training, and to report. The Committee's work was to a large extent delegated to three sub-committees with the following broad remit.

- A structured training programme to achieve a continuing or "seamless" educational process from the start of specialist training to its termination.
- An examination of the structure and function of Advisory Appointments Committees.
- To explore with advice the adequacy of British "harmonisation" with European Community law.

In the case of the College of Anaesthetists, the Council, after much consultation and discussion, concluded that a seamless training programme in anaesthesia could be completed within six years. In very general terms this would be made up of three years of basic or core study of anaesthesia together with preparation for, and hopefully passing, the requisite examinations for the Fellowship. One year would offer a period of "elective" activities. These could range from involvement in research, experience overseas, secondment in a different specialty field or even (to put it politely) "a period of consolidation" for those who were finding it something of a struggle to maintain the pace. Two years at the end of training would offer experience and content in line with the present Higher Professional Training programmes. One year would emphasise for special study much of the modern idiom of our health service: management, audit, training in teaching and training. The activities of the first of the last two years could be continued to the second year, with some aspects of study in greater depth. Additionally, however, we wished to make provision for those who are quite certain of a wish to pursue a particular specialty interest (such as cardiac anaesthesia, neuroanaesthesia, pain management etc.) to be allowed to commence these studies in depth in the last year of specialist training. Clearly it would be undesirable if every trainee were to take the critically important decision to develop a special interest in that year if the prospect of employment in that specialty, or the commitment to the specialty, was not assured.

Within the Calman Committee structure, attention was given to defining the beginning and end of specialty training. The start of specialty training occurs on the first day of the first year of the recognised training programme. The termination of specialty training is, as I have mentioned, at the end of six years in anaesthesia. In other disciplines the period of training will be different because it is the prerogative of each College to set

its own criteria. On completion of training the doctor will be eligible for a designation CCST (Certificate of Completion of Specialist Training). The recognition of that certification rests with the General Medical Council who, however, will act on a signal of approval from the appropriate college. The CCST indicator will be published in the Medical Register together with the year in which it was granted and the country in which the doctor has obtained training recognition as a specialist. One of the paradoxes of our European harmonisation is that the prescribed period of specialist training differs from one EC country to another. Although there are moves to bring the total duration of training, and its content, into line between the countries it may be some years before that can be achieved. For those who express concern that there may be a type of "back door" to specialist recognition from a country in which the standards are not so demanding as in the UK it should be emphasised that the European specialist recognition does not guarantee appointment as a specialist in any country of the European Community. It is simply a device by which a doctor becomes eligible. If in any appointments process a doctor is not considered to be suitable for the post that has been described no appointment should be made. Essentially all that will change is that it is a contravention of European law to indicate that someone who is designated as a European specialist has been unsuitably trained.

Although we appear to have provided a framework in which the original problem that caused the Calman Committee to meet can be solved, there is still much to do. Government must respond to the Calman Report and most people consider that there will be a need for injection of capital in order to facilitate change in the staffing structure and the deployment of trainee doctors in a training-led rather than a service-led context. Also, there are several very important additional areas that need to be considered in the course of the changes and these have hardly been addressed. They include the future training of overseas doctors, the development of an academic career for those in clinical training (lecturers etc.) and the unique and changing needs of doctors in the armed services.

One other essential point in relation to seamless training. It is now widely recognised (particularly by Royal Colleges and Postgraduate Deans)

that an effective training programme for the specialties can only be pursued if there is much more professionalism in relation to the methods and devices for postgraduate training than has existed previously. There is also a need to ensure that there is a continuing process of assessment of progress throughout the whole of the period of training (such assessment, which would occur within the training institution, is referred to as formative assessment). The summative assessment which is the process which we recognise in national examinations will continue to have an important role also, but there will be a need to modify national examinations to take account of the new approach.

Continuing Medical Education

Just as we are in the midst of a revolution in specialty training, stimulated by outside and to some extent unexpected influences, so there is also pressure for a revolution in attitudes to the continuing education of doctors. I believe that most doctors have an innate enthusiasm for keeping up-to-date in the areas in which they practice. Sadly, there is a small minority who do not and they can have a huge impact on the public image of medicine when practice goes wrong to the extent that legal proceedings of one kind or another are commenced and public reporting ensues. In such circumstances it is not surprising that a variety of lay people, notably Members of Parliament and managers within the National Health of Service, ask by what means we can be sure that a doctor, in mid career for example, is really up-to-date. The fact is we have no means at our disposal. As a consequence there has been much pressure on the Royal Colleges to introduce guidelines and some type of scoring system for continuing education. The Royal College of Anaesthetists' first attempt at that has been published and indicates, in common with several other colleges, a proposal to have a system of cognitive points in an attempt to quantify, albeit very crudely, what has been undertaken within a given time period. Neither I nor anyone else could guarantee to society that evidence of fulfilling a programme of Continuing Medical Education brings quality in the doctor. Conversely, however, I am in no doubt that a doctor who persistently does not take part in some type of continual education cannot offer a satisfactory quality in patient care.

There is an additional dimension in Continuing Medical Education. Having accepted that the majority of practitioners are well motivated to educate themselves there needs to be some type of sanction imposed upon those who are refractory to continuing education. Council of the Royal College of Anaesthetists, in common with most other Colleges, supports the principle of recertification of a specialist, probably on a five yearly basis. This is very much in line with what is occurring in the United States and likely to occur in several other countries throughout the world. To those who feel that their professional freedom is being interfered with by these processes I would draw their urgent attention to the major embarrassment suffered when we make the headlines in an unfavourable light. If we cannot do more than we have done to give assurance to the public that they are "safe in our hands" then I believe that pressures will operate further from outside and some system of re-examination would have to be instituted. Re-examination makes no sense in specialist medicine because most specialists become more and more specialised within their specialty and the best of them have no peers who could examine them; equally their breadth of knowledge diminishes naturally without detriment to their usefulness to society.

In my present period as President of the Royal College of Anaesthetists, in which the College has been dignified by the grant of its own Charter I have tried to emphasise to all fellows the main functions of medical Royal Colleges within our society. The clearest and simplest example comes from the Royal College of Surgeons of Edinburgh which at the beginning of the 16th century received its Charter, first from the Town

Council and then from James IV. Immediately before that the practice of surgery in Edinburgh was in the hands of one of the more disreputable craft groups of the city. Thieving, drunkenness and murder were a very regular part of the scene and there was much to fear. With the Charter came the clear definition of the eligibility of being admitted as a Fellow. Only those of a particular class and type could be considered. They had to have the ability to read and write, master the signs of the zodiac, and be knowledgeable in anatomy. In return they were privileged to be given a certain proportion of hanged bodies from the Grassmarket together with rights to trade in aqua vitae within the city. Nearly 500 years later the new Royal College of Anaesthetists has been allowed to continue that tradition if not in such stark terms. We have the privilege of self regulation of those within our discipline through setting appropriate standards and auditing their effectiveness. Our responsibility is to the public at large and embraces the need to ensure that we are not backsliding in relation to standards compared with what is necessary and feasible.

In the forty years or so since Norman Rollason and his contemporaries were making their essential contribution to the development of the good standing of anaesthesia much has happened, and much more is likely to happen in the next forty years. I would like to think that our distinguished predecessors would understand and approve of what we are doing today.



Professor Alastair Spence receives a commemorative glass bowl from Mrs Margaret Rollason after delivering the lecture.



Professor Spence receives a gift of crystal for the Royal College of Anaesthetists from Dr John Ross, President of the North East of Scotland Society of Anaesthetists

ANAESTHESIA FOR TRAUMA - THE BALTIMORE EXPERIENCE.

DR PAUL D MARTIN, SENIOR REGISTRAR, ABERDEEN ROYAL INFIRMARY

Introduction

Since 1989, the Department of Anesthesiology at the R Adams Cowley Shock Trauma Center at Baltimore in the USA has regularly employed British trained anaesthetists at the Attending (consultant) level for periods varying between one and two years. There have been sixteen holders of these positions to date, six of whom have come from Scottish departments. I spent a year there between August 1992 and September 1993 and this article is a description of my time and experiences there.

The R Adams Cowley Shock Trauma Center is named after its founder, a thoracic surgeon, who appreciated the magnitude of the epidemic of trauma that is now recognised worldwide. Moreover he realised that the reversibility of the pathogenesis of multiple injury relied on expert attention being administered very quickly and it was he who described the concept of the golden hour of opportunity for intervention before irreversible organ damage ensued. He succeeded in persuading politicians to support the establishment in the early 1970s of a hospital dedicated to the care of injured patients in Baltimore in the eastern state of Maryland in the USA. In 1989 the facilities were upgraded in a new building which bears his name and is the largest free standing Trauma Center in the world.

MIEMSS

Essential to the provision of appropriate hospital care of injured patients is a well organised system of field care and rapid, safe transport. This is provided by the Emergency Medical Systems (EMS) which together with the Trauma Center and the National Study Center for Trauma and Emergency Medical Systems constitutes the Maryland Institute for Emergency Medical Service Systems (MIEMSS) which cares for every emergency patient in the state of Maryland.

MIEMSS comprises more than 49 hospitals with 24-hour emergency departments, 9 Trauma centers, 20 specialty referral centers (e.g. burns, neuro-trauma etc.), 480 ambulances, more than 29000 trained and certified pre-hospital care

providers, a state of the art communications center linking ambulances, helicopters, hospitals and central alarms and a med-evac helicopter program operated by the Maryland state police and coordinated with MIEMSS.

The Course of an Injured Patient

Each of the critically injured patients treated at Shock Trauma (of which there were 4086 in 1992) usually enter the system after a 911 (equivalent to a British 999) call. They are attended to by first line responders who will administer Basic Life Support (BLS) in accordance with established protocols reinforced by mandatory annual recertification of skills.

Based on their assessment of the severity and type of injury (apparently uninjured patients whose mechanism of injury is severe are admitted to the Trauma Center on the grounds of possible injury not yet presenting) these pre-hospital carers decide whether the patient can be transported by ambulance or helicopter. While fire departments and rescue squads operate the ambulances it is the state police troopers who operate the statewide system of helicopter attendance and transfer. Each trooper is a fully trained paramedic as well as a police officer (and as such is armed!). There are eight strategically stationed specially designed and equipped helicopters throughout the state and they account for over 65% of transfers to Shock Trauma.

The patient will be delivered to the center having been stabilised whenever possible, with intravenous access established and crystalloid fluid therapy instituted, supplemental oxygen will be administered and intubation, if necessary, will have been performed. Virtually all patients will be transported on a backboard with head immobilisation and wearing a stiff neck collar. Current practice ensures mast trousers are often fitted but not always inflated. They will arrive at the ambulance bay or on the helipad (capable of accommodating 4 helicopters) on the roof of the building. There they are met by a trained nurse from the Trauma Resuscitation Unit (TRU), an anesthesiologist or nurse anesthetist and technician. An initial assessment is made en route to

the TRU as well as taking a history from the paramedics.

Once in the TRU the patient is admitted to one of ten resuscitation bays fully equipped and capable of functioning as an operating theatre. There he is immediately attended to by the Trauma Team comprising a team leader (most often a fellow in trauma surgery roughly equivalent to senior registrar status) under the supervision of an attending trauma surgeon; junior surgeons; an attending anesthesiologist or a nurse anesthetist under supervision; nursing staff and technicians. This often results in overcrowding of the resuscitation bay and can be frustrating and counter-productive. The patient is assessed and resuscitation proceeds according to the ATLS (Advanced Trauma Life Support) protocol. Blood investigations are immediately analysed in a dedicated stat lab and presented to the clinicians within 10 minutes on the bedside computer. Necessary X-rays are taken by the bedside using a machine mounted on a ceiling gantry and therefore able to be moved to each bay avoiding patient movement. There is a easy access to a dedicated CT scanner and angiography suite situated adjacent to the TRU, no further than 15 metres from each bed.

Following assessment, investigation and appropriate resuscitation, the patient proceeds to the adjacent suite of six operating rooms all equipped with modern operating and anaesthetic facilities including Rapid Infusion Systems capable of administering warmed blood and fluids at up to 1500ml/min, cell saving machines, full invasive monitoring including intracranial pressure as well as cardiovascular monitoring and gas analysis by mass spectrometry. Following resuscitative surgery the patient is transferred to a similarly equipped recovery or Post Anaesthetic Care Unit (PACU) and thence to one of the 100 available beds in the hospital, all capable of ITU designation.

A period of rehabilitation and or further surgery may follow before the patient is discharged home in 78% of cases, or to other hospitals in 15%. The remaining 7% die.

MIEMSS Anesthesiology

The department of Anesthesiology at Shock Trauma comprises 16 Attending (Consultant)

Anesthesiologists, 3 or 4 Anesthesiology Fellows (Senior Registrar equivalents), 10 Nurse Anesthetists, 2 secretaries, a Quality Assurance co-ordinator and 3 Anesthesia Technicians. The stated aim of the department is: *To deliver high quality anesthesia, acute critical care and acute pain management for patients in the Shock Trauma Center.*

In 1992 there were 6425 anesthesia procedures/services, 66% of which were emergencies. This clinical work is based around 12-hour shifts. There is an attending anesthesiologist designated as in charge for each day who works 0630 to 1830 and who does not administer anesthesia but arranges the workload for the day, i.e. the order and location of the elective cases, and who attends the emergency admissions. This charge person has at his disposal two other Attendings working 0700 to 1900, one of whom will usually supervise one or two of the three nurse anesthetists on for the day. The other will be working solo in the theatres. In addition there is also a Fellow and an Attending assigned to the Acute Pain Management Service (APMS) who work 1000 to 2200 and provide continuity over the handover to the night Attending working 1830 to 0630 whose staff include two or three nurse anesthetists and a Fellow. These shifts are divided up over each month so that each Attending works 15 of these 12-hour shifts each month. This in itself marks an important difference from UK practice and, combined with the tasks of administering an unpredictable schedule of work, supervising several procedures at once often in relative isolation provides valuable experience and appreciation of a very different anaesthetic service.

Specific examples of significant differences from UK practice include the fact that pre-operative assessment is almost always been carried out by someone other than yourself and pre-medication is often frustrated by frequent alterations in the operating schedule. There are no anesthetic rooms and each patient is anesthetised in theatre or in the TRU. There is little skilled and dedicated anesthetic help and one has to use other colleagues for this who may or may not be readily available. There is a different appreciation of anesthesiologists' clinical skills so that it is not unusual for a very junior surgeon to tell you to *go easy on the pentothal* or *you may now intubate the patient*. These problems take some time to come to terms with, are acknowledged by both the visit-

ing and permanent staff and may be overcome with diligence and a co-operative attitude.

On the more positive side is the clinical work; it is very satisfying to be involved in the successful reversal of an often fatal process. Shock Trauma is the state referral center for neuro-trauma and this includes over 120 cervical spine fractures each year which are most commonly managed by awake fibre-optic intubation. Working with nurse-anesthetists is a novel experience for most British anaesthetists and the responsibility for supervising and teaching these highly skilled, experienced and independent individuals, many of whom have worked at Shock Trauma for many years, is different but rewarding.

The anesthetic form for each individual is very comprehensive and includes spaces for the recording of every monitored variable and possible intervention as well as a large space for a written narrative of the anesthesia care. This facilitates the very highly developed quality assurance (QA) program in the department. This is based on a daily review by the quality assurance co-ordinator of all the anesthetic services administered and a monthly meeting of the QA committee, comprising two permanent anesthesiologist members and one temporary, (the British Attendings are encouraged to fill these positions), two permanent nurse anesthetist members and one temporary, and the QA co-ordinator. The committee scrutinise the anesthetic management of any patient suffering an adverse outcome and reports accordingly (most often to exonerate the anesthesia care) to the Hospital QA Committee. This can seem quite intimidating to the newcomer but the process does make for very good audit and opportunities for teaching, and provides a huge data base for anyone wishing to write case reports or reviews.

There are ample opportunities for teaching. All visiting attendings are accorded the title of Visiting Assistant Professor of Anesthesiology at the University of Maryland. Student groups include medical students, paramedics, other medical specialists, trainee and qualified nurse-anesthetists and trainees in anesthesia.

The Acute Pain Management Service (APMS) is, again, novel to most British anaesthetists. It comprises the Attending designated to it, usually for three or four consecutive days and a full-time

nurse. Patients are referred to the service by consultation. This comprises an assessment of the analgesic requirements often in the presence of narcotic and alcohol abuse and sometimes in conjunction with multi-system dysfunction or failure. This is followed by formulation of a pain management plan and prescription of appropriate analgesia most often using patient controlled morphine infusion or patient controlled epidural administration of analgesia but also including nerve blocks and analgesia for dressing changes (in recent times we have made successful use of PCA with alfentanil for this). The patients are reviewed by the pain team at least once a day and their continuing requirements monitored until they are discharged from the service.

So far I have concentrated on what the visitor may get out of working at Shock Trauma but visiting Attendings are also able to contribute. It is only in the last two years that the LMA has been available in the institution and we were able to use our experience to speed its acceptance. The visiting anaesthetists have made a significant contribution in demonstrating the value of regional anaesthesia both for surgical procedures and pain control. The facilities for research in the department are less than ideal and many of the projects now running follow initiation from the British Attendings.

For anaesthetists interested in working in the department, the qualifications are to have passed the FRCA or FFARCSI and have successfully completed an ATLS provider course. A demonstrable interest in trauma and resuscitation is understandably advantageous. At this time no further exams need to be passed! All the appointments have to be approved following an interview with Dr Peter Baskett of the Frenchay Hospital in Bristol who originally organised these posts and continues to supervise them.

Life outside Shock Trauma

It will be appreciated that this forms a very well organised sabbatical year or longer for any interested individual. The package includes excellent remuneration, a generous educational allowance, all medical defence fees, medical insurance for the incumbent and his or her (to date there have been two female visiting attendings) families, life insurance and a retirement plan amongst other benefits. Housing is arranged in a privately

owned condominium type complex following recommendation by the department but the rent is paid by the individual. Most of us are very happy with this arrangement, it is located in a safe residential area about 7 miles from the hospital with a wide range of facilities for families. However one should not be under any illusions regarding personal safety in Baltimore, it is a very violent place fuelled by lax firearm legislation and a massive epidemic of narcotics and other substance abuse combined with poverty, and the reality of this can be disturbing.

On a more pleasant theme, fifteen 12-hour shifts a month leaves plenty of time for leisure and tourist activities and everyone who has held these posts has been able to travel widely and gain an appreciation of not only the different

health system but a very different society. This position represents a great personal and professional opportunity for any interested anaesthetist and his or her family.



VISITING FELLOW 1993

Following the proposal at the Annual General Meeting that the Society should sponsor a Visiting Fellow from Eastern Europe, Council approached Professor Bogdan Kaminski of Warsaw to nominate a suitable candidate. He recommended Dr Krystyna Zdziechowska, a young consultant from Warsaw. For obvious reasons, and much to her amusement, her name presented some difficulty with pronunciation and she was universally known as Krystyna.

Krystyna arrived on 16th October and returned to Warsaw on 11th December. She spent the first three weeks in Aberdeen, followed by a few days in Dundee, then the next three weeks in Glasgow, followed by a few days in Edinburgh. She attended the Society's Scientific Meeting in Paisley, the College's Regional Meeting at Law and finally the College's two day Scientific Meeting in London on her way home. She was exposed to a broad spectrum of anaesthesia in Scotland, and was particularly interested in Neurosurgical and Thoracic Anaesthesia and in Intensive Care.

The Society was responsible for all of her expenses including travel, accommodation and attendance at meetings. We are particularly grateful to the Aberdeen Royal Hospitals NHS Trust,

who provided free accommodation and to Professor W Fitch who arranged her scientific programme in Glasgow. Throughout her visit, council members and office bearers looked after her professionally, socially and touristically and at least one of them reached places he had never been before - the top of the Wallace Monument.

Krystyna thoroughly enjoyed her stay and was most grateful for the time, attention and hospitality which she received. She has asked that her thanks be passed on to all members of the Society. The Society presented her with a small engraved Quaich as a memento of her visit.



Krystyna and John McKenzie

FROM DAN TO BEERSHEBA

Members of the Society undertake a wide variety of pursuits in their own time but one of the more unusual was the bicycle ride by Dr John Barker formerly a consultant in the Southern General Hospital, Glasgow and Dr Calum Wilson from Kirkaldy. They cycled some two hundred and forty miles in Israel from Dan to Beersheba to raise funds for a Nazareth Hospital project. John and Calum raised in excess of £6000 for this very worthwhile cause.

John travelled by rail from Glasgow to London and then, after a long wait because of stringent security checks, on an El Al flight to Tel Aviv. Arriving at 3.30 a.m. on Sunday, he transferred by coach to Dan arriving at the Kibbutz Hagoshrim in time for breakfast where he met up with Calum. The rest of the day was spent getting the bikes and making sure that they were in good condition. On Monday, they set off riding through forests and fields in the foothills of the Golan Heights and then left the road to take a mountain track over the hills down the side of the Sea of Galilee. That evening, they took a boat trip over the lake to Tiberius where there was a service in the expatriate Church of Scotland. Tuesday was less strenuous and they cycled down the Jordan Valley to Bet Shean and saw round the archaeological dig. The Israeli's are rebuilding a Roman town there. From Bet Shean it was a short ride to Kibbutz Kfar Ruppin and in the evening they went into Nazareth to see the hospital and new extension which they were raising money for. Wednesday was the longest day and involved riding down the Jordan Valley towards the Dead Sea - a distance of some 104 kilometres. Although the general trend may have been downhill there were uphill as well and it was a relief to arrive at a Crocodile Farm for lunch. An Israeli TV crew arrived and they had a slot on television that evening. After lunch they continued down the valley, cycling through Jericho, the oldest city in the world. Thursday was spent riding along the side of the Dead Sea which involved some

very steep hills, passing Qumran, where the Dead Sea Scrolls were found. The heat made riding uncomfortable in places and after a long tiring ride there was a late lunch at Massada, an ancient fort built by Herod the Great. The night was spent in Bedouin tents which proved more comfortable than anticipated! Unfortunately the Arabs had one of their four days of rain a year on the Friday morning but the rain soon stopped and the group cycled through Arad followed by a long journey through the desert to Beersheba. During the week the mechanics who had travelled with the group mended a total of 250 punctures!

This sponsored bicycle ride is organised annually by the Edinburgh Medical Missionary Society and anyone wishing further details should contact them. The Nazareth Hospital was founded in 1861 and is owned by the Society. It is a 136 bedded hospital with an international staff of 379 and is the oldest centre for nursing education in the State of Israel. The majority of the buildings date back to the early 1920's and are quite unsuitable for the practice of modern medicine. Proceeds from the Biblical Bike Ride go towards a development programme to fund the upgrading of nursing training, construction of a new hospital wing and modernisation of existing buildings and facilities.



Calum Wilson and John Barker

ONCE IN A LIFETIME?

DR MICHAEL CRAWFORD, SENIOR REGISTRAR, ABERDEEN ROYAL HOSPITALS

From time to time anaesthetists become involved in cases which test their resourcefulness to the extreme. This is an account of my experience as a recently appointed registrar on a quiet Monday afternoon when I was required to join an Emergency Team attending a train crash in Glasgow.

An Emergency Surgical Team consisting of an accident surgeon, a general surgeon, an orthopaedic surgeon and an anaesthetist together with basic surgical instruments, dressings, antibiotics, intravenous fluids and intravenous analgesic and anaesthetic agents attended the site of the head-on collision of two passenger trains.

At about 1.30 p.m., the driver of one of the trains was found to be alive but trapped, his cab having collapsed on top of him on impact. He was conscious and coherent but was having difficulty breathing and had severe pain in his legs. Only his right arm was accessible through a small opening which had been made in the wall which divided the cab from the passenger saloon. Through this gap he was given 10 mg cyclimorph i.m., the needle being passed through the sleeve of his jacket. A further 25 minutes passed before this dividing wall could be broken down and he was able to pass his right arm through. A strong radial pulse was identified, and a 14G cannula was sited in the dorsum of the hand. A further 5mg cyclimorph was given intravenously, and 1 litre polygeline infused. The remainder of the partition was removed and it became apparent that the casualty was trapped between the wreckage of the front of the train which had collapsed on top of him, and the driver's chair behind. The chair was cut away freeing his upper body from the wreckage; this resulted in an immediate improvement in the breathing and oxygen was commenced through a Hudson type mask and ECG monitoring was established. Both legs remained trapped some 18 inches above floor level in such a fashion that he was forced to adopt a semi-lateral position and several layers of padding were placed underneath his trunk. The fire fighters continued their efforts to free the victim's legs, using heavy lifting and cutting equipment, and this caused severe pain. In the absence of a revealed head injury (GCS 15 and no sign of head trauma), and because the casualty's position prevented the easy passage of an endotracheal tube, ketamine was administered to provide analgesia during further attempts to free the legs. An initial dose of 100mg ketamine was given intravenously and this resulted in loss of consciousness but without obvious detrimental effect on respiration. Further attempts by the fire-fighters resulted in freeing of the right leg, but it proved impossible to release the left leg.

Over two hours following the arrival of the Emergency Team a further 1 litre of polygeline, 1 litre of normal saline and 3 units of Group O Rh negative packed cells

were transfused and a total of 250mg ketamine administered. The patient was breathing spontaneously, but was unconscious, hypothermic, and no peripheral pulse was detectable. It appeared that there were no gross head, chest or abdominal injuries present, all trauma being limited to the lower limbs which were grossly deformed. The air temperature was falling and daylight would begin to fade in another hour's time. In view of the desperate situation, the only possibility to save this victim lay in amputation of the left foot. A further 100mg ketamine was given and because of the position of the trapped leg, it was necessary for the surgeon to work from outside the train standing on a ladder, and reaching into the driver's cab. Skin incision produced no response from the patient, and the foot was crudely amputated proximal to the ankle joint. The patient was then able to be pulled back into the passenger compartment where an area had been cleared of all unnecessary equipment and seating and a second surgeon applied a tourniquet to the leg and clipped obvious bleeding vessels. An attempt was made to intubate the patient but this proved impossible in the conditions and tracheostomy was not considered appropriate as the patient had a patent airway, adequate respiration and this procedure would have delayed evacuation.

The patient was placed on a stretcher and carried from the train across several tracks to an ambulance. He was then transferred to the receiving hospital accompanied by anaesthetist and surgeon. On arrival at the Accident and Emergency Department further assessment and resuscitation were performed and the patient was taken to theatre for wound toilet and fixation of fractures followed by admission to ITU for post-operative IPPV. A coagulopathy developed and was treated with repeated transfusion of concentrated red cells, fresh frozen plasma, cryoprecipitate and platelets. Renal function, gas exchange and cardiovascular function remained good and the patient was discharged from ITU after 24 hours.

This type of case represents a major challenge to the resourcefulness of anaesthetists. Most of us are unprepared for this sort of situation but must overcome our anxiety to apply the basic principles of resuscitation which have been learnt in a hospital environment. It is essential that all staff familiarise themselves in advance of an emergency with the equipment and drugs which will be available. This patient was extremely fortunate to have survived. Particularly important factors in this were his youth and the speed with which he was discovered and fluid resuscitation commenced. The absence of head, chest or abdominal trauma was miraculous given the circumstances under which he received his other injuries.

This was an exhilarating, if worrying, case with which to be involved, and which hopefully will turn out to be a once in a lifetime experience.

NEWS FROM THE REGIONS

Forth Valley

Falkirk

1993 has seen a number of changes in staffing and facilities in Falkirk. Dr Bill Thomson finally retired after a period in his old post as a locum and we wish him well. We have welcomed three new consultants to the department, Dr Henry Robb formerly a consultant in Glasgow, Dr Ian Broome who came from a senior registrar post in Sheffield and Dr Gordon Wardell from a senior registrar post in Edinburgh. A new suite of offices was opened in the Spring and are a vast improvement on the old broom cupboard. A new Day Surgery Unit has recently opened and the building work has just commenced for a new ITU which is expected to be completed during 1994.

Stirling

The Stirling Unit became a Trust in April 1993 and Hamish Finlay was appointed Clinical Director of Theatres, Anaesthesia, Intensive Care, Coronary Care and the Endoscopy Unit. A new Day Surgery Unit has been built and is to open shortly. There have been no retirements but Dr Brian Kennedy, previously a senior registrar in Glasgow, was appointed to a new consultant post and Dr Ibtesam Kassib-Bashy, previously a registrar in Stirling, to a staff grade post.

Grampian

Aberdeen

During the year the Aberdeen Royal Hospitals NHS Trust was awarded a Charter Mark for excellence in the provision of public services. The sounds of rejoicing could be heard echoing loudly along the corridors albeit briefly as the true significance of this prestigious award finally sank in. The major news this year is the appointment in Aberdeen of Professor Nigel Webster to the Chair of Anaesthesia and Intensive Care. Funding for the Chair was achieved primarily by the efforts of the Chair Working Group headed by Dr George Robertson. This exciting development for Aberdeen is welcomed by all and Professor Webster joins the Department next year.

There were no retirements this year but we welcomed

Dr Ann Robertson and Dr Kathleen Ferguson as Consultants to the Department. Dr Ferguson appears to be wearing those wrist bands again that usually mean a later date with the Tuohy needle but she is keeping mum on that particular one. Dr Michael Crawford has been appointed to a senior registrar post, replacing Dr Ferguson. Dr Mala Sathanathan was appointed Staff Grade this year after three years as Registrar in the Department and we congratulate her on her recent acquisition of the Fellowship. Drs. Helen London and Dan Munday have also joined the Department as Staff Grades. Dr Munday has returned to this country after three years as head of anaesthetic services to the United Mission Hospitals in Nepal. Dr Paul Martin has returned from a year at the Trauma Center in Baltimore to rejoin his colleagues who continue to look rather glum principally as a result of the new deal on doctors' hours. The trainees have developed a rather strange gait reminiscent of those who have discharged a gunshot into their lower extremity.

By the time of going to press the new theatre complex totalling 15 theatres, an 8 bedded general ITU and 4 bedded cardiac ITU will be in operation so that virtually all anaesthetic services will be concentrated in one area of the Foresterhill site.

Elgin

Building continues at Dr Gray's Hospital, Elgin with the first phase due for completion in December 1994. Three new consultant posts will be advertised to increase the existing set-up of 2 consultants, Dr G Duthie and Dr A Bruce, and a general practitioner. This large expansion at Elgin is welcomed by both patients and general practitioners in Moray but in the rather strange world we live in it is perceived as a threat by management in Aberdeen. Presumably this threat will take on an even greater dimension when Elgin finally achieves its own Charter Mark.

Highland

Both Raigmore Hospital and the Acute Unit in Caithness achieved Trust Status in April 1993. Dr John Machin has been appointed as Medical Director of the Raigmore Trust. His vacated sessions remain to be filled. Dr John May joined the Department from a Consultant post in Lincoln in

March in place of Dr Bryony McEvedy who is now happily married. Dr Ian Johnston has recently arrived from a previous appointment with the Army to take up a consultant post with an interest in Obstetric Anaesthesia. As a result of this a limited Obstetric Epidural Service is now in place. Introduction of the full time service is awaiting the arrival of the remaining junior staff complement. Doctors Dempster and Trythall have joined the Department as Staff Grade Anaesthetists under the initiative to reduce junior doctors hours of work.

South East

Edinburgh

The news from this region is of course dominated by the "New Royal Infirmary"- see also previous reports at approximately ten year intervals or as elections loom. Seriously though, it looks like this time we may get at least to the stage of a couple of Ministers and the odd marginal MP wearing hard hats in a field and smiling to camera. Applications for car parking in the new hospital close next week.

Meanwhile back in reality, Trusts march onwards with the Royal setting forth under the medical helm of Iain Davidson. It remains to be seen how markets develop, but as the Royal takes on more acute services, it's difficult to see where elective patients can go. The answer, as any anaesthetist will tell you, is in the day room sitting on their luggage, waiting for a bed!

Royal Infirmary developments last year included the dubious privilege of becoming the home of the Scottish Liver Transplant Unit. Our fears of blood running out of the theatre doors seem to have been unfounded, and it is a tribute to the hard work of all the team, including consultant anaesthetists Alistair Lee, Ian Armstrong and Antony Pollock, that results of the first series of grafts are excellent, especially the acute, fulminant liver failures. There is also a junior post related to the programme which has been held by Colin McFarlane and presently Barbara Phillips. Tribute should also be paid to our colleagues throughout Scotland for the early referral and safe transfer of this group of patients. The Shock Team certainly know their way here now! Elsewhere in the RIE we await the

imminent arrival of Respiratory Medicine from the City hospital - another change which will not affect our ITU workload (allegedly). The old routine of 'if we've been redecorated we must be closing' has restarted, and questions hang over PMR and the City remaining in their present roles. The Western also look set to change with a major rebuilding programme proposed in the overall strategy. Consultation processes may affect the final placement of units and specialities and we all wait with interest.

St John's at Howden are already off the starting blocks as the West Lothian Trust and have the advantages of new technology and spare capacity at this stage. Lothian Health see their role as developing further. Interesting developments are already under way with industry links to run early phase trials of new drugs on site. New management structuring seems to have benefited Sally Edwards, who has been on an educational tour in Australia - she is of course sorry it had to be in the depths of our winter.

Staff changes throughout the region have been viewed with interest as the accredited senior registrar becomes an endangered species. Calvin Hider, a well known sheep farmer with an interest in anaesthesia, surprised us all with a rapid departure from the RIE. He regaled us all with an incredible series of stories at a farewell drinks party, ranging from sinking landing craft to exploding patients with all points in between. There is no doubt that we miss him enormously, particularly in his way with a rumour-it can be fanned from spark to roaring flame with appropriate nurturing and expert spreading. Dr Grace at St. Johns also left this year, but has been sighted since both there and in PMR augmenting the pension and looking fitter than ever. The same applies to Jimmy Wilson, who had a splendid and well attended retiral dinner. The bounce in the step of these friends led to a close perusal of superannuation benefits in the end of year payslip by our colleagues near the top of the telephone list.

Consultant arrivals have included a Gang of Three to St. John's in the persons of Pat Armstrong (previously University lecturer), Mike Brockway and Lachlan Morrison. A more saintly trio it would be hard to find. David Ray was appointed to join the ITU staffing in the Royal, which allowed Dave Brown to sorrowfully relinquish ITU call for a return to the general team. David Watson has

taken up a post in Cardiac and Dental Anaesthesia - the only problem being to remember which ones get the big syringe of relaxant. No doubts about which ones cause most problems! Pete Alston has also finally stopped (or paused) his travels in cardiac anaesthesia here in Edinburgh. Margaret Cullen goes to the Western with an interest in pain and further developments may be on the way. Agnes Delvaux also is welcome back from Belgium to a three year consultant post at the Eastern General.

Senior Registrar departures include Dave Ramage, who found the memories of sun and barbecues too much and returned to Australia where he had spent an enjoyable year. New Senior Registrars include Julie Freeman, Ellis Simon from the shock team, Eddie Doyle and Alistair MacKenzie. Mike Fried moves across from an Astra Research Fellowship but also has the important function of chief wine taster and tutor to the Anaesthetic Dining Club. This learned society has probably been banned from most of the restaurants it frequents. Field trips are also held to Paintball and Quasar sessions where Juniors can shoot consultants in the back with impunity.

We were all saddened by the death this year, after a bravely borne final illness, of Dorothy Taylor. In her post as secretary to the late Professor Robertson she was well known to all trainees in Edinburgh for many years. She had a pawky sense of humour and never veered from politeness despite her daily exposure to choice language from the members of the Royal department. We will always remember her with much affection.

During this year we have had the usual run of local meetings and courses. Ian Armstrong ran a very successful Registrars' meeting for the Scottish Society and the Edinburgh Anaesthesia Festival was, as usual, well received by the delegates. Dermot McKeown continues to run the local ATLS course despite accusations of being a Moonie.

So as the JCBs prepare to roll in preparation for our new hospitals, what do we expect in the future? We wait for a response to the Calman report, and wonder who the first "seamless registrar" will be. Trusts look like being here to stay, even if a change of government changes the names, and we can only get involved and work for our patients' best wishes. If all else fails I suppose

we could subcontract them all to Clydebank and have a holiday!

Borders

In common with many others, those in the Borders have had the stress of the required division of a satisfactorily functioning single unit in the move to Trust status. A sixth consultant has joined the department - Dr Ian Yellowlees came from a senior registrar post in Newcastle and has a special expertise in pain relief.

Fife

This has been an eventful year. Having undergone local reorganisation three years ago with the formation of a single acute unit comprising the hospitals of Kirkcaldy and Dunfermline, the Management Executive required the dismantling of the unit from April 1993 in the run up to the expected creation of two hospital Trusts from April 1994. A major event in the Kingdom was the official opening in June by the Princess Royal of the new District General Hospital in Dunfermline. In the 900th anniversary of the death of Saint Margaret (wife of Malcolm Canmore) it was appropriately named the Queen Margaret Hospital. It is unique in the UK in hospital building terms, the construction being of the design and build method, a suggestion put forward to the SHHD by the then Fife Health Board Chairperson, Mrs Ann Ferguson who is a highly qualified civil engineer. Accordingly, the project was completed on time and at the agreed cost of £53 million. Originally intended to bring together the specialties contained in the three old Dunfermline hospitals, a rearrangement occurred as the long awaited decision on the maternity services recommended that inpatient obstetric care should be centralised in Forth Park, Kirkcaldy (where a midwife only unit is also being set up). The anaesthetic department in Dunfermline, for many years unusual with consultant only staffing, has reintroduced anaesthetists in training.

Two new consultants have come to Fife. Dr Maher Gergis to the Victoria, Kirkcaldy from a tour in Saudi Arabia, previously a consultant in Bishop Auckland and Dr Paul Nicholas to an additional post in Dunfermline from a similar post in Darlington. Does this indicate more flexibility at consultant level? The Victoria, Kirkcaldy, for over

25 years the flagship of Fife's hospital services, is commencing a programme of refurbishment. Already some corridor floors have been re-laid with the world famous local product - linoleum.

Tayside

Dundee

This year has seen the initiation of Trust status for the Dundee Unit. The most glaring problem has been the severe limitation of funding for Study Leave by the Unit, and this has created considerable difficulties for all grades of staff. Ninewells Hospital has been allocated funding for the development of laparoscopic procedures and it is anticipated that further anaesthetic time will be allowed for this. In addition, at Stracathro Hospital a laparoscopic nephrectomy service is being developed. This can only be good news for the Pain Clinic as several referrals presently come from these disciplines. The Pain Clinic has been allocated Waiting List funding for the first time. This has enabled the compilation of a comprehensive database in order to keep track of and carry out research on TENS machines, amongst other things. The acute pain service is now well established. PCA machines have been in use in Ninewells for nearly two years now and there is a full-time nursing sister to oversee their use during the day. More recently, an epidural infusion service has been started and is running well. Trainees are now allocated one week per quarter to go round the acute and chronic pain services. There have been no new consultant appointments in Tayside, but Dr G McLeod and Dr D Carson have been appointed as senior registrars.

Perth

1993 has seen quite an upheaval for the anaesthetists in the Perth and Kinross District. The Perth Royal Infirmary development including a five theatre suite and four bedded intensive therapy unit was opened in the Spring with the transfer of orthopaedic services from Bridge of Earn in the Summer. As a result we are now technically well equipped, something which was long overdue and appreciated by all. The Department itself has not so far been able to transfer from the old premises as planned, but hopefully we will be installed in 1994.

The manpower changes implemented in Achieving a Balance initiative and the changes in trainees

hours of work has resulted in loss of a tier of cover and the emergency service is now delivered by a single senior/single trainee system. This has produced a marked change in working practices but also provided opportunities for improvements in some aspects of the service, particularly in the ITU and the Acute Pain Relief Service. The latter is flourishing under the attention of Dr Arthur Ratcliff and has been augmented by the appointment of a full time nurse to the service.

The rotational training scheme for trainees between Dundee and Perth is also functioning very satisfactorily, despite the changes and the trainees appear to continue to enjoy their visits to the Styx.

Finally we are now planning the equipping and servicing of a new Day Case Unit housed in a much modified Theatre Suite in the old building. We will no doubt be using a bottle of Diprivan at the opening ceremony rather than champagne.

West of Scotland

Glasgow

Last year's entry stated that Stobhill Hospital had been granted Trust Status from April 1993. This was an error and should have read the Southern General Hospital.

The experience of those hospitals which became Trusts from April 1993 has been largely neutral. Events have shown that remaining a directly managed unit is no protection from the changes presently occurring throughout the NHS. The Western Infirmary, Glasgow Royal Infirmary and Stobhill Hospital are currently awaiting an announcement from the Scottish Office as to whether their applications for Trust Status have been successful or not.

Greater Glasgow Health Board published a review of acute services and maternity services to the year 2001 in November last year. This set out several options which involved, amongst other things, the closure of one to three major hospitals and several possibilities for construction of replacement hospitals. The capital costs of these ranged from £147 million to £402 million.

This particular strategy review appears to have disappeared without trace and it is believed the Health

Board is now considering an increased number of options. Increasingly it looks as if the Health Board is completely paralysed with regard to its future strategic plans. At the present time the Health Board is in a state of crisis for reasons which are probably not unconnected with its future strategy. Mr Peterkin the General Manager, has been summarily dismissed under highly dubious circumstances, only to re-appear as a highly paid employee of the Management Executive. Mr Bill Fyfe the Chairman of the Health Board has now resigned in consequence of his part in Mr Peterkin's departure. We await developments with interest.

To move from the ridiculous to the sublime, Dr Gavin Kenny, that well known globe trotter from the University Department of Anaesthesia, is about to trade in his air miles for a ticket to Clydebank. Health Care International, an American company who are being assisted by Scottish Office funding, are about to open a major new hospital development in Clydebank and Dr Kenny is the Director Designate of Anaesthesia. He will, however, retain an association with the University. The capital costs of this venture are rumoured to be in the region of £300 million to £400 million which compares rather nicely with the proposed capital spend for the whole of Glasgow. The new HCI hospital will have 64 intensive care beds, virtually the same number as the present number for the whole of Scotland. We await with interest to see where the patients and the staff for this venture are going to come from.

Royal Hospital for Sick Children

The Royal Hospital for Sick Children became part of the Yorkhill NHS Trust in April 1993 along with the Queen Mother's Hospital and the Community Paediatric Service for Glasgow. Dr Douglas Arthur was appointed Clinical Director of Anaesthesia, Theatres, Day Surgery Unit and Intensive Care.

The establishment of Trust Status was followed by the retiral of our two senior consultants, Dr Charles Cairns and Dr Jimmy Collins. Both had clinical sessions at the Western Infirmary and Charles Cairns also worked at the Queen Mothers Hospital in addition to the Royal Hospital for Sick Children. Their posts were filled on a full time basis from October 1993 by two established consultants. Dr John Currie joined us from the South Ayrshire Trust having previously worked at the Seafield Hospital in Ayr and at Great Ormond Street. Dr

John Sinclair having worked at Toronto Sick Children's joined us after a brief period as a consultant in Glasgow Royal Infirmary.

Dr Eddie Doyle has been employed as a research fellow in acute pain for the past year funded by the Sir Jules Thorn Trust and established an acute pain service which we hope to continue now that he has moved to Edinburgh to a senior registrar post. Research in the department continues with investigations into new drugs in paediatric anaesthesia including new transdermal local anaesthetics and the stress response of the neonate. Several members of the department presented a seminar on paediatric day surgery at 9 Bedford Square and this is now coming up for its third repeat early in 1994.

Southern General Hospital

The Southern General Hospital became an NHS Trust in April 1993. As yet this has caused no problems and first impressions have been favourable. Dr WJ Kerr has been appointed Clinical Director of Anaesthesia and Intensive Care. This apart, the management structure of the hospital is little changed from the old regime. We expect to move to a more radical form of Directorate structure in 1995 and it is not clear where service specialties such as anaesthesia will fit in. We have continued to benefit from the last Greater Glasgow Health Board Strategy Review. A new two theatre Urology Unit has been opened to deal with all Urology for South Glasgow and Dr Philip Oates, previously a senior registrar in Liverpool, took up a new consultant post related to this at the beginning of October. Earlier this year Dr Janet Pollock who was a senior registrar at the Victoria Infirmary was appointed as a consultant to a new post funded by day case surgery and spinal injuries. Dr Janie McIntyre retired at the end of June and she will be sadly missed. Dr Joan Prentice transferred from a consultant post at Law Hospital to replace Dr McIntyre. Dr Douglas Walker who was a senior registrar in Sheffield was appointed to a consultant post in the Institute of Neurological Sciences in April. He replaced Dr John Donald who retired last year.

Stobhill Hospital

Dr Bill Docherty transferred from a consultant post at Stobhill Hospital to one in Hastings in June. This is a sad loss to Glasgow and seems an unlikely move for such an ardent Scot. Dr Mike Duggan is

doing his locum. We opened our new purpose built Day Surgery Unit in June and are currently applying for Trust Status. We have introduced a system of lead consultants under the heading of Surgical Services with the Medical Executive acting as Co-ordinator or Director.

Victoria Infirmary

The Victoria Infirmary became an NHS Trust in April 1993 and Dr Brian Cowan was appointed Director of Anaesthetic, Intensive Care and Theatres. Trust Status has caused no problems and there have been no major new developments in the hospital.

Dr Jonathon Oates has recently been appointed to a consultant post, having previously been a senior registrar in Liverpool. He replaces Dr Philip Matthew who left to take up a consultant post in Gateshead, having previously been a senior registrar in Newcastle. Dr Jane Purdie and Dr Janet Pollock have been appointed as consultants at the Victoria and the Southern General respectively and been replaced as senior registrars by Dr Allan Brown and Dr Sue Midgely.

Western Infirmary

The senior staff complement continues to grow apace this year. Pauline Stone was welcomed back from Cardiff to a consultant post. Dr Winifred Finlay was granted premature retiral on health grounds and Mr Mick Semple appointed to the vacancy. Dr Alistair Macfie has been promoted internally to the vacant post with an interest in cardiothoracic anaesthesia. Drs Charles Cairns and Jimmy Collins have now retired and this has resulted in the creation of a new consultant post based entirely at the Western and which will be appointed in the new year.

There has been much change within the Senior Registrar ranks. We congratulate Drs Bill Reeve, Jackie Church, Sofia Chaudhri, Brian Kennedy and Anne Moffat on their appointment to consultant posts. Replacement senior registrars include Drs Allan Gillespie, Ros Lawson, Sarah Lloyd, Malcolm Booth, Jim Findlay and Regina O'Connor.

The system of Clinical Directorates was established at the Western on April Fools' Day and the Divisional System has thus ended. Dr Peter Wallace has been appointed to the unenviable position of the first Clinical Director. The Clinical

Directorate consists of Anaesthesia, Intensive Therapy, Theatres and Acute and Chronic Pain Relief Services. It has been agreed that during the present transitional phase the Department will retain a Chairman and will continue to have meetings on a regular basis. The Directorate will meet separately under the Chairmanship of the Director. The Hospital has applied for Trust Status from April 1994.

Royal Infirmary

There have been a great many changes in the Department of Anaesthesia at the Royal Infirmary over the last twelve months or so. Needless to say, many of these changes have been political ones being part of the Hospital's preparation for becoming a Trust in April 1994. January 1993 saw the dissolution of the Division of Anaesthesia and its replacement with the Directorate of Anaesthesia and Intensive Care, the first Clinical Director being Dr WG Anderson. Simultaneously the Anaesthesia Directorate Advisory Committee was set up under the chairmanship of Dr WT Frame and it was hoped that this structure would act as a suitable forum for discussion of matters of mutual interest between consultant colleagues. Thus far arrangements seem to have worked reasonably well although it is still early days. More recently Dr Anderson has also taken the theatres under his wing and hence is now Clinical Director of Anaesthesia, Intensive Care and Theatres. On the staffing front there have been a number of changes over the last year. There have been two retirals - Drs Robin Neill and Duncan Ferguson who each have more than twenty five years of service as consultants in the Royal. Another consultant departure has been that of Dr John Sinclair who has moved to take up a consultant post in the Royal Hospital for Sick Children. We wish all three well. In March 1993, Dr Elizabeth McGrady arrived as a Consultant with a special interest in Obstetric Anaesthesia and Analgesia and she joined us from a similar post at Bellshill Maternity Hospital. More recently there have been two new appointments to the Cardiac Anaesthesia establishment, Drs Bill Reeve and Jackie Church. The Directorate has also made three further Consultant appointments - Drs Steven Hickey, Anne Moffat and Neil Smart. During the last year the senior registrar establishment has also seen a larger number of changes in staffing complement than normal. Dr Peter Andrews and Dr Colin Runcie left to take up consultant appointments in Edinburgh and at the Western Infirmary, Glasgow, respectively. Four new senior registrars have joined

us over the last year namely, Drs Fred Davies, Colin Dryden, Douglas Russell and David Swann. Drs Davies and Russell were previously employed within our own department. Dr Colin Dryden came from the Western Infirmary and Dr David Swann from Edinburgh. We are particularly happy to have returned our consultant establishment to its full complement as we have been struggling for some time with decreased staff numbers and this has made it extremely difficult to fulfil all our commitments. We now look forward to a period of stability and to the new challenges which Trust Status and the increasing influence of the internal market in health care will provide.

Crosshouse Hospital

Due to managerial reorganisation Ayrshire has been forced to split into the North Ayrshire and Arran Trust and the South Ayrshire Trust with John Hildebrand and Kenneth Mackenzie as Clinical Directors in the North and South respectively. As a result of this split, the Division of Anaesthesia in Ayrshire has also separated with a Division of Anaesthesia in the North chaired by Paul Wilson and as yet no matching Division in the South.

On the new arrival front, Dr Steven Laurie from Aberdeen was appointed in August and Dr Charles Martin in October. Unfortunately for Ayrshire, Dr John Currie has taken up a specialised Paediatric appointment at the Royal Hospital for Sick Children in Glasgow and Dr Chris Cumming has departed for Plymouth.

Dumfries and Galloway

Dr John Mason has recently retired from the Department, having been a consultant in Dumfries since 1969. He made an enormous contribution to Anaesthesia in the South West and members of the Department will miss him greatly. They now look forward to his excellent company away from work even more than formerly. There have been no new recent appointments.

Inverclyde Royal

Dr Moira Simmons was appointed Consultant Anaesthetist in January 1993. There have been no retirements. A Day Surgery Unit is now open and functioning efficiently.

Law Hospital

Law Hospital will assume Trust Status in April

1994. Dr Terry Nunn is Clinical Director of Theatres, ITU and Anaesthetics. The Divisional structure is to be retained with Dr Donald Maclean as Chairman. Dr Joan Prentice resigned her post at Law to take up an appointment as Consultant Anaesthetist at the Southern General Hospital in Glasgow. An Acute Pain Service is now up and running with Dr Nadia Hodsman as lead consultant.

Monklands Hospital

Monklands and Bellshill Hospital Trust has been functional since April 1993. Dr Alistair Naismith continues as Clinical Director of Surgical Services. During the last year Dr Liz McGrady resigned her post to take up a specialist Obstetric appointment at the Royal Maternity Hospital, Rottenrow, Glasgow. The Division of Anaesthesia has one vacancy at present.

Royal Alexandra Hospital, Paisley

The Royal Alexandra Hospital assumed Trust Status in April 1993 with a concomitant flurry of managerial activity and redistribution. We have had no major changes or developments as yet, but with fiscal constraints ever present the future of any such developments must remain uncertain. The Hospital hosted the Annual Scientific Meeting in 1993 and members enjoyed their visit to Paisley with a day rich in social and scientific activity. Many compliments were forthcoming with regard to the venue and for the excellent carvery for lunch.

Dr Sophia Chaudhri joined the Division of Anaesthesia in May 1993 as a Consultant Anaesthetist to cover the increased workload in the surgical specialities in the Hospital. There have been no retirements or resignations as yet.

Vale of Leven Hospital

Clinical Directorates were introduced in November 1993 with the Division of Anaesthesia being included in a Theatre Directorate. Dr Adrian Tully has been appointed Clinical Director with Dr Bill Easy continuing as Chairman of Division. An Acute Pain Service is to be introduced imminently. At junior level two university linked posts have been created to fill the vacuum left by the Western Infirmary severing links with the Vale of Leven department. There is the possibility of an increase in Consultant staff to cover developments in orthopaedics.

Edinburgh and East of Scotland Society of Anaesthetists
(Honorary Secretary - Dr JH McClure, Royal Infirmary of Edinburgh)

- Oct 5 The Sumerian Connection
Dr Ian Verner
- Oct 29 Combined meeting with Glasgow and West of Scotland Society of Anaesthetists
- Dec 7 St Margaret and Dunfermline
Mrs Elspeth King, Director of Dunfermline Heritage Trust at the Queen Margaret Hospital, Dunfermline
- Jan 11 Toxins and Tragedies
Professor Busuttill
- Feb 10 Presidential Address - Dr E Pitt
- Mar 1 Members night
- Mar 12 Annual Dinner
- May 3 Annual General Meeting

North East of Scotland Society of Anaesthetists
(Honorary Secretary - Dr C Allison, Stracathro Hospital, Brechin)

- Oct 14 Front Line Chest Trauma
Mr James McGuigan, Belfast
- Dec 2 Members night - visit to the Glaxo manufacturing plant at Montrose

- Mar 31 Assisted Passage
Dr Duncan Macrae, The Royal Hospital for Sick Children, Great Ormond Street
- May 22 All day meeting at the Craigendarroch Country Club, Ballater.
Presidential Address, Annual General Meeting, Registrars' Prize Papers and the 2nd Norman Rollason Lecture by Dr JM Imray.

Glasgow and West of Scotland Society of Anaesthetists
(Honorary Secretary - Dr JC Howie, Victoria Infirmary)

- Oct 29 Combined Meeting with the Edinburgh & East of Scotland Society of Anaesthetists at the Hunterian Museum, University of Glasgow
Dr G Durante - The Hunterian Museum and its Collection
- Nov 23 The State of Anaesthesia
Dr GNC Kenny and Dr AJ Asbury
- Dec 6 Combined Meeting with the Glasgow Anaesthetic Research Club
- Jan 17 Members' Night presented by the Directorate of Anaesthesia, Royal Hospital for Sick Children
- Feb 15 Domiciliary Ventilation
Dr G Spencer, St Thomas' Hospital, London
- Mar 10 Presidential Address - Dr RL Marshall
- Apr 28 Annual General Meeting
- May Annual Golf Outing

TRAINEE'S PRIZE

The Society annually awards a prize of £250 for the best original essay submitted by a trainee anaesthetist in Scotland. A second and third prize may also be awarded for papers of particular merit at the discretion of the assessors. It is not necessary that entrants be members of the Society.

The conditions attaching to the award are as follows:

The paper or essay should be original i.e. it should not have been read previously at any meeting or published in any journal.

It is desirable that entries show evidence of personal work, but surveys of the literature are eligible for consideration. The Council of the Society wishes to stress that intending contenders should not be discouraged through fear of their efforts being judged elementary. It is fully realised that trainees in some peripheral hospitals may not have opportunities to deal with special types of cases or employ advanced anaesthetic techniques.

Four Copies of each entry MUST reach the Honorary Secretary by the end of February.

The Hon Secretary places all entries in the hands of the Awards Committee which consists of the President, Vice-President and Past-President. These individuals wish to adjudicate without knowing the name or the hospital of the entrant; it is therefore requested that these details be submitted on a separate covering page and that the essay itself give no indication of its source. Acknowledgements to named colleagues should not be included but a statement should be included about the contribution which the author made personally to any study which is reported.

The winner of the prize will be required to give a digest of the paper at the Annual Trainees Meeting in June. His/her expenses for the Annual General Meeting at Peebles and those of a partner will be met by the Society.

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