NEWS L

THE SCOTTISH SOCIETY OF ANAESTHETISTS

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SCOTTISH SOCIETY OF ANAESTHETISTS

COUNCIL FOR 1988-89

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REGIONAL REPRESENTATIVES

		Retires
Aberdeen	Dr. J.D.McKenzie	1990
Dundee	Dr. A. Shearer	1991
Edinburgh	Dr. G.M. Carmichael	1990
	Dr. J. McClure	1991
Glasgow	Dr. T.L. Fraser	1989
	Dr. B. Maule	1990
Inverness and North	Dr. J.D. Muir	1989

PROGRAMME FOR 1989

Registrar's Prize: Entries to be submitted to the Secretary by 28th February, 1989
Annual General Meeting: Peebles Hydro Hotel, 21st-23rd April 1989
Registrars' Meeting: Aberdeen Royal Infirmary, 26th May 1989
Scientific Meeting and Gillies Memorial Lecture: Kelvin Conference Centre, 17th November 1989
Golf Outing: Glenbervie Golf Club, 22nd June 1989

PRESIDENT'S NEWSLETTER

Since the last President's newsletter much interest has been generated in the reports published by the Association of Anaesthetists dealing with Anaesthetic Services for Obstetrics, Recommendations for Standards of Monitoring during Recovery and Anaesthesia, and the future provision of Intensive Care Services. The most significant and historic event, however, as far as anaesthesia in this country is concerned, has been without doubt the creation of the College of Anaesthetists within the Royal College of Surgeons. This is an achievement which has been sought for many years by many anaesthetists and I am sure that members of the Scottish Society would like to extend their congratulations and best wishes to the Council of the College and to the first President, Professor Michael Rosen. The staffing of anaesthetic departments and the training of anaesthetists is a problem which is still with us and is likely to persist as long as there is a specialty of anaesthesia. The Shaw report which was unveiled with a great flourish last year seems now to be in a period of hibernation and the Government's official response to the report is still awaited. The Council of our Society, in accordance with the views of members at the last A.G.M., wrote to Dr. Shaw informing him that while they recognised the merits of some of the proposals as regards training and the career structure they were deeply concerned about the difficulties which could arise in maintaining the level of services to patients. It is clear that if the report is implemented the changes envisaged will have to be introduced gradually and their effects closely monitored and assessed. There is general agreement that no junior anaesthetic post should be disestablished until methods of covering the existing workload have been identified and implemented.

Another matter which was raised at the A.G.M. was the concern that the Specialty Subcommittees of the National Medical Consultative Committee (N.M.C.C.) were about to be disbanded. This event has now been realised and there is, therefore, a need to establish an alternative body or group to act as a source of advice on Anaesthetic matters to the N.M.C.C. and the Secretary of State. Discussions between representatives of the Council of our Society and members of the retiring N.M.C.C. Specialty Subcommittee in Anaesthesia are taking place and the outcome of the talks will be referred to the Society membership at the next A.G.M. for their consideration.

During the course of the year our two regular Scientific Meetings, namely the Registrars' Meeting in June held on this occasion at the Kelvin Conference Centre in Glasgow under the auspices of the Victoria Infirmary, and the November meeting at the Western General Hospital in Edinburgh, provided an interesting and varied programme and the speakers and organisers are to be congratulated. What must be a unique occurrence is the fact that all three distinguished "guest" speakers at our meetings this year were members of this Society - Professor Alistair Spence at the Registrars' Meeting, Dr. Bruce Scott who delivered the Gillies Lecture at the November meeting, and Professor Donald Campbell at the A.G.M. in Peebles. From each of them we received a fascinating, thought provoking and memorable presentation.

The social side of the Annual Meeting in Peebles was, I think it would be agreed by all, as enjoyable and invigorating as ever. The members of our angling and golfing sections struggled to overcome the adverse and frustrating conditions which always seem to accompany their visit but despite this they intend to return again in an endeavour to achieve that elusive success which in their opinion their inherent and latent skills undoubtedly merit. Our Secretary, Dr. Peter Wallace, and our Treasurer, Dr. Douglas McLaren, have accomplished their many tasks on behalf of the Society in their usual unobtrusive but most expert manner and have transformed the potential burden associated with the honour and privilege attached to the office of President of the Society into a most pleasurable experience. To them, and to the Council, I express my sincere thanks.

Finally, Council would like to thank all members for their continuing support. The success and vitality of the Society depend on the interest, support and involvement of its members in educational and political issues as well as social. We look forward to seeing as many members as possible at the next A.G.M. in Peebles to enable us to renew old friendships and to enjoy discussions on matters of common interest, anaesthetic or otherwise!

EDITORIAL

The topical discussion subject in Scottish anaesthetic circles in 1988 seems to have moved on from the "Shaw report" (R.I.P.?) to monitoring during anaesthesia and recovery, stimulated by the publication of the Association of Anaesthetists' document. Much has been said on the subject both for and against the recommendations, but the underlying motivation of improving the standard of the practice of anaesthesia must receive unanimous support. We practice our art in an atmosphere of increased public expectation of "perfect attention and outcome", and increased likelihood of legal redress if expectations are not met. Although improving standards nearly always has resource implications, this should not detract us from seeking to provide a safer and better service for our patients. However, a potential area of considerable concern exists where the resources perceived as necessary by the clinician are not made available by management. Who carries the responsibility then?
On a lighter note, 1989 marks the 75th anniversary of the Society which was founded on 20th February, 1914, and Council have agreed that the next edition of the Newsletter should recognise this milestone by incorporating several changes. (This *will* have resource implications!). Council have also agreed to include in this current edition a document on "Anaesthetic Service Accommodation in District General Hospitals" which is broadly similar to an original paper produced by the D.H.S.S. in the early seventies.
Finally, I would like to thank all those who have contributed to this edition, and who have made it once again a publication to enjoy.

ANNUAL GENERAL MEETING

The Annual General Meeting of the Society was held in the now customary venue of Peebles Hydro from the 22nd to the 24th April. The weekend followed the established pattern of previous occasions with the AGM held on Saturday morning, and the Presidential Address, Registrar's Prize Lecture and Guest Lecture in the afternoon. These were all highly topical and of exceptional quality, and are of course recorded in full in this Newsletter.
A goodly number of golfers teed up on Friday afternoon for the first scientific session of the weekend on the practical aspects of neuromuscular co-ordination in the intermittently static subject. Many found the topic difficult to master owing to the persistent presence of a small, white object, but most performed well in the ambulatory part of the course. Dr.Robin Allinson, who had clearly attended many such meetings previously, was adjudged to have shown the best grasp of material with the fewest mistakes, and was rewarded with the prize.
The fishing outing to Portmore loch was again somewhat of a disappointment with a lack of fish enticed to forsake the water for dry land. This has prompted the organisation of an autumn meeting which is reported elsewhere.
The weekend was well supported and the relative proximity of Peebles to Edinburgh and Glasgow allowed many who were unable to stay the full weekend to attend on the Saturday. As usual the social intercourse was very enjoyable with old friendships renewed and new ones made. It really is a weekend not to be missed!

PRESIDENTIAL ADDRESS DR.A.M.REID

EFFICIENCY OF OPERATING THEATRE UTILISATION

I thought it might be of interest to review and discuss a problem which, while not directly concerned with the administration of anaesthesia, does bear very much on our own daily working practice and environment, namely the efficiency of utilisation of operating theatres. This topic has been the subject of a recent report by the National Audit Office to Parliament (1), and as a sequel to this several working parties are being established at N.H.S. and governmental level to examine some aspects in greater detail. Without doubt, therefore, we are going to be presented with further reports in the near future.

As Utting (2) has so rightly said, the principle concern of surgeons, anaesthetists and nursing staff in the operating theatre is to get through the work in hand as safely, efficiently and humanely as possible. Efficiency is defined as the ability to produce the desired result at the highest standard. The question arises, therefore , as to what results and standards we should adopt in assessing the efficiency of use of operating theatres. In 1983 various Performance Indicators were introduced to the National Health Service by management in an attempt to give some measure of how efficiently the main functions of the N.H.S. were performed at District and Hospital level. A few of the indicators introduced such as waiting list sizes, bed throughput, turnover intervals and number of beds per theatre have a bearing on or are influenced by theatre usage, but so far no indicator has been produced which specifically measures theatre utilisation.

There is no doubt, however, that efficiency in the context of operative treatment, particularly from the patient's point of view, can be evaluated properly only after the operation by the avoidance of morbidity and mortality and the early return to health of the patient.

Apart from this overriding objective which is sought by all theatre teams, some of the measures which may be applied to assess the efficiency of the various aspects of theatre activity include the throughput of patients, the extent of use of available theatre time and the deployment of staff. To these may be added the elaboration and supply of instruments and equipment, theatre design and staff training. In this short review I propose to deal only with the first three measures.

Throughput of Patients

This a figure much loved by the administrators but in fact the numbers of patients operated on are of little value on their own in assessing the efficient use of theatres or in comparing different specialties, as the duration of operation depends so much on the type of case. One theatre session of 3.5 hours could probably accommodate 16 D.& C.s, but only one Wertheim's hysterectomy and only part of a major abdominal procedure such as a Whipple's operation. The skill and speed of the surgeon, as we all know, also plays an important part in the throughput of cases. Some surgeons may complete two or three operations in the time that it takes another surgeon to do one similar case and this is particularly true when operations are delegated to surgeons in training. However, these are factors over which we as anaesthetists have no control, and in fact any attempt to speed up a surgeon who operates at a slow but meticulous pace may only end in increased morbidity for the patient.

Because of these factors - the differing types of case and the varying speed of different surgeons - the only practical measure in most instances of how efficiently a theatre session is used by a particular operating team is to ascertain how much or what percentage of the sessional time available is taken up.

Availability of Staff

Before an operating session can be undertaken there must be in addition to a surgeon appropriate matching of anaesthetist, nursing and support staff. In the Glasgow area in 1978/79 the Anaesthetic Departments and Operating Department Committees found themselves faced by requests from the surgeons for 53 additional elective sessions. Theatre space and surgeons were available but there were no anaesthetists to meet these additional demands. Added to this were re-

quests for another 74 Consultant sessions from the Anaesthetic Divisions themselves to meet additional needs for Intensive Care Units, Pain Clinics, Senior Cover for Accidents and Emergencies, and replacement of isolated Registrar lists.

Requests for additional anaesthetic staff were therefore submitted to A.C.M.E. and we were privileged to receive not the usual brief yes or no response but an actual short paper from the Scottish Home and Health Department itself in which it was stated that it was difficult to see how any request for additional anaesthetic posts in the Glasgow Area could be sustained. This conclusion was based on three main points derived from the S.H.H.D. statistical collection.

1) The Glasgow Area had more anaesthetists per head of population than anywhere else.

2) The number of operations per year when related either to the number of W.T.E. consultants or to the total number of anaesthetic staff was the lowest of any Scottish area.

3) The number of alleged operating hours per consultant anaesthetist placed Glasgow third bottom of the fifteen areas in the Scottish Region.

At first glance there seemed no room for argument but the figures which were presented were in fact an outstanding example of incomplete and sometimes inappropriate data from which completely erroneous conclusions regarding anaesthetic workload were drawn by the S.H.H.D., and they serve to illustrate how important it is for the specialty to be able to present accurate figures and appropriate interpretation when dealing with the management or administration. As Gumpert(3) pointed out recently in the Annals of the R.C.S., some otherwise intelligent health service members bestow on numbers a magical property and will make decisions on numerical differences whose accuracy is quite unproven. For the benefit of our younger members, I will elaborate these points briefly in the hope that it may be of help to them if they ever have to deal with administration or management over similar problems in the future, and it must be said that, as one get. older, it beeomes apparent that these same problems have a tendency to recur.

The Consultant Anaesthetist/Population ratio at that time ranged from 1 in 15,600 for Glasgow and 1 in 18,600 for the Lothian Area to between 1 in 37,500 and 1 in 54,300 for the other Scottish areas; the corresponding English figure was in the range 1 in 27,000 to 1 in 48,000. It was pointed out by the Glasgow Area Anaesthetic Committee that it was only to be expected that this ratio would be higher in Glasgow than in other Scottish areas because the extent of services provided was greater than,and could not be economically duplicated, in other areas. There existed a full range of regional specialties including Cardiothoracic, Vascular, Plastic and Maxillo-facial, Neurosurgery and Paediatrics, in addition to five large Teaching Hospitals with their various commitments and five large Maternity Hospitals dealing with approximately 13,000 deliveries per year.

All these groups required staffing and all attracted a significant proportion of patients from other areas and even some from overseas. In some circumstances, such as Cardiothoracic Surgery and Paediatrics, approximately 70% of patients came from outwith the Glasgow area, and even in General Surgery the figure was over 30%.

The larger number of anaesthetists in this area was merely a reflection of the work done and was related to the needs of a population much greater than that of the Glasgow area. Subsequently the S.H.H.D. accepted this point and agreed that the resident population is not a particularly useful measure of workload when comparing all Boards.

The second measure put forward by the S.H.H.D. relating to the number of operations per W.T.E. Consultant Anaesthetist and also per W.T.E. Anaesthetic Staff is again of little relevance in comparing work done between areas providing different levels of service. I have already mentioned the fallacy of numbers in relation to time required for the work and the ratio is even more misleading when junior staff are involved in the calculation. The S.H.H.D. seemed to take no cognisance of the fact that junior staff participated in an extensive training programme and the time, therefore, which they could give to administering anaesthetics on their own was strictly limited.

In the third instance the S.H.H.D. presented the reputed number of hours spent in theatre each year by Consultant Anaesthetists in-

volved in elective operations in the 15 Scottish areas. In the full table Glasgow came third bottom in performance with 1,034 hours per Consultant while the Highland Area rested on top of the table showing 2,159 hours per Consultant. However, on examining the table more closely obvious discrepancies become apparent to any practising anaesthetist.

A Consultant who confines his sessions involving the actual giving of an anaesthetic solely to the operating theatre could provide a maximum of 7 or perhaps 8 elective theatre sessions each week. Over the year, if six weeks holidays are taken into account, this would amount to 1127 to 1288 hours (assuming the sessions averaged 3.5 hours each). When these figures were considered, therefore, it rendered the interpretation of the operating hours given by the S.H.H.D. rather difficult. What has happened in the areas where the alleged hours spent by Consultants in elective operating theatre work exceed 1300? The excess is certainly not all accounted for by excessively long sessions or by some emergency work which has been included inadvertently in the figures and we can only assume that an unknown proportion of anaesthetics were given by other than consultant staff. In the absence of such data the ratio of operating hours per Consultant Anaesthetist, as calculated by the S.H.H.D., cannot give a true comparison of consultant workload in the different Health Board Areas. This criticism applies particularly to the higher ratios.

For example, in the Highland Area 3.5 W.T.E. Consultant Anaesthetists were listed as providing 7557 operating hours in the year, giving a figure of 2159 hours for each Consultant per year. However, when the 4.3 Limited Specialists were found hiding in another staffing table and were added to the Consultant numbers a much more realistic figure of 969 hours per Consultant and Limited Specialist resulted.

The other important factor, which was not taken into account in the S.H.H.D. assessment of Consultant hours worked, was the work done by anaesthetists outwith the actual elective operating theatres - the hours actually spent during the normal weekday working in Obstetric and Intensive Care Units, Pain Clinics, and the provision of anaesthesia for procedures in Radiology, Radiotherapy and E.C.T.

This work in the Glasgow Area, including time for pre- and post-operative care etc. amounts to 38% to 47% of a consultant's workload depending on the method of calculation used. When the actual hours worked are selected for the calculation, rather than merely the number of sessions, the percentage result is higher because in units such as the Maternity and Intensive Care, morning and afternoon sessions normally last 5 and 4 hours respectively instead of the 3.5 hours assumed in the sessional calculation. Administrators and managers, and I regret to say even some physicians and surgeons, need reminding of this work commitment outside of operating theatres.

Finally, in order to clarify the situation the Area Anaesthetic Committee, after much labour, collected and correlated accurate figures for actual operating hours in the Glasgow Area and found that over 6000 had failed to reach Edinburgh. To obtain some idea of the actual consultant contribution to these operating hours in the absence of full data the total figure was reduced by an allowance for sessions not normally done by a consultant. The actual time spent by consultants during normal working hours in units outwith the theatre area was then added to these adjusted operating hours, and from this sum the average yearly hours worked by a consultant was calculated. This figure for the Glasgow Area, came to 1235 hours per year - which comes within the range of hours expected with seven to eight 3.5 hour sessions per year. These figures did not include any of the two session time spent on pre- and post-operative care, teaching, administration or research, and also did not include any of the emergency work done outwith normal working hours.

There was absolutely no evidence , therefore, to substantiate the suggestion by S.H.H.D. that anaesthetists in the Glasgow area were underutilised and working less intensely than their colleagues in other areas.

Possibly as a result of these labours the S.H.H.D. came to agree with the view of the Area Anaesthetic Committee that the measurement of actual service workload is the most important factor in assessing the adequacy of anaesthetic staffing and the case for additional posts.

Use of Theatre Time

Maximum use of theatre time is an important practical issue because one of the central elements in the planning of admissions from in-patient waiting lists is the availability of theatre time and this in turn affects the use of beds and staff.

As you well know there are large numbers of cases awaiting hospital admission, most of them requiring surgical treatment. If it were possible to increase the throughput of theatre cases this measure should result in a reduction of the waiting list size, an objective much sought after in political circles as well as by other bodies and the patients themselves.

As a result of this view the National Audit Office (N.A.O.) was commissioned to examine the use of operating theatres in the N.H.S. in England and presented a report to the House of Commons which was published only last November(1987). The N.A.O. employs some 900 staff and is headed by the Comptroller and Auditor General, Sir Gordon Downey. He and the N.A.O. are totally independent of the Government. He certifies the accounts of all government departments and a wide range of other public sector bodies and he has statutory authority to report to Parliament on the economy, efficiency and effectiveness with which departments and other bodies use their resources.

In order to establish the extent to which operating theatres are used it is necessary to take into account the total number of theatres available, the number of theatres staffed and allocated for use, and the extent of use of allocated theatre sessions.

The N.A.O. set out to determine these figures by examining in detail the operating theatre use in the five District Health Authorities of Bath, Northampton, Southampton, Tameside and Wakefield during the months of February, March, and April 1986. The survey concentrated on the utilisation of available theatre capacity during weekdays in the specialties of General Surgery, E.N.T. and Orthopaedics. Each theatre was looked at as being able to provide a maximum of ten day-time sessions per week for elective work. For the purposes of analysis and discussion each morning and afternoon session is regarded as providing a period of 3.5 hours for the work of the operating team. A session actually lasting 3.5 hours is credited as 100% use of available theatre time; one of two hours duration would then represent 57% usage and one of 4 hours 114%.

In the five D.H.A's examined there were 54 theatres providing 540 day-time weekday operating sessions per week. Only 384 or 72% of the potentially available sessions were regularly staffed and scheduled for use. 5% were unallocated but designated for maintenance and 23% were unstaffed and unallocated. The proportion of unallocated sessions varied among the five Districts from 2.7% to 36.7%.

These findings are very similar to the earlier surveys of the D.H.S.S. and Oxford R.H.A. and also to the situation at present existing in the Glasgow Area where approximately 25% of potential theatre sessions are unstaffed and unallocated.

There is obviously, therefore, a significant amount of spare theatre capacity. To some extent this may be planned as the number of theatres constructed at any one time may originally be chosen to meet projected needs and future expansion.

Use of Scheduled Sessions

As regards the actual sessions which had been staffed and allocated to the three specialties in the English study, over the 90 day period only 77% of the available time had been used. 23% of the staffed theatre time was unused and of this 18% related to operating sessions which had been cancelled. This figure is the equivalent of an average of approximately 15 sessions/D.H.A./week. The remaining 5% represented the net effect of sessions running shorter or longer than their scheduled duration of 3.5.hours. There was significant variation among D.H.A.'s ranging from 62% use of theatre time in Northampton to 102% use in Bath. There was even greater variation in use of theatre time by individual clinicians varying from 24% to 133%.

In a similar study undertaken in Glasgow over a six week period in February/March 1986 involving 1377 sessions spread over the five Districts in the City the overall figures for the three selected specialties were a slight improvement on the English figures - an average of 85% of available theatre time being used, 7% of cancelled sessions, and 8% net underutilisation of sessions.

A more prolonged analysis conducted over two three month periods, January - March,

and September - November 1987, involving 1084 sessions in one hospital, the Glasgow Royal Infirmary, showed a somewhat greater use of available theatre time, signifying more efficient use or more lethargic surgeons. Here 90% of the available theatre time was utilised. Of the 10% unused time, 6% was due to cancellations and 4% to net underuse. It should be noted, however, that none of the periods analysed in these surveys included the peak holiday months of July and August when in most hospitals there will almost inevitably be cancellations due to lack of staff. In Glasgow Royal Infirmary, for example, such cancellations amount to approximately 13% of elective sessions and by agreement between the Anaesthetic and Surgical Divisions are planned well in advance.

Duration of Operating Sessions

Analysis of the duration of planned sessions allocated to General Surgery, Orthopaedics and E.N.T. in the various surveys showed a broadly similar pattern of scatter with 20% to 30% lasting less than 2.5 hours amd a similar percentage exceeding 4 hours.

It is not always possible to forecast exactly the duration of certain operations and there has to be give and take on all sides. There must also be a reasonable interval between cases - a compromise between delay and undue haste. Time is required to allow nurses and ancillary staff to clean the operating room and prepare for the next case. A short period of rest for the surgical team and nurses is also indicated after the physical and mental stress of a long procedure; and some time may need to be allotted to teaching.

Nothing reduces efficiency more than a surgeon frenziedly trying to push through more cases than is feasible in the time available. This practice may lead to disaster. Until the early 1960's in the Glasgow Royal Infirmary it was common practice to use two surgical teams and tables to run two operations simultaneously in the one theatre. This practice, however, came to an end when in one month swabs were left in two patients, largely because the nurses could not reasonably cope with the pace of work being attempted and could not guarantee an accurate swab count. There must be agreement also on the time at which a list should finish. If a list should overrun its allotted time it is in many instances unreasonable or impossible for nursing staff to stay on or be replaced, as they may be required to staff the emergency theatre. Apart from this, because of financial restrictions in many areas, no payment is made to nurses for overtime work, and if they do stay on to complete the list they are given subsequently time off in lieu so that some future elective list will be deprived of their services. Any assessment of theatre utilisation is not intended to give an additional merit award to a surgeon who consistently over-runs his allotted time and records, therefore, a high percentage usage of theatre time. This type of practice merely tends to put undue stress on the theatre team, and staff who work in a state of discontent cannot be expected to give of their best. Efficiency in theatre is dependent on cooperation and mutual understanding among all members of the operating team and the creation of a congenial atmosphere.

Reasons for Curtailed Sessions

From the foregoing findings it is obvious that if we wish to utilise as fully as possible the available theatre time it is necessary to ascertain the reason for cancelled or curtailed sessions and to determine whether by appropriate planning these factors can be avoided. Some of the contributory causes include staff shortages, non-arrival of patients, no beds available, I.C.U. full, no blood available, investigations incomplete, or a decision not to operate.

Let us look briefly at the first three items which together accounted for 82% of cancelled sessions in a survey conducted by Oxford Regional Health Authority(4).

Shortage of Staff

Absence of surgeon or anaesthetist accounted for some 51.5% of cancelled sessions in the Oxford survey. As regards the availability of surgeons it is clear from this and other surveys that some 17% - 20% of surgeons were unable to use their allocated sessions due to other commitments, while in contrast 40% - 42% considered they were allocated insufficient theatre time. The N.A.O. survey found that generally theatre time was allocated to individual consultants rather than specialties and that allocations were largely on a historical basis. Despite identified underutilisation relatively little change in allocation had occurred. Without doubt this is a situation which calls

for re-allocation of theatre sessions and could in future become the province of hospital managers but I think it would be much less traumatic if done by the profession itself. In the Glasgow Royal Infirmary this power to re-allocate is part of the remit of the Operating Department Committee and has been used on several occassions.

In addition to any re-allocation, however, the report by the Royal College of Surgeons in June 1986 makes it clear that an increase in the number of Consultant Surgeon posts would be needed to solve the problem of long waiting lists.

As an additional approach the use of locums might be considered but the view has been expressed by Wessex R.H.A. that the quality of service to patients suffers from the use of locums who are unfamiliar with the routines of the hospital, and are often not very experienced in the particular work undertaken and do not have the same commitment.

Cancellations resulting from the lack of an anaesthetist as we all know are due almost solely to sickness with perhaps an odd day for holidays or study leave, and the only way round this is to employ more consultants, registrars or locums.

Availability of nursing staff is a crucial factor in making the best use of available theatre time and other resources. In many areas nurse recruitment is a problem but apart from this there is an obvious need to match available theatre staffing to workload. In some hospitals shift patterns may contain significant overlaps which inflate staff cover at certain times of day. To avoid this and promote the most efficient use of staff closer correlation of shifts and timing of theatre sessions is required.

Non-arrival of Patients

In the Oxford R.H.A. survey 22.6% of cancelled sessions were due to the fact that patients did not turn up for treatment. Some of the reasons contributing to this were that the patient had turned up as an emergency, or received alternative treatment, died, changed address, changed mind or was given too short notice of admission.

It is obviously desirable to have as accurate and up-to-date a waiting list as possible available and the N.A.O. observed that reviews of waiting lists had usually resulted in the removal from the lists of substantial numbers of patients - 18% upwards. In fact in one instance where over 100 cases who had been on a waiting list for over a year were contacted only 10% could be found who still required surgery. Not unexpectedly, also, the number of patients failing to attend is likely to be greater the shorter the notice given. The notice of admission given to patients varied from 3 days to 2 weeks. Optimum utilisation of resources is likely to be achieved only by giving early notification of admission dates and requesting positive confirmation from patients of their intention to attend. Also, if records are maintained of patients willing to be admitted at short notice, this may allow cancellations to be filled.

On occasion there are patients who are admitted but who have to be removed at the last moment from the planned operating list either because there is insufficient time to complete investigations or because they develop an acute respiratory tract infection or suffer from some medical condition which has been inadequately treated or previously undiagnosed when seen at the out-patient clinic.

It was hoped a few years ago that the establishment of a pre-assessment clinic, as envisaged in the Duthie Report, would minimise this difficulty but, of course, the patient's condition may change in the interim. Moreover, it has been pointed out that these clinics divert resources, particularly medical staff, away from other activities and the benefits of screening need to be evaluated in this light. A cost-effectiveness study by Yorkshire R.H.A. did not demonstrate that significant benefits would be gained from pre-admission screening.

Bed Availability

Lack of available beds was responsible for 7.9% of cancelled theatre sessions. Beds may be unavailable because they are filled by emergency cases or by cases with an unexpectedly prolonged duration of stay arising from postoperative complications or difficulty in discharge because of inadequate home conditions or lack of second line beds. Alternatively, there may be insufficient beds for the number of available theatre sessions or, put another way, too many theatre sessions for the number of beds provided.

To achieve flexibility the D.H.S.S

recommends that bed allocations should be to a team of surgeons and not individuals, and that there should be co-operation between specialties as regards short-term borrowing and lending of beds. It may also be possible to improve the use of beds by changes in the theatre timetable.

Emergency cases pose particular problems in the planning of elective admissions because of their impact on theatre time and beds. The problem is particularly acute where there are no theatres specifically set aside for emergencies. In such situations a significant amount of emergency work may have to be undertaken during or at the end of elective sessions resulting on occasion in the cancellation of elective cases. It is important wherever possible to provide theatres and bed facilities for emergency cases in line with expected workload and it may be that the concentration of emergency services at one main hospital rather than small scattered sites would provide a better service and also a saving of costs.

Data Collection

From what we have discussed it is obvious that if we want to make optimum use of the theatre time available a great deal of data has to be collated and analysed continuously. As we all know, there are significant problems in data collection, manipulation and interpretation. Information is inherently an expensive commodity both in time taken to collect it and subsequently to verify that it is accurate, complete and meaningful. So who is going to undertake or be given this task?

At present in the Glasgow Royal Infirmary, as in many units, the times of each theatre session are entered by theatre sister or one of her staff on a printed form, which we are in the process of modifying to show by the use of a coded letter the reason for a cancelled or curtailed session and also to show whether any patients on the list were cancelled due to lack of available theatre time. This data is then entered on a computer programme which has been formulated by Dr.Gavin Kenny and from this a print-out can be obtained to show the percentage of available theatre time used by each team for each session, together with the reasons for cancellation or curtailment. This data can be grouped to show the usage of a particular session or by a particular surgeon for any selected period during the year so that at a glance it is easy to identify any repeated under or over-usage and possible steps which may be taken for correction.

Even with this relatively simple data it would take approximately four to five hours each month to enter the details of the twelve theatres included in the programme.

Is this all the data we require to maintain efficient use of theatre time? With modern microcomputers there is almost no limit to the data that can be collected and analysed. One such advanced system, Theatreman, which was developed in conjunction with Crewe Health Authority, has already been installed, or is in the process of being installed in Cardiff, Southampton and Newcastle. This system besides providing details of utilisation of theatre time maintains a number of records or sets giving information on types of admission, operation and outcome along with details of Surgical and Anaesthetic staff involved and the anaesthetic used. With the addition of the appropriate model it can also provide full Stock Control facilities, and accurate costings of materials, theatre trays and sterile packs. It can thus produce a full audit of each theatre's activities including costings of the total operation based on time taken, overheads, staff and material costs.

This type of system will obviously be very time consuming in entering data, much more expensive than the simpler models and will almost certainly require trained , devoted personal staff to feed it. It may well come to the fore when cost budgeting becomes established, but it will be needed in all areas, and is the patient going to benefit from better service than at present? There is obviously a need to initiate a trial of such schemes for a period in selected centres followed by a careful cost-benefit analysis.

Besides the availability of appropriate data it is clear that the efficient use of theatres and any proposed change in practice is dependent on firm control by some individual or group and it has been suggested that to achieve this a post of Theatre Services Director or Manager should be established. Alternatively, it might be that in some situations this control could emanate from a strong Operating Department Committee and Chairman. It is felt that the Theatre Services Director should preferably be medically qualified so that he or

she can relate more easily with medical and nursing colleagues over problems. Where it proves impossible to fill this post with a medically qualified person, a senior nursing colleague might be appropriate but must be given sufficient authority to achieve maximum usage.

An appointment along these lines has already been established in Cardiff where a recently retired Consultant Anaesthetist has been granted wide ranging powers and using them has had much success in improving theatre usage.

Financial Considerations of Increased Use of Theatres

In this review I have looked at several measures which can be taken to improve theatre utilisation, increase the throughput of patients and go some way towards reducing the waiting lists but do our N.H.S. Managers with their limited budgets and do our political mentors (unless they are in the opposition parties) really want to see empty unallocated theatres brought into use? In private medicine increased throughput of patients means increased income for the private hospital and specialist. In fact it has been said that to survive an American hospital needs as many patients as possible using as much sophisticated equipment as possible with as fast a turnover as possible. In the National Health Service, however, every such step means increased costs.

When Bath D.H.A. through active measures increased its theatre utilisation from approximately 82% to 102% it had to spend an extra 100,000 pounds in the year on surgical and medical supplies alone.

In 1984 the D.H.S.S. examined the likely cost implications of using operating theatres additionally at the weekends. It assessed that such a move could produce overall benefits and a reduction of up to 3% on cost per patient treated. However, they also estimated that to obtain these benefits would involve increases in overall costs of over 300 million pounds per annum at 1983 prices.

Even providing one extra weekday session costs money and Wakefield D.H.A. have estimated that to commit an unallocated and unstaffed theatre session would cost up to 450 pounds per hour.

It is clear, therefore, that any significant increase in the use of operating theatres cannot be achieved without extra expenditure. The additional outlay required would be very difficult to finance from existing restricted health services budgets and could be met in most instances only with the aid of increased government funding.

References

1.Use of Operating Theatres in the N.H.S.- Report by the Comptroller and Auditor General, National Audit Office, Nov.1987. Published by H.M.S.O.

2.Utting J. Chapter in The Design and Utilisation of Operating Theatres. Eds. Ivan D. Johnston and Andrew R. Hunter. Published by Edward Arnold 1984.

3.Gumpert J.R. Annals of the Royal College of Surgeons of England 1988; 70: 85-92.

4.Oxford Regional Health Authority - Use of Operating Theatres in the Oxford Region - Preliminary Report, Oxford: Oxford R.H.A. 1982.

QUALITY SLEEP

"Generosity he has, such as is impossible to those who practice an art, never to those who drive a trade; discretion tested by a hundred secrets; and what are more important, Heraclean cheerfulness and courage. So that he brings air and cheer into the sick room, and often enough, though not so often as he wishes, he brings healing". These words of Robert Louis Stevenson, while romantically and even extravagantly couched, probably truly reflected the public view of the doctor of one hundred years ago. That there has come about a sea-change in the general public's view of our profession is indisputable, a change in social attitudes which among other things, has embraced diminished feelings of gratitude and loyalty to doctors. Indeed, the ever-present threat of litigation looms large although there is no evidence whatsoever, at least judged by the American experience, that this threat has done anything to improve the quality of patient care or even to improve the standard of practice of those doctors whose performance is less than satisfactory. The opposite is likely to be the case since the distressing trend is to view every patient who comes under our care as a potential enemy and litigant and this must be detrimental to the quality of care. The spectre of defensive medicine is among us and it behoves us to seek ways by which our self-regulating profession can rapidly improve its image and restore that precious confidence that is the sure foundation of the doctor-patient relationship.

"The public is now taking a closer interest in clinical standards, medical competence and the provision of services. And with good reason. In some areas the quality of medical care falls far below acceptable standards. Sometimes this is because finite resources cannot match infinite demand but bad medicine is also to blame sometimes". This observation was not made recently but 10 years ago by John Illman in an article on "Problems of Medical Audit". He was expressing a view which was, and still, is borne out by the facts and subsequent events but the urgent question for us now is how far have we progressed in recognising the situation and taking appropriate action? Is there not a detectable tendency, almost daily publicised in the press and television, to point the critical finger at Government in its obvious dilemma and manifest failure to meet the infinite demand with inadequate resources, distracting us from what is the prime business of the profession, to put our own house in order?

When the Royal Commission on the N.H.S. reported some years ago (1979) it advocated Peer Review but acknowledged that in many hospitals this had already become more formalised with regular reviews of treatment and progress and through "deaths and complications" conferences. It added that Peer Review has the obvious advantage that it is not imposed by some external body and it avoids the difficulty of appearing to apply some ill-defined national standard but, unless it is undertaken systematically, it will lack public credibility. In the absence of a credible initiative by the profession, Government is increasingly responding to public demand in a predictable manner, so far as politicians are concerned, by seemingly endless reorganisations including the introduction most recently of the industrial techniques of professional management and performance indicators. At this point it might be worth reflecting that while men in their wisdom create institutions, thereafter the institutions shape the men. The increasing institutionalisation of medicine may have a bearing on the public's apparent lack of confidence in those who work within these increasingly impersonal organisations. That all of this might not be the end of the Government's more direct intervention is evident from the public press which is now openly discussing the need for yet further review of the Health Service and, backed by two recent reports from the Adam Smith Institute, debating proposals for new methods of funding and new managerial structures,

"aimed at producing a more cost-effective and competitive health service". One suggestion is the abandonment of Regional, Area and District authorities altogether and the establishment of new Health Management Units.

Against this background of almost constant political and structural change, what progress is the profession and in particular our own specialty making, which would restore and maintain public trust and credibility if this is indeed deteriorating? I would like now, from a very personal point of view based on a certain amount of relevant experience, to consider our position, take stock and perhaps identify some persisting defects that require remedy. In doing so, I may ruffle some feathers but I have always tended to agree with George Bernard Shaw who, in the Doctor's Dilemma, said: "As to the honour and conscience of doctors, they have as much as any other class of men, no more and no less". I also believe that our National Poet Robert Burns was near the mark when he commented on the self-interest and lack of objectivity of his fellow men in an "Epistle to a Young Friend" as follows:-

"But och! Mankind are unco weak,
An' little to be trusted;
If self the wavering balance shake
It's rarely right adjusted".

In reviewing this specialty's record in matters of self criticism in its efforts to achieve and maintain the highest standards I have come across quite early evidence of true concern and effective action in the fairly distant past. One hudred and six years ago the Committee of the Glasgow Royal Infirmary Managers showed early interest in the supervision of training in anaesthesia and the improvement of patient safety. Concern arose in 1882 from the frequency of deaths associated in particular with chloroform anaesthesia. Suggestions were made at that time, mainly by a *lay* member of the Board of Managers, a Mr. McEwen, that a course of instruction must be required for all House Officers before they would be certified to give anaesthetics.

The following are extracts from the minutes of those Board Meetings;

9th.October 1882 :

2. That the Pathologist shall deliver a course of lectures on anaesthetics at the beginning of each Winter Session, or oftener if required by the managers.

3. That in making the appointment of resident Assistants, the Managers will consider it necessary that the candidates have attended a special course of instruction on the action of anaesthetics, or have a certificate from the Pathologist showing that they have a proper knowledge of the subject.

4. In case of a death occurring while the patient is under an anaesthetic, whether in the presence or absence of the Physician or Surgeon, he shall make particular note of all the circumstances of the case in the Ward Journal or Operation Book, and shall report the same, through the Superintendent, to the next meeting of the Weekly Committee.

These resolutions amended by the omision of the words "The Pathologist" were given approval by the medical staff.

16th March 1883

The thoroughness of the Manager's enquiries into the teaching and administration of anaesthetics was shown further in the following year. At the instigation of Professors W.T.Gairdner and John Clelland, a very detailed questionnaire was sent to all the principal hospitals in the United Kingdom and Ireland, enquiring as to their practice in this regard.

These questions, in what must have been the very first national survey in anaesthesia or indeed in any aspect of clinical practice included the following:

1. Are there any formal regulations with respect to the use and administration of anaesthetics, especially chloroform?

2. Is there any special instruction given in the Hospital.

3. Are the Resident Medical and Surgical Officers permitted to administer chloroform without the presence of the Visiting Surgeon or other Member of the Senior Staff?

6. Are unqualified Assistants allowed to give anaesthetics?

7. Is there any Specialist appointed for the administration of anaesthetics?

8. Have fatal accidents occurred in your hospital during the administration of chloroform?

The replies indicated that:

1. There were no formal regulations in

Scotland and very few in England and Ireland.
2. Instruction was given in Edinburgh, Aberdeen, London (Guy's, Westminster, King's College and the University College Hospitals), Leeds and Dublin.
3. All the hospitals except Dundee and Dublin allowed anaesthetics to be given without the presence of one of the visiting staff.
7. There were very few Specialists in Anaesthetics; in Scotland, none except possibly Aberdeen; in England, 3 hospitals only (St. Thomas's, Guy's and King's College).
8. Fatal accidents associated with anaesthetics were reported from almost every hospital.
The results of this survey strengthened the resolve of the Royal Infirmary Managers to continue with their actions to improve patient care in this respect in Glasgow. However, despite this early interest in the systematic teaching of anaesthesia and the proper control of its administration, it was more than 20 years before the formal appointment of an anaesthetist specialist was made. The first appointee was a Dr.A.L.Watson in 1906 and subsequent appointments were made until there were, by 1912, six anaesthetists on the staff. One of these was Dr.H.P.Fairlie in 1910, who held the position at the Royal for sixteen years when he transferred to the Western. In his time Harry Fairlie was considered to be the most renowned anaesthetist in Glasgow if not in Scotland. He was co-author of Ross and Fairlie's "Handbook of Anaesthetics", the standard textbook for all housemen throughout the United Kingdom, and the esteem in which he was held is evident from his election to the Presidencies of the Anaesthetic Section of the R.S.M. and the B.M.A. and, of course, the Scottish Society of Anaesthetists.
Certain significant events have led directly over the years to further improvements in the standards of education and training in anaesthesia. The first was the founding of the Association of Anaesthetists of Great Britain and Ireland in 1932. This body, along with the Royal College of Surgeons of England, gave birth in 1948 to the Faculty of Anaesthetists whose principal task has since been in broad terms to see to the quality of anaesthetic practice in the United Kingdom by control of educational standards. Amongst many other contributions the Faculty has tightened control of standards through its various agencies and some years ago issued a statement on Quality Control in Anaesthesia as a guideline to consultants and those involved in training. The Board of Faculty concluded in that document: "There is not yet any conclusive evidence that audit in anaesthesia improves patient care although it might be expected to do so. If results show that this does actually occur, then the Board will consider whether audit activities, as well as other educational meetings and morbidity/mortality surveys, should be incorporated into the requirements for recognition of hospitals for the training of anaesthetists". Since that statement, the Faculty along with the Royal College of Surgeons of England has been moving to the position where these activities will be mandatory.
A further important milestone in our specialty's concern in the matter of standards of practice and patient safety is marked by an editorial in February, 1955 in the British Journal of Anaesthesia. It drew attention to the knighthood conferred that year on Sir Robert Macintosh for his great services to anaesthesia and made much of the important catalytic influence on standards of teaching of University Departments such as Oxford. The same editorial drew attention to the first University Department of Anaesthesia in Scotland that year with the appointment of Dr.A.C.Forrester to the headship as Senior Lecturer. This brought the United Kingdom total of University Departments to seven, including Oxford, Newcastle, Leeds, Cardiff, Liverpool and Bristol. Part of this important editorial is worth quoting in full as evidence of anaesthetists' concern for Medical Audit at that time: "..... there is ample evidence that accidents still occur. One has only to regard the reports of the Registrar General on deaths, or of the Committee of the Association of Anaesthetists of Great Britain and Ireland which is investigating deaths under anaesthesia (1952; Pask,1955) to be convinced that all is not well nor perhaps even as good as it could be .....". Further commenting on the lack of co-operation the Association's investigation encountered in some leading centres, the editorial goes on : "If we are not

prepared to help.... it will not be surprising if the administrators of the National Health Service feel tempted to step in and carry out their own investigation". Surely these are prophetic and indeed chilling words when we consider that thirty years later we have only now achieved the recent Confidential Enquiry into Perioperative Deaths and this year its successor the National Enquiry supported by the D.H.S.S. All efforts to initiate a similar exercise in Scotland have failed to date, despite repeated negotiations by the Faculty's Scottish Standing Committee with the S.H.H.D.

In the interval since that editorial, there have been many reports and publications emanating from and supported by such bodies as the Nuffield Provinicial Trust, King's Fund, the Association of Anaesthetists, the Faculty and the R.S.M. and tens of thousands of words in books, editorials and articles on the subject, perhaps a greater threat to sylviculture than acid rain. Real progress, however, in instituting a regular oversight, managed by the profession itself, of its own activities, has been erratic, deathly slow and almost certainly lacking in public credibility. Too little has been done to instititute regular interdisciplinary morbidity and mortality meetings between surgeons and anaesthetists so essential for proper evaluation of our performance at the all-important departmental level.

The recently published C.E.P.O.D. study points out clearly that all previous endeavours, commendable though they were, shared the same weakness since few considered anaesthesia and surgery together. An overall death rate in this study of 0.7% in over 500,000 operations with only 0.004% classified as avoidable might lead to an attitude of complacency were it not for the pattern of unsatisfactory practice revealed in many instances leading to avoidable deaths within the first thirty postoperative days.

A whole range of interacting and overlapping factors were considered to contribute to death in most cases but there was revealed a clear need for better surgeon and anaesthetist collaboration in preoperative risk assessment in all patients and also in resuscitation of the gravely ill prior to embarking on surgery. Inappropriate surgery on the very elderly and terminally ill was another disturbing factor which must receive attention.

Lest we believe that these observations mark some new discovery, it is worth a brief digression to cast our minds back over 200 years to William Hunter, that remarkable polymath. Some years ago I came across his rough notes in his own hand for a lecture on surgery to be given to his students in London. The points he made have a startling relevance to our subject today.

1. Has the patient strengh and habit of body and mind fit for the operation?
2. Will the advantage balance the risk?
3. If doubtful - trust to Nature - both because it does wonders and that surgery may not always do good.
4. Have trusty assistants and communicate to them.
5. Before and at the time, study tenderness for the patient.

We must be clear that the C.E.P.O.D. and the new National C.E.P.O.D. enquiries refer only to the crude statistic of death. It is worth remembering that there are too many "near misses" and that the trend of non-lethal accidents and damaged patients is very disturbing. This is reflected in the Scottish Medical and Dental Defence Union statistics leading to an awesome increase in out of court settlements and expensive in-court litigation reflected in a 400% increase in subscriptions in the last decade.

Hoffenberg (1986) in his recently published Rock-Carling monograph "Clinical Freedom" referring to the American experience says: "If the shadow of medical litigation is now beginning to reach our shores, which steps should we take to contain it before our own style of medical practice is affected?". He suggests three possible ways of tackling the problem.

1. By improving standards of care.
2. Limiting the damages awarded.
3. A form of "no-fault" compensation.

Only the first is within the profession's immediate control.

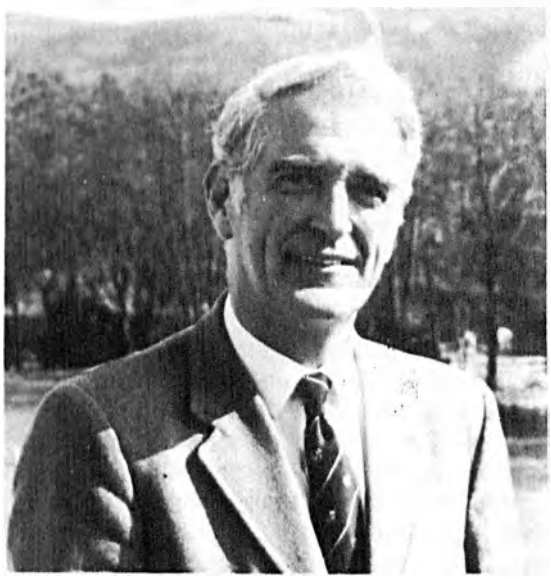
Our specialty has not been idle in this respect with particular emphasis being made on the improvement, wherever cash-limits make it possible, of the physical surroundings of anaesthetic rooms, recovery rooms and operating theatres, and the steady

introduction of the latest high-technology equipment for the administration of anaesthesia and the monitoring of the patient's response. This has been accompanied by countless articles, seminars and symposia attempting to define the proper place of these complex products of the genius of the computing and medical engineering industries. Less has been done to evaluate the cost-effectiveness and cost-benefits of this technological revolution in anaesthetic and surgical practice and less still on the ability of the operators to employ it skillfully and safely. It could be argued that there is a real risk that, improperly used, equipment of such complexity may tend to come between us and our patients, distracting us to some extent from our primary concern. High technology has intruded increasingly into our working environment and incidentally contrasts vividly with the essential simplicity of the operating environment of yesteryear. The almost overwhelming deluge of on-line patient information now necessitates computer-controlled automatic acquisition of data if it is to be used for the patient's benefit in "real time". The monitors themselves are sufficiently complex that they themselves must be monitored to give immediate warning to the anaesthetist of errors in performance or complete breakdown. The modern theatre environment is anything but user friendly and indeed is fast becoming hostile with its cacophony of peeps, bleeps and buzzers and flashing warning lights, signalling either impending doom for the patient, or the need for surgeon or anaesthetist to contact the hospital switchboard. As a matter of urgency it is necessary to restore a more tranquil atmosphere conducive to rational thought, and direct scrupulous attention to the anaesthetised or recovering patient and unfailingly safe performance by the anaesthetist. Because something is technically possible in surgery or anaesthesia is a long way from justifying the claim that it is essential or even desirable.

It seems to me now unarguable that regular anaesthetic/surgical audit of the C.E.P.O.D. type on a national basis, combined with self-assessment and peer review at departmental level, is both desirable and urgently necessary. Those bodies charged with the training and education of young anaesthetists and surgeons throughout the United Kingdom must now exert their undoubted influence and authority to establish this process of self-examination as an *integral* part of everyday practice. The matter is of too fundamental importance to be left to politicians, medical or otherwise, who too often appear to avoid the intellectual rigour of constructive thought, rather as athletes eschew sex, lest it blunt their competitive edge! The profession itself must contrive to take the initiative and demonstrate convincingly to the public that it is doing so and therefore be worthy of their trust.

It is highly improbable that it will fall to any of us, like William Morton, to take part in any dramatic leap forward in medical science. Ours, however, is the no less important task to make the modern practice of surgery and anaesthesia ever safer by painstaking and constant self examination of our everyday performance. Only the highest quality will suffice and, while new drugs and new technology can assist, the essential ingredient for success was, is, and always will be, our professional attitudes in teaching and performing to the highest possible standard.

This Scottish Society has taken important initiatives in the past with considerable success on behalf of our specialty. I submit that there is another opportunity now to give a lead in this endeavour to improve further our practice in Scotland and keep faith with our predecessors and our patients.



REGISTRARS PRIZE

Dr.Donald Maclean

Maximum expiratory airflow during chest physiotherapy on ventilated patients, before and after the application of an abdominal binder.

INTRODUCTION

Chest physiotherapy has become established as part of the clinical management in the intensive care unit for the prevention and treatment of chest infection(1). However there is little firm evidence concerning its role in therapeutics(2) on which to base the widespread use of this treatment which draws heavily on resources and manpower(3). A number of techniques have been advocated but little is known concerning the efficacy of the various methods. This paper deals with and will be restricted to the basic principles governing the mode of action of chest physiotherapy.

PATHOPHYSIOLOGY

Normally three distinct mechanisms(4) exist for clearance of mucus and foreign particles: the alveolar macrophages, the mucociliary system, and coughing. The first mechanism, the alveolar macrophages, is concerned with the clearance of the alveoli and terminal bronchioles (and this will not be discussed further), and the mucociliary system and coughing are concerned with the clearance of the airways above the terminal bronchioles.

The second mechanism, the mucociliary system, is normally the most important mechanism of mucus clearance. However, this system is readily made deficient or paralysed by inhalation of smoke, inhalation of dry gases, hyperoxia, hypoxia, and infection(5). Certain infections themselves interfere with ciliary activity by an unknown mechanism(6) and others may denude the bronchial epithelium. In addition, the ciliary clearance escalator can be overwhelmed by excessive and tenacious secretions.

The third mechanism, the cough reflex, is well described by Leith(7). At the end of a large inspiration, coordinated contraction of rib-cage and abdominal muscles against a closed glottis produces high intrathoracic pressures reaching 100-200 cm.H_2o. The glottis is then opened actively and a sudden spike of expiratory airflow of high velocity occurs as a result of collapse of the major airways. This mechanism of mucus clearance is deficient in patients as a result of intubation itself, the debilitating disease process or as a result of sedation with or without paralysis.

PHYSIOTHERAPY TECHNIQUE

The aim of physiotherapy is to promote mucus expectoration, reduce airway obstruction, minimise the onset of atelectasis and airway collapse, and improve gas exchange.

Techniques of chest physiotherapy include hyperinflation, postural drainage, tracheal suctioning, chest wall compression and chest wall oscillation(8). Some intensive care units rely on the physiotherapist to apply chest compressions in timing with the expiratory phase of the ventilator, while other units favour the manual ventilation ("hand-bagging") technique(9). In this technique, one person, usually an anaesthetist, inflates the chest with a large tidal volume. At the end of inspiration the physiotherapist applies an initial large compression to the chest, followed by external pressure to, and "oscillation" of, the chest wall throughout expiration.

Physiotherapy is applied to the basal, middle and apical areas of the lung in turn, and frequent tracheal suctioning is carried out. The number of times per day that treatment is performed depends on the condition of the patient's chest. In some patients it may be necessary to repeat the treatment at hourly intervals(8).

MODE OF ACTION

The precise mode of action is unknown, but the intention is to move secretions from the peripheral to the central airways, within reach of a suction catheter. Chest compression, hyperinflation, postural drainage and tracheal suctioning may all have a part to play.

Chest compression may act simply by squeezing secretions from the peripheral to the central airways.

It is possible that hyperinflation re-expands collapsed airways, but there is no firm evidence to substantiate this.

Postural drainage has however been shown to

be effective. Wong(10) using a radionuclide imaging technique demonstrated that gravity was influential in mucus transport and supported the clinical trials(11) suggesting that postural drainage is an effective form of therapy for expectoration of secretions.

In the absence of good mucociliary clearance, the ability to cough becomes vitally important, and attempts have been made to simulate the high air velocities which occur during a cough e.g. by exsufflation with negative pressure(12).

The importance of airflow in mucus transport has been stressed more recently by King(13) in a study of anaesthetised dogs, the results of which suggest that mucus clearance may be enhanced by high expiratory air velocity. Animal work(14) also suggests that oscillation of the chest wall leads to a "two-phase" airflow (to and fro) within the airways. If the expired air velocity exceeds the "inspiratory" velocity, then this favours the cephalad movement of secretions due to an interaction at the air-mucus interphase.

In a review of the literature we could find no information on the maximum expiratory flow rates (MEFR) which occur during physiotherapy. Opie(15) showed that simultaneous compression of the abdomen and chest, during physiotherapy, increases the intrapleural pressure and thus the resulting expiratory airflow may be greater than that produced by chest compression alone. However this method would require two "physiotherapists" and would be impractical in most clinical circumstances. Therefore, this present study was devised to measure the MEFR before and during physiotherapy. In addition we measured the MEFR during physiotherapy after application of an abdominal binder to prevent dissipation of the compressive force through abdominal movement. We chose the "cough-lock" as a readily available binder which is familiar to the physiotherapists.

METHODS

Approval was obtained from the hospital ethical committee and 11 patients who were ventilated as part of their neurosurgical intensive care were investigated. All patients had an ineffective cough, either as a result of sedation, with or without the administration of neuromuscular blocking drugs, or as a result of severe head injury. Physiotherapy was performed using a manual ventilation ("hand-bagging") technique(9).

APPARATUS

A self-inflating bag (Laerdal) incorporating a non-rebreathing valve was supplied with 100% oxygen. This was connected to a pneumotachograph, a bacterial filter (Ultipore), an angle piece and then to the patient's endotracheal tube. Inspiratory and expiratory flow was measured using a mesh pneumotachograph connected to a differential micromanometer and recorded on a chart recorder. The chart recorder and micromanometer were calibrated before use.

PROCEDURE

Inspiratory and expiratory air flows were measured under three conditions:

A) Manual ventilation without physiotherapy

B) Manual ventilation with chest compression

C) Manual ventilation and chest compression, after application of the abdominal binder.

The cough-lock (Hawksley and Sons) is a velcro-lined fabric binder, 10cm. wide and 126cm. long. This device can be used by post-sternotomy patients as an aid to coughing by wrapping it around the chest, splinting the rib-cage, and thereby reducing the discomfort of coughing. In this study the binder was pulled firmly around the abdomen, centred on the umbilicus.

An attempt was made to standardise tidal volume by giving the maximal inspiration possible from the inflation bag. The next inspiration was not given until expiratory flow rate had fallen to zero. A continuous record of inspiratory and expiratory air flow was obtained. The maximum expiratory flow rate (MEFR) could be measured directly from the charts.Inspired and expired tidal volumes were measured by integration of the flow-time record.

RESULTS

Six patients had x-ray evidence of pulmonary infection. Figure 1 is a typical flow-time curve and demonstrates the timing of the maximum expiratory flow (at the beginning of expiration), and also demonstrates the oscillation of airflow of 3-4 Hz. which occurred throughout expiration when physiotherapy was applied. Statistical analysis was carried out to allow for any effect

tidal volume might have on MEFR. To do this, a linear relationship was assumed between Vt. and MEFR. The slope of this relationship was calculated (using the line of best fit) for each patient. This allowed calculation of the expected MEFR at a common tidal volume (1375 ml) in each treatment group, for every patient. Thus the results were corrected for Vt. and a mean MEFR was calculated for each treatment group. At a common Vt., the MEFR increased with physiotherapy, and the application of the abdominal binder was associated with a further increase in MEFR (Figure 2). The mean MEFR (at a common Vt) for the three conditions of the study were:

A) Manual ventilation without chest compression - 72.7 l/min.

B) Manual ventilation with chest compression - 102.9 l/min.

C) Manual ventilation and chest compression after application of the abdominal binder - 121.7 l/min.

The standard error of the difference was 5.86 between any two means, making these conclusions highly significant.

CONCLUSIONS

Chest physiotherapy has become established in clinical practice for prophylaxis and treatment of chest infection and secretion retention (1). Practice varies widely, and physiotherapy may be carried out for as little as a few minutes up to an average of 57 minutes (17). Our own unit uses the manual inflation technique (described above) over 10-20 minutes. Despite the considerable use of expensive resources and the possibility of serious complications, it is surprising how little information is available on the efficacy of physiotherapy.

The precise mode of action of physiotherapy is unknown. Hyperinflation, chest compression and vibration, postural drainage and tracheal suctioning may all play a part (1,2). King (13) demonstrated that airflow and expiratory air velocity are important in mucus transport and consequently the MEFR that can be generated during physiotherapy may be important.

This study shows that physiotherapy using this manual inflation technique increases the maximum expiratory flow rate. This study also shows that the use of a simple binder (cough-lock) may be associated with a further improvement in the maximum expiratory airflow during chest physiotherapy. However no attempt was made to relate this to clearance of secretions or improvement in lung function and further studies are required.

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REFERENCES

1. Kirilloff LH, Owens GR, Rogers RM, Mazzocco MC. Does chest physical therapy work? Chest 1985;88:436-444.

2. Sutton PP, Pavia D, Bateman JRM, Clarke SW. Chest physiotherapy: a review. Eur J Resp Dis 1982;63:188-201.

3. Lyle CB, Bianchi RF, Harris JH. Evaluation of respiratory physical therapy. New Eng J Med 1979;301:665-666.

4. West JB. Pulmonary Pathophysiology 3rd Edition. Baltimore: Williams and Wilkins, 1987.

5. Slonim NB, Hamilton LH. Respiratory Physiology. Toronto: Mosby, 1987.

6. Hers JPFH. Disturbances of the ciliated epithelium due to influenza virus. Am Rev Resp Dis 1966;93(supp):162.

7. Leith D. Respiratory Defence Mechanisms Vol 5 (PartII). New York:Marcel Dekker, 1977.

8. Gaskell DV, Webber BA. The Brompton Hospital Guide to Chest Physiotherapy, 4th Edition. London: Blackwell, 1980.

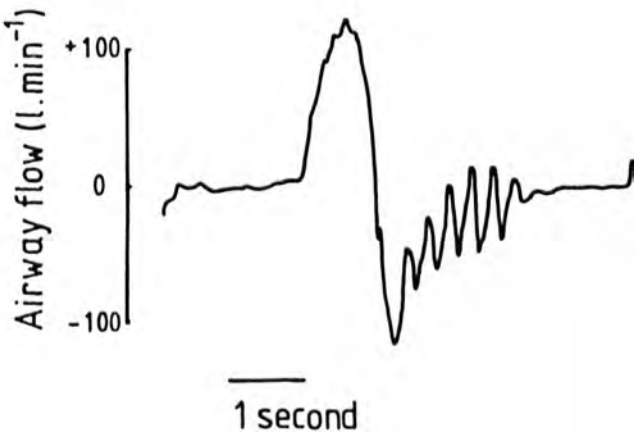
9. Clement AJ, Hubsch SK. Chest physiotherapy by the "bag squeezing method": a guide to technique. Physiotherapy 1968;54:355.

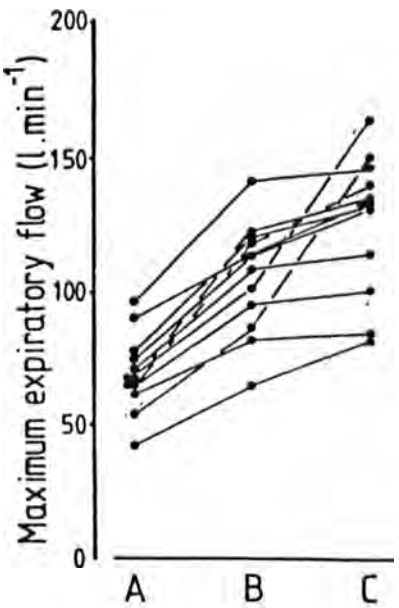
10. Wong JW. Effects of gravity on tracheal mucus transport in normal subjects and in patients with cystic fibrosis. Paediatrics 1977;60:146.

11. Lorin MI, Denning CR. Evaluation of postural drainage by measurement of sputum volume and consistency. Am J Phys Med 1971;50:215-219.

12. Bickerman HA. Exsufflation with negative pressure (EWNP): Elimination of radio-opaque and foreign bodies from bronchi of anaesthetised dogs. Arch Intern Med

1954;93:698-704.
13. King M, Phillips DM, Gross D, Vartian V, Chang HK, Zidulka A. Enhanced tracheal mucus clearance with high frequency chest wall compression. Am Rev Respir Dis 1983;128:511-515.
14. King M, Phillips DM, Zidulka A, Chang HK. Tracheal mucus clearance in high frequency oscillation. Am Rev Respir Dis 1984;130:703-706.
15. Opie LH, Spalding JMK. Chest physiotherapy during intermittent positive pressure respiration. Lancet 1958;2:671-673.
16. Gormezano J, Branthwaite MA. Effects of physiotherapy during intermittent positive pressure ventilation. Anaesthesia 1972;27:258-263.
17. Mackenzie CF, Shin B, Hadi F, Imle PC. Changes in total lung/thorax compliance following chest physiotherapy. Anaes and Analg 1980;59:207-210.





REGISTRARS' MEETING

Kelvin Conference Centre, Glasgow, June 3rd.

The Registrars' Meeting took place this year in the popular Kelvin Conference Centre in Glasgow and was hosted by members of the Victoria Infirmary Division of Anaesthesia. A good representation of registrars (or was it a representation of good registrars!) attended. The meeting was organised by Dr.J.C.Howie, who also chaired the morning session.

Following a welcome by the President, Dr.A.M.Reid, the first speaker, Dr.Jane Howie, spoke on Assessment of Severity of Illness by scoring systems. She reminded us of several systems in use and described one, the APACHE II, in some detail. This is of value particularly in the Intensive Care unit and ascribes a score from 0-4 for a number of physiological, biochemical and haematological variables in the patient. The advantages and disadvantages of this system were indicated and its value as a prognostic index highlighted.

Dr.Alan McDonald then took us on an interesting journey through the Development of Inhalational Anaesthesia from the discovery of nitrous oxide in 1772 by Priestley, through the first use of ether as an anaesthetic in 1842 by Hickman, to the events of December 1846 when ether was first used in Britain in Dumfries and London. Over the next 40-50 years ether and chloroform each had their protagonists but it was not until 1930 that a significant new agent, in the form of cyclopropane, appeared. The modern inhalational agents date from 1956 when halothane was first used in clinical practice.

A further historical flavour was supplied by Dr.Graham Gillies in describing the Development of Intubation Techniques. The stimulus for this came from advances in head and neck surgery, and the names of Chevalier Jackson, Magill and Macintosh were prominent. Dr. Gillies was able to show a fascinating early film of Magill using his blind nasal technique of intubation, and also had a modern video of flexible fibre optic intubation under local anaesthesia.

The Development of Intravenous Anaesthesia was the topic covered by Dr.Norman Lees. The first attempts at intravenous anaesthesia were in the 1870's but it was not until thiopentone was developed by Lundy in the 1930's that it became a practical reality. Nowadays the study of pharmacokinetics and pharmacodynamics give us a clearer insight into drug behaviour in the body and can help in pursuing ways of controlling continuous intravenous anaesthesia. Dr.Lees explored some of the mathematical concepts necessary for the understanding of this control, and concluded by pondering on what the future held in this field.

After lunch at which there was the opportunity to participate in a wine-tasting competition, the afternoon session concentrated on relief of pain and was chaired by Dr.David Dutton.

Dr.Gavin Gordon's talk was entitled Techniques of Relief of Chronic Pain and summarised recent work in the Pain Clinic covering some 1700 referrals. The most frequent conditions dealt with included low back pain, cancer pain, causalgia and reflex sympathetic dystrophy. Some of the treatments used were indicated and a video of a stellate ganglion block concluded the presentation.

Dr. Heather Hosie then discussed the use of Continuous Intercostal Block including the indications and complications. She described some research work on the spread of solutions in intercostal blocks and some of the problems encountered. Some further research seemed to be indicated to improve the results of this technique.

The final speaker on the theme of relief of pain was Dr.John Sinclair who spoke on the subject of Patient Controlled Analgesia. He described the method of achieving this , and discussed the advantages and disadvantages of this form of pain relief. While it was probably an expensive method for routine use the technique had considerable value as a

research tool.
After a short break for coffee the final speaker for the day, Prof. Alistair Spence, spoke on The Shaw Report: Background, Implications and Pitfalls. He described the background of the various committees and their work which led to the formation of a Steering Group and an Anaesthetic Sub-group to look at junior staffing in Scotland. This Sub-group visited every anaesthetic department in Scotland collecting information on staffing
and produced a report with recommendations for future levels of staffing. The report envisaged rationalisation of services, particularly emergency work, and sought to match registrar numbers more closely with those of senior registrar to improve career prospects. A lively debate followed, and the meeting was brought to a close by the President who expressed thanks to Dr.J.C.Howie for organising such a successful day, and to all who had contributed.
The first prize in the wine-tasting competition was won by Dr.Reid from Edinburgh, and runner-up was Dr.Geddes from the Western Infirmary, Glasgow.

SCIENTIFIC MEETING

Edinburgh, November 18th, 1988

The annual Scientific Meeting took place in the Outpatients Department Lecture Theatre of the Western General Hospital, Edinburgh and was organised by Dr.G.M.Carmichael. The Chairman for the morning session was Dr. K.B.Slawson and after a welcome by the Unit General Manager, Miss McLean, he introduced the speakers who each had a "neurological" theme. Following an excellent lunch the President, Dr.A.M.Reid, took the chair for a very varied afternoon session. Abstracts of four of the talks are printed below.
The eleventh Gillies Memorial Lecture was delivered after tea by the doyen of epidural anaesthesia in Scotland, Dr.D.B.Scott of Edinburgh Royal Infirmary. Not surprisingly the topic of the Lecture was epidurals and it is reproduced later in the Newsletter.
The meeting was concluded by the President who presented Dr.Scott with the Gillies Memorial Vase and thanked Dr.Carmichael and all who had helped to make it a success.

MONITORING EVOKED POTENTIALS

Dr.J.L.Jenkinson

The EEG gives an indication of the activity of the cerebral cortex, whereas evoked potentials are monitors of deeper brain and spinal cord pathways. The three commonly employed evoked potentials are visual (VEP), brain stem auditory (BAEP), and somatosensory (SSEP). During surgery they can be recorded continuously if necessary, particularly at delicate stages of the procedure.
For visual evoked potentials during anaesthesia an adequate response can be obtained by using light emitting diodes placed on to swimming goggles. The recording electrodes are placed on the occipital part of the skull, and 100 stimuli will normally produce a good result. Positive waves will be obtained at 109 and 200 milliseconds after the signal, and a negative wave will be obtained at 169 milliseconds. The VEP can be used as a monitor for surgery near the optic chiasm, pituitary surgery, retrobulbar lesions, and lesions of the sphenoidal wing.
The brain stem auditory evoked potential is produced by giving a series of 2000 clicks via a small earpiece into the external auditory meatus. The recording electrode is placed over the mastoid process, and the first 5 waves of the response will be produced in 5.5 milliseconds following the stimulus. This is a very useful monitor in posterior fossa surgery, and in surgery near the VIIIth cranial nerve.
The somatosensory evoked potential can be obtained by giving 100 electric shocks over the posterior tibial nerve or the median nerve, amd placing the recording electrodes over the sensory cortex. When the posterior tibial nerve is used positive waves are obtained at 37, 57, and 93 milliseconds. This is a useful monitor of spinal cord and deep brain pathways, and can be used in spinal cord surgery including removal of AVM, removal of tumours, syringomyelia, and correction of scoliosis. It will also give early warning of incipient spinal cord ischaemia during repair of thoracic aortic aneurysm, and is a good predictor of outcome following head injury.
When the median nerve is used and the recording electrode is placed over the second cervical vertebra the signal is normally picked up as it passes through the cervical medullary junction which occurs about 13 milliseconds post-stimulus. The cortical part of the wave normally occurs at about 19 milliseconds. The difference between these two signals is known as the central conduction time (CTT) and is a useful monitor in intracranial aneurysm surgery, both in deciding when to operate and during surgery in detecting ischaemia.

AUTONOMIC DYSREFLEXIA IN QUADRAPLEGICS

Dr.D.Child

Dr.Child demonstrated the occurrence of autonomic dysreflexia during anaesthesia and in other circumstances in quadraplegic patients, and brought along a patient to recount her experiences of this condition. (No summary received)

ISOFLURANE IN NEUROANAESTHESIA
Dr.N.M.Dearden

An ideal neuroanaesthetic should provide optimal operating conditions and maximise neuronal survival. For intracranial surgery this comprises rapid and smooth induction, maintenance with a technique that favourably maintains the ratio of energy supply to energy demand while preserving cerebrovascular reactivity to carbon dioxide and cerebral autoregulation, avoidance of cardiovascular or respiratory depression and a rapid, smooth recovery.

Isoflurane invokes a dose dependent reduction in cerebral metabolic rate and electrical activity until isoelectricity at 2 MAC inspired concentration, above which no further metabolic perturbation occurs. Global cerebral blood flow is increased at inspired concentrations of 1.5% in oxygen if blood pressure is maintained. If blood pressure is not maintained cerebral blood flow remains constant during both 2% isoflurane/oxygen and 2% isoflurane/nitrous oxide/oxygen anaesthesia. However, at inspired concentrations above 1.5% cerebral autoregulation is abolished. In the presence of nitrous oxide this threshold may occur at concentrations below 1%. Cerebral blood volume is increased by isoflurane especially in the presence of nitrous oxide.

Intracranial pressure is increased by 1% inspired isoflurane in the presence of nitrous oxide and normocapnia if the patient has reduced intracerebral compliance. Although hyperventilation reduces intracranial pressure, a greater concomitant fall in cerebral perfusion pressure occurs. Intracranial pressure is invariably elevated and cerebral perfusion pressure severely reduced at inspired concentrations of 2% isoflurane in the presence of nitrous oxide even with hypocapnia.

In patients with reduced intracranial compliance isoflurane should probably only be used after dural opening as part of a balanced anaesthetic technique incorporating hyperventilation to a $paCO_2$ of 4 kPa, and in concentrations below 1% if nitrous oxide is used or below 1.5% if air/oxygen is used to avoid loss of cerebral autoregulation and cerebrovascular engorgement.

Isoflurane remains the best available anaesthetic vapour for neuroanaesthesia. Its effects on the intracranial compartment vary depending on the presence of intracranial pathology, $paCO_2$, the patient's blood pressure and the concomitant use of nitrous oxide.

ACUTE MANAGEMENT OF HEAD INJURIES Prof.J.D.Miller

Prof. Miller gave a brief review of the neurological aspects of the management of acute head injuries with particular emphasis on the prevention of ischaemia and infection. (No summary received)

POSTOPERATIVE PAIN RELIEF
Dr.Linda Rutledge

Dr.Rutledge spoke on some aspects of relief of pain postoperatively, an area where there was generally still room for much improvement. (No summary received)

PARENTS IN THE ANAESTHETIC ROOM
Dr.David Wright

Opinions among anaesthetists differ as to whether parents should be encouraged to accompany their children until anaesthesia is induced. The National Association for the Welfare of Children in Hospital is not in doubt:"Children should be able to be accompanied from the ward, by a parent, who would remain with them until they are anaesthetised".

We decided to see what would happen if all the parents of children having elective surgery were encouraged to come to the anaesthetic room. We kept records, using a questionnaire, of 200 anaesthetics. For 75% of these, the parents were seen preoperatively and invited to accompany their children. 94% of those seen said they would come and all but five did come. Of the 50 parents not seen, 20 actually came to theatre anyway. We looked at how the

children and the parents behaved in theatre and what the anaesthetist felt about the presence of the parent.

Most of the children were acceptably co-operative during induction, but 19% were not co-operative. Previous hospital admissions, previous anaesthetics, premedication and whether a parent accompanied the child seemed not to be related to whether the child was uncooperative or not. Age did seem to be relevant with a greater proportion of children under the age of two in the non-co-operative group.

Most of the parents seemed relaxed during induction (79%) though some required re-assurance (18%). Only five parents (3%) were felt to be distressed.

On most occasions the anesthetist thought that the presence of the parent was helpful(79%). Thirty parents were not felt to have been helpful and three were felt to be counter-productive.

Post-operatively most of the children asked would prefer their parent to be present again if a future anaesthetic was necessary. Almost all of the older children who had not been accompanied were happy to consider anaesthesia again without a parent. 80% of the parents did not recall any distress when questioned afterwards; 90% felt that their presence had been helpful and all but one said that they would come again.

In conclusion, when parents are encouraged almost 80% of children coming to theatre for elective surgery can be accompanied by a parent. The majority of parents are not distressed and the presence of only a tiny minority is felt by the anaesthetist to be counter-productive.

ANAESTHETIC COSTS

Dr.N.H.Gordon

It will not be long before computer data collection is applied to expenditure in anaesthesia and Departmental Budgeting will become the major force in the drive to improve efficiency and cost effectiveness. Once this information is available there will not only be monthly accounts but also comparisons made between anaesthesia departments for similar procedures - Performance Indicators.

Staffing levels, which account for over 80% of anaesthesia costs, will require continuous justification. Adoption of departmental policies on pre-operative investigations and the choice of drugs, anaesthetic techniques and disposables for common procedures will, after open debate, have a part to play. A degree of standardisation will increase the meaningfulness of clinical audit.

In stores, pharmacy and clinical departments re-organisation offers considerable savings by standardising ranges (Preferred Product Policy), optimising purchase discounts, minimising capital tied up in stock and operating a top-up delivery system (Just in time Policy).

The cost awareness of the individual anaesthetist can be fostered by price-ticketing, publishing price lists and monthly departmental review and discussion of expenditure. A recent study has highlighted the difference in costs between individuals and between grades of anaesthetists which are hard to justify on clinical grounds in the absence of data on critical incidents and patient morbidity. Conversely, so-called "expensive" drugs used in TIVA can be less expensive than conventional anaesthesia for short procedures.

The cost ratios of the volatile anaesthetics are fairly well appreciated but the tendency to abandon halothane on the basis of promotional rather than proven grounds does require redress. Fresh gas flow rates are a major element in anaesthetic costs. With the provision of in-circuit monitoring of gaseous and volatile agents, a return to the closed circuit and even the vapouriser-in-circuit could justify the capital investment in apparatus by the savings in drug expenditure.

Analgesic prescribing patterns are another area worthy of review. Where post-operative pain is anticipated are short-acting drugs the best choice? Does diamorphine have clinical advantages over morphine or papavaretum to justify the 700% cost difference? Prospective studies of cost-effectiveness will be of value in determining the direction of anaesthetic practice.

Anaesthesia must rise to the challenge of audit, both clinical and financial, for the benefit of the patient and for the reputation of the specialty.

GILLIES MEMORIAL LECTURE Dr.D.B.SCOTT

"A little knowledge ....."

It gives me more pleasure than I can say to deliver this lecture. John Gillies was my mentor from the time I started my training in anaesthetics in 1953 until he retired in 1960. He was one of this world's gentlemen, knowledgeable, approachable and kind. You always had the impression that his main concern was for you and your welfare. I wonder how many directors of anaesthetic departments would actively encourage a young registrar to perform a technique which no one else was using in the department. But that was exactly what John Gillies did for me when I asked if I could continue to use epidural blocks after joining the department at the Royal Infirmary. It was incidentally at the time when the Woolley and Roe case was hitting the headlines. Nevertheless he decided that it was a good idea to encourage the use of the method so that those in the department could see for themselves at first hand, and the juniors would have a chance to learn it.

It may come as no surprise that my lecture today should be about epidurals. However I would like to concentrate on the use of epidural and subarachnoid opioids for analgesia, because one has the impression that the clinical use of these techniques, though widespread, is based on a considerable degree of woolly and muddled thinking.

Few innovations in medicine have achieved such a rapid and worldwide introduction into clinical practice. The discovery of morphine receptors in the brain was not made until the 1970's (1,2,3,4), and this was soon followed by the demonstration of mu receptors in the periaqueductal grey of the medulla and finally in the spinal cord itself, particularly the substantia gelatinosa of the dorsal horn(5).

At our last Scientific Meeting in Aberdeen, Dr. Kosterlitz told us of the discovery of endogenous opioids, the enkephalins, by using a prepararion of the mouse vas deferens (6,7). The progenitor of all this research was the introduction of the pure opioid antagonist naloxone which could displace opioids from receptor sites.

Although it had been shown that parenteral opioids produced some of their analgesic effect by occupying mu receptors in the spinal cord, most of their action was in the brain itself. Yaksh and Rudy (8) reported in 1976 that intrathecal morphine produced dose dependent analgesia in rats and that this was reversed with naloxone. Behar and his colleagues in Israel published the first clinical use of epidural morphine in man in 1979 (9). Although only a preliminary communication in the Lancet, it attracted enormous interest and within months dozens of papers had been produced with a wide variety of indications, drugs and dosages. Virtually all were enthusiastic and many had also used subarachnoid as well as epidural injection. Very extravagant claims were made but few of the studies had been done in a properly controlled manner.

As with many new methods in medicine it was not long before the negative aspects of the technique became apparent. Side-effects included pruritus, nausea and vomiting, urinary retention and most importantly delayed respiratory depression (10). Nor was the analgesia always up to expectation (11). Epidural morphine was rather ineffective in relieving labour pain (12) and although fentanyl was said to be effective (13), it had to be used in doses of the same order as used intramuscularly, and its analgesic effect could have been due to systemic absorption.

Delayed respiratory depression was, and is, the great concern when using epidural opioid. Although all the side-effects, including respiraory depession, are easily reversed with naloxone, the major problem is rapid diagnosis. Paradoxically, it is often the patient in whom the epidural opioid has failed to work satisfactorily, who is the most vulnerable. When the patient complains of pain in spite of the epidural injection, an intramuscular dose is given and later he or she is found unconscious, with pin-point pu-

pils and breathing 2-3 times a minute. Clearly any delay in making the diagnosis and giving naloxone is highly dangerous. Moreover the naloxone may have to be given in large quantities and for a long time. The incidence of respiratory depression requiring treatment with epidural morphine is said to be around 1 in 200-300 (14), a figure which makes many very circumspect unless the patient is being monitored in an intensive care unit. Undoubtedly this incidence is much higher when the intrathecal route is chosen and apnoea has been reported 10-12 hours after the injection (15). With both epidural and intrathecal use, respiratory depression is dose dependent.

One important fact that is often overlooked is that virtually all reported cases have followed the use of morphine. Morphine is of course the most frequently used drug by far, because of its long duration but many other opioids have been used. John McClure and I reported 2 cases of respiratory depression after epidural pethidine (16), but both occurred soon after the injection and were almost certainly due to systemic absorption. Why is morphine the odd one out? Consideration of its physico- chemical properties gives the answer. Unlike all other commonly used opioids it is much less lipid soluble, by two or more orders of magnitude. Lipid solubility, oil/water partition coefficient and pKa are all of importance in the behaviour of the drug after it has been injected intraspinally. The local pharmacokinetics are of the essence.

Any drug injected epidurally must cross the dura and arachnoid maters to enter the cerebrospinal fluid. Here it will traverse the pia mater to enter the spinal cord and gain access to the mu receptors in the laminae of the doral horns. When a sufficient number of the receptors are occupied analgesia will appear and it will remain until the drug is removed by absorption into the blood, remembering of course that it may become quite tightly bound to the receptors.

Analgesia will only be produced if the drug reaches receptors in the dorsal horns subserving the area of pain, excluding of course any effect produced by systemic absorption.

Absorption of the drug is occurring continuously first from the epidural space, which has a similar absorption profile to an intramuscular injetion (17). After reaching the CSF it can be absorbed by the meninges, but only very slowly. The spinal cord has a relatively good blood supply and the last remnants of the drug will be absorbed from the cord. Undoubtedly the major portion of the drug is removed while it is still in the epidural space. This accounts for the clinical observation that the epidural dose of an opioid is approximately 30-100% of the intramuscular dose, while the intrathecal dose is only 10-20% of the IM dose.

The lipid solubility and the pKa govern the rate at which any drug can penetrate the meninges and reach the CSF. Only unionised drug can penetrate membranes and tissue barriers. All the common opioids except morphine reach the CSF quickly (10). From the CSF, transfer of the drug to the spinal cord depends upon its partition coefficient. Thus most opioids reach the spinal cord quite rapidly and produce analgesia in 10-15 minutes. Morphine however crosses the meninges slowly (18) and once in the CSF, only reaches the cord slowly. As a result analgesia may be delayed for up to an hour.

The rapidity with which drugs leave the CSF has other important clinical implications. Highly lipid soluble drugs, with high oil/water partition coefficients will not disperse up and down the subarachnoid space to any degree. They must therefore be injected fairly close to the spinal segments involved in the pain process. They are unlikely to give analgesia in the mid-thoracic region if injected at a low lumbar epidural space. By the same token it is very unlikely that they can migrate in the CSF to reach the respiratory centre of the brain. Any respiratory depression will be due to absorption from the epidural space which gives peak plasma concentrations 20-40 minutes after injection. Delayed depression is most unlikely unless large doses are given. Drugs which gain access to the cord quickly are liable to leave it quickly. Highly lipid soluble drugs such as fentanyl produce profound but very transient analgesia after IV injection, and if given epidurally, the analgesia is also of short duration (19).

Compare and contrast this to morphine. It reaches the CSF slowly and once there,

because of its low oil/water partition coefficient, it is in no hurry to enter the spinal cord. It can diffuse up and down the subarachnoid space with ease. The advantage of this is that it can produce analgesia when injected many spinal segments distant from those concerned with the pain process (20). Moreover, its slow removal from the CSF means that it will have a long duration of analgesia (19). The disadvantage is that it can reach the respiratory centre many hours after injection.

Diamorphine (Heroin) is a special case worth considering for intraspinal use. In its unchanged form it has no analgesic properties because its two acetyl radicles prevent it gaining access to the mu receptors. However because it is very lipid soluble it can reach the nervous tissue much more quickly than morphine (21). It is rapidly hydrolysed, first to mono-acetyl morphine (losing one of its acetyl groups) and then to morphine itself. The mono-acetyl form does have analgesic proerties as of course does morphine. Thus diamorphine can reach the receptors rapidly where it changes to mono-acetyl morphine and morphine. It can thus give relatively long lasting analgesia while still leaving the CSF relatively rapidly.

Now we can begin to see the pros and cons of the various opiates and opioids when used intraspinally. Morphine with its slow onset, wide band of analgesia, long duration and potential for delayed respiratory depression contrasting with lipid soluble opioids with their rapid effect, their need to be injected near their site of action, their shorter duration and freedom from respiratory depression.

Note that I have said nothing about local tissue toxicity or irritation. I remain aghast at the number and variety of drugs that have been injected into the epidural space or even intrathecally, either by intention or by accident. For virtually none of these drugs have proper animal experiments been done to assess their effects at the site of injection, certainly no experiments which a licensing authority would approve of. Doctors can use drugs any way they wish, unlike drug companies who have to prove both safety and effectiveness before recommending any particular indication. Doctors must of course take responsibility if things go wrong, but it looks as if the fates have been kind to those brave souls who appear to be looking for more and more esoteric receptors subserving pain in the spinal cord. For what are they searching? If the present choice of drugs, opioids and non-opioids, cannot fulfil their needs, what is the reason?

Apart from the scientific interest, it can only be because the present selection is not producing good or excellent analgesia in all patients, or the dangers are perceived to be too great.

In regard to effectiveness we already have drugs which are far better than opioids, namely local anaesthetics. These can completely anaesthetise the appropriate spinal segments. Their other advantages include considerable modification of the stress response in lower abdominal and lower limb surgery, increased blood flow in the lower limbs with decreased incidence of deep venous thrombosis and embolism, less interference with gastro-intestinal function and no cerebral effects (22). Their disadvantages are the possibility of hypotension and motor paralysis. Those who have used continuous epidural blockade for postoperative pain are less impressed with these particular complications than with the need to maintain the block to the correct level in individual patients. Considerable care and effort is required to achieve the best results.

Having persevered with continuous blocks in postoperative analgesia for many years, working incidentally in an ordinary ward, not an ICU, most of the fears have proved to be unfounded. Hypotension is almost a non-event and if it does occur it will either respond quickly to simple measures the nurse can apply (tilting the bed, fast IV fluid, IM ephedrine), or it will indicate, sooner rather than later, the presence of haemorrhage. Monitoring of the arterial pressure is, in any event, much simpler and more precise than trying to detect respiratory depression.

In attempting several different ways of trying to maintain effective blocks, our most successful was a continuous infusion of 0.125% bupivicaine given at a rate of 15-20ml/hr. At the end of surgery a loading dose of 0.5% bupivicaine is given, usually 10ml, and the infusion started as soon as the patient is returned to the ward. Once the effect of the

0.5% solution has disappeared, motor block is usually of a minor degree and the patient can move the legs quite freely. If the block regresses too far, and pain appears, this can only be corrected by a top-up of 0.5% bupivicaine.

The solution to our main problem, regression of the block, came with the publication of studies performed in Copenhagen by Professor Kehlet and his colleagues who were trying to achieve similar results to ourselves and investigating the effects of this type of analgesia on the surgical stress response. They found that IV morphine would prevent and even reverse regression of the block (23). Even better, the addition of small amounts of morphine to the local anaesthetic solution prevented regression and improved the analgesia considerably (24).

We substituted diamorphine for the morphine and added it to the bupivicaine 0.125% solution so as to give 0.5mg in 15ml, the hourly dose. Note that no bolus dose of diamorphine was used, and the 24hr dose was only 12mg. It was shown in a double-blind study that the results in terms of analgesia were much superior to either bupivicaine alone or diamorphine alone (25).

We should not have been too surprised as we had done what many have done in the past - re-invented the wheel. The whole concept of modern anaesthesia is to use a combination of drugs, each with a different effect and a different site of action. The effects being additive means that no one drug need be given in excessive amounts.

Combining neural blockade of the spinal nerves with mu-receptor activation in the spinal cord, achieves the best possible analgesia with the advantages of each drug and without the possibility of overdosage with either. I would now regard the use of local anaesthetic alone, or opioid alone, to provide prolonged analgesia, as akin to using ether or chloroform, or any other inhalational agent, alone.

Anaesthesia we all believe is an art based on science, though it is easier to learn and practice the art than it is to acquire the science. However in rather less than 10 years the facts have become much clearer and the bits of the jigsaw are falling into place. Our choice of drugs, or combination of drugs, routes of administration and dosage regimes can now be more logically based so that we can achieve the highest success with the minimum of complications. A little more knowledge is a safer thing.

John Gillies was always committed to the science behind our day to day practice and he undoubtedly helped anaesthesia in Scotland to cope with the exceptional increase in the scope of the specialty that took place from the end of World War II until his retirement. Certainly the department he ran was never dull and it was a privilege to have worked with colleagues who accepted new ideas without their feet leaving the ground. Many have either been Presidents of this Society or have given the Gillies lecture or both. John led his troop from the front. A master of his art, totally imperturbable and with a background of knowledge and wisdom, he contributed enormously to anaesthesia achieving its independence. Our good luck was to have had the right man in the right place at the right time.

REFERENCES

1. Martin WR, Eades CG, Thompson JA et al. The effects of morphine and nalorphine-like drugs in the non-dependent and morphine dependent chronic spinal dog. J. Pharmacol. Exp. Ther. 1976;197:517.

2. Pert CB, Snyder S. Opiate receptors demonstration in nervous tissue. Science 1973;179:1011.

3. Terenius L. Stereospecific interaction between narcotic analgesics and a synaptic plasma membrane fraction of rat cerebral cortex. Acta Pharmacol. Toxicol. 1973;32:317.

4. Simon EJ, Hiller JM, Edelman I. Opiate receptors. Specific binding of the potent narcotic analgesic tritium-labelled etorphine to rat brain homogenate. Natl. Acad. Sci. Pro. USA 1973;70:1947.

5. Atweh SF, Kuhar MJ. Autoradiographic localisation of opiate receptors in rat brain. I. Spinal cord and lower medulla. Brain Res. 1977;124:53.

6. Hughes J, Smith TW, Kosterlitz H. Isolation of two related pentapeptides from brain with potent opiate activity. Nature 1975;258:577.

7. Lord JA, Waterfield AA, Hughes J, Kosterlitz H. Endogenous opioid peptides: Multiple antagonists and receptors. Nature 1977;267:495.
8. Yaksh TL, Rudy TA. Studies on the direct spinal action of narcotics in the production of spinal analgesia in the rat. J. Pharmacol. Exp Ther. 1977;202:411.
9. Bahar M, Olshwang D, Magora F, Davidson JT. Epidural morphine in treatment of pain. Lancet 1979;1:527.
10. Cousins MJ, Cherry DA, Gourlay GIC. Acute and chronic pain: Use of spinal opioids. In Neural Blockade, 2nd edition. Eds. Cousins MJ & Bridenbaugh PO. Lippincott, Philadelphia 1988: p.955.
11. McClure JH, Chambers WA, Moore E, Scott DB. Epidural morphine for postoperative pain. Lancet 1980;1:975.
12. Husemeyer RP, O'Connor MC, Davenport HT. Failure of epidural morphine to relieve pain in labour. Anaesthesia 1980;35:161.
13. Carrie LES, O'Sullivan GM, Leegobin R. Epidural fentanyl in labour. Anaesthesia 1981;36:965.
14. Gustafsson LL, Schildt B, Jacobsen KJ. Adverse effects of extradural and intrathecal opiates: Report of a nationwide survey in Sweden. Br. J. Anaesth. 1982;54:479.
15. Davies GK, Tolhurst-Cleaver CL, James TL. Respiratory depression after intrathecal narcotics. Anaesthesia 1980;35:1080.
16. Scott DB, McClure JH. Selective epidural analgesia. Lancet 1979;1:1410.
17. Chauvin M, Samii K, Schermann JM, Sandouk P, Bourdon R, Viars P. Plasma pharmacokinetics of morphine after IM extradural and intrathecal administration. Br. J. Anaesth. 1981;54:843.
18. Nordberg G. Pharmacokinetic aspects of spinal morphine analgesia. Acta Anaesthesiol. Scand. 1984;79:1.
19. Torda TA, Pybus DA. A comparison of four narcotic analgesics for epidural analgesia. Br. J. Anaesth. 1982;54:291.
20. Shulman M, Sandler AN, Bradley JW, Young PS, Brebner J. Post-thoracotomy pain and pulmonary function following epidural and systemic morphine. Anaesthesiology 1984;61:569.
21. Jacobsen L, Phillips PD, Hull CJ, Conacher ID. Extradural versus intramuscular diamorphine. A controlled study of analgesic and adverse effects in the postoperative period. Anaesthesia 1983;38:10.
22. Scott DB, Kehlet H. Regional anaesthesia and surgical morbidity. Br. J. Surg. 1988;75:299.
23. Lund C, Mogensen T, Hjorts NC, Kehlet H. Systemic morphine enhances spread of sensory analgesia during postoperative epidural bupivicaine infusion. Lancet 1985;2:1156.
24. Hjortso N-C, Christensen NJ, Andersen R, Kehlet H. Effects of extradural administration of local anaesthetic agents and morphine on the urinary excretion of cortisol, catecholamines and nitrogen following abdominal surgery. Br. J. Anaesth. 1985; 57:400.
25. Lee A, Simpson D, Whitfield A, Scott DB. Postoperative analgesia by continuous extradural infusion of bupivicaine and diamorphine. Br. J. Anaesth. 1988;60:845.

NEWS FROM THE REGIONS

WESTERN REGION

Glasgow

In March Dr.Alan Macdonald of the Victoria Infirmary delivered a most entertaining Presidential Address to the Glasgow and West of Scotland Society of Anaesthetists on the subject of "Explosions in Operating Theatres". The Presidency of the Society is now in the capable hands of Dr.Donald Braid of the Western Infirmary, with Dr.Mike Telfer of the Royal Infirmary as Vice President. Dr.William Fitch, who has been in charge of the running of the University Department of Anaesthesia, has been awarded a well deserved personal chair in the University of Glasgow. Dr.Leslie Baird has been appointed Secretary of the Association of Anaesthetists of Great Britain and Ireland and has resigned as Regional Education Adviser, being replaced by Dr.John Vance in this onerous position. Dr.Vance's position as Assistant R.E.A. for the East sector of Glasgow has been filled by Dr.Brian Maule of the Royal Infirmary. After several years as Chairman of the Anaesthetic Subcommittee of the West of Scotland Postgraduate Medical Committee, Dr.Donald Braid has retired and been replaced by Dr.Alan Macdonald. On the same Committee Dr.Tom McCubbin of the Western Infirmary takes over from Dr.Brian Stuart as the Specialty Adviser, and Dr.John Murray of Falkirk is the new Chairman of the recently reformed Basic Specialist Training Subcommittee.

The list of Consultant appointments in the last year is impressive - Drs. Ann Blyth, Joyce Reid and Louis Plenderleith to the Western Infirmary; Drs. Arthur Bell and Ronnie Glavin to the Victoria Infirmary, and Drs. Pauline Cullen, Neil Morton and Crispin Best to the Royal Hospital for Sick Children. The year also saw the retiral of Dr.Wilfred Sniper from the Victoria Infirmary.

Lanarkshire

At Law Hospital Dr.T.N.McComb retired on the 31st December, 1987 and Dr.Donald MacLean was appointed to the vacant Consultant post on the 2nd May, 1988. Dr.MacLean was Senior Registrar in Edinburgh Royal Infirmary, and is the present holder of the Registrar Prize of the Scottish Society of Anaesthetists presented at the A.G.M. in Peebles in April, 1988.

Dr.S.Maragathavelu, Registrar at Law Hospital, has been regraded on a personal basis as an Associate Specialist with effect from March, 1988. Also during 1988 Law Hospital had an accreditation Faculty visit which was satisfactory apart from criticisms of a small isolated Maternity Unit. It is known that a new 60-bedded Maternity Unit is planned to be built at Law Hospital in the near future. At the present time, trainees are seconded to Glasgow for training in obstetric anaesthesia.

Dr.T.L.Fraser, Consultant Anaesthetist, accepted the additional responsibility of Medical Member of the Unit Management Team, and took up this post in June, 1988. At the present time Dr.Anne Moffat is employed on a full-time basis as Research Registrar in the Division of Anaesthesia under the guidance of Dr.Joan W. Prentice. Little change is reported amongst Senior ranks at Monklands Hospital although Dr.Jane Freshwater has assumed the additional burden of Clinical Member of the Unit Management Team. Under the tutelage of Dr.J.Thorp, our juniors continue to acquit themselves well in the Fellowship exam - in the past year the success in the new Part I is 100% and 3 out of 4 candidates have gained Part II.

Having obtained the FFA, Dr.Mike Higgins has moved on to the Western Infirmary, Glasgow, to take up a Research Registrar post in anaesthesia.

On a sad note, we were shocked by the untimely death of Dr.Simon Alexander in October, 1988. Simon had trained in Glasgow and had helped us out on a part-time basis whilst training in his second career as an Artist. Having recently graduated from the Glasgow School of Art, he joined our department on a full-time basis as Registrar shortly before his death. Simon was a popular and stimulating colleague, as was demonstrated by the large number of anaesthetists from the West of Scotland who attended his funeral.

Dumfries and Galloway

Following a Faculty re-assessment for G.P.T. conducted by Professor Dundee this summer, we are pleased to say we passed with flying colours - Schedule I accreditation was renewed and conferred for the maximum period.

Dr.J.R.C.Stubbs, Consultant Anaesthetist in this Department for the past 20 years, takes early retirement at the end of the year under the recently introduced "Achieving a Balance" scheme. His successor, Dr.Michael Bell, at present Senior Registrar in Liverpool, will be well known to our colleagues in Glasgow, having spent his formative years at the Western Infirmary.

On 1st September, 1988, Dr.Ewan Cameron joined us as Registrar from Edinburgh and Dr.Michael Steyn started as Senior House Officer at the same time.

Ayrshire and Arran

The past year has seen the retiral of Dr.Ronnie Lewis, and the appointments of Dr. Muriel Shaw and Dr.Catriona Thompson to Consultant posts. On a sadder note, Dr.David Everleigh sustained serious injuries in a car accident while carrying out his duties. He is making a slow but courageous recovery and the Society wishes him future health.

Argyll and Clyde

Dr.Sam McKechnie has retired from Inverclyde Hospital, and Dr.T.Barbour and Dr.C.Thomas have joined the staff as Consultants. Dr.Jim Canning has been appointed Consultant at the Royal Alexandra Hospital, Paisley.

Forth Valley

At Stirling Royal Infirmary much activity and anticipation heralds the opening of the new Surgical Unit in 1989. This will be followed by the centralisation of Eyes and E.N.T. in-patient services there for Forth Valley, which will result in a closer working relationship between the two Divisions of Anaesthesia in the area. At Falkirk Dr.Catherine Mellon has retired and emigrated to Spain. We are delighted to welcome Dr.Alan Semple to the vacant post. Dr.Semple was a Senior Registrar in Dundee, and has brought his expertise in Chronic Pain to Falkirk which has enabled Dr.John Murray to "retire" from this particular activity.

There have been no changes of note in Hairmyres or Vale of Leven.

TAYSIDE REGION

Our main news of the year has to be the departure of Dr.Ian Grant who, after 7 years as a Consultant in Dundee, moved to Edinburgh to become Director of the new Intensive Care Unit in the Western General Hospital. We were disappointed to lose such an outstanding colleague who had contributed so much to patient care as well as to research, teaching and administration. We wish him well in his new venture.

Three of our Senior Registrars have been promoted to the Consultant ranks. Replacing Dr.Grant is Dr.Rae Webster who will bring her recent experience in Toronto to intensive care in Dundee. Dr.Neil Morton will bring his North American experience in his long held interest in paediatric anaesthesia to the Royal Hospital for Sick Children, Glasgow, and Dr.Alan Semple will have ample opportunity to develop his special interest in pain relief in Falkirk.

Local candidate Dr.Eddie Wilson, and Dr.John Colvin from Glasgow have filled two of the Senior Registrar posts. Registrars who left were Dr.Angela Dawson returning to Australia via Scandinavia, and Dr.Anne David moving to Edinburgh as Senior Registrar. Dr.Amin, on clinical attachment from Malaysia, returned to the Far East having gained his Fellowship. Dr.Cathy Davies wil be moving to Liverpool in January as a post-fellowship registrar in paediatric anaesthesia. Registrar appointments were Dr.Sally Crofts, Dr.Fergus Miller, Dr.Ian Skipsey, Dr.Alisdair Mackenzie and Dr.Eileen Forrestal. SHOs appointed were Dr.Fiona McQueen, Dr.Cliff Barthram, Dr.Ute Goldmann and Dr.Simon Kennedy.

To Perth we welcome Dr.Peter Coe from Guy's Hospital who is regarded as a national expert on the use of the fibreoptic laryngoscope, and he takes up the Consultant post previously held by Dr.Calum Davie. We also welcome his wife, Dr.Susan Coe, who has undertaken sessions created by the waiting list initiative. Dr. Barbara Reay returned to Perth in place of Dr.Qureshi who moved to Swansea. New SHOs are Drs.Eleanor Guthrie, Damien Carson and Sandy Binning.

Dr.Bill Macrae has been appointed by the North British Pain Association to supervise a research fellow funded by the Ian Mactaggart Trust to study the epidemiology of chronic pain. The study will be carried out in cooperation with members of the Association who run Pain Clinics in Scotland and the North of England. The fellowship has been set up with the help of the University of Dundee and is due to start at the beginning of 1989.

The medical undergraduate curriculum in Dundee has been reorganised and, largely as the result of a long campaign by Dr.Farquar Hamilton, there is now an increased commitment to the teaching of anaesthesia and resuscitation.

Dr.Grant Hutchison, currently a Senior Registrar in Dundee, spent 3 months at the McMaster University in Ontario enabling him to study computer assisted learning and clinical epidemiology. As well as enhancing the computer expertise, we were fortunate that funds were available to upgrade the computing facilities in the department. As a result of relentless negotiation by the divisional chairman, Dr.Iain Gray, our invaluable departmental secretary, Mrs. Dorothy Morrison, has eventually been promoted to her rightful status of senior clerical officer.

HIGHLAND REGION

There have been few staff changes this year, Dr.Paul Martin having moved to Aberdeen and been replaced by Dr.Ankie Moesker from Holland. Next year, and over the next 5 years, our band of "GP Anaesthetists" staffing small hospitals throughout the region are mostly due to retire. This will pose problems for the Board providing an anaesthetic service in the future. They have done sterling work in maintaining a service in such a scattered community. Meanwhile significant expansion in staff in Inverness looks likely this coming year.

SOUTH EAST REGION Lothian

Professor Alistair Spence has been appointed Vice President of our new College of Anaesthetists. Drs.Willie MacRae and Bruce Scott continue to serve on the Council of the College. Dr.Ivor Davie has been appointed Regional Educational Adviser in succession to Dr.MacRae. Dr.MacRae continues as Honorary Treasurer of the Association of Anaesthetists and Drs.Tony Wildsmith and Walter Nimmo represent our interests on the Council of the Association.

Dr.Ian Grant has been appointed Director of the new Intensive Care Unit which opened this year in the Western General Hospital, Edinburgh. Dr.Ian Armstrong has also been appointed as a Consultant Anaesthetist in the Western General Hospital and shares duties in the new ITU with the Director and Dr.David Wright. Dr.Archie Milne retired this year after many years' service to anaesthesia in Lothian and is replaced by Dr.Gordon Pugh. Drs.Donald Maclean and Alan Conn (Senior Registrars) were appointed Consultants in Law Hospital, Carluke and Ashington Hospital, Northumberland, respectively. Dr. Margaret Riddoch retired from her part-time Consultant post at Bangour General Hospital and has been replaced by Dr.Jane Chestnut (Senior Registrar Manchester) who will commence duties in February 1989.

1988 saw the expected closure of Elsie Inglis Memorial Hospital resulting in the redeployment of Consultant Staff to Obstetric sessions in the SMMP and the new Lithotripsy Service in the Deaconess Hospital (RIE Urology).

Dr.Walter Nimmo has returned to Edinburgh as Medical Director of Inveresk Clinical Research, Musselburgh, and he has been appointed Honorary Fellow in the Anaesthetic Department, Royal Infirmary. New Senior Registrars appointed are Drs.Ann David, Donald Galloway, Martin Payne and Mark Worsley. Dr.Alistair Lee is overseas in Christchurch, New Zealand for one year.

New Research Fellows in the Royal Infirmary are Drs. Mike Brockway (ASTRA) and Patrick Armstrong (Association of Anaesthetists). Dr.Bruce Scott delivered the Gillies Memorial Lecture, and congratulations to Dr.Donald MacLean who won the Registrar Prize. Dr.John MacKinnon won the local Annual Golf Competition at Mortonhall Golf Club on a glorious day in September.

Fife

Dr.Catherine Adam retired from the Department at the Victoria Hospital, Kirkcaldy, and has been replaced by Dr.Janet McKean (Senior Registrar Manchester). The regrading of several ODA posts within the Victoria Hospital to Senior ODA may set an interesting precedent in Scotland.

In Dunfermline and West Fife the establishment remains at six Consultants with Dr.Keith Birkinshaw as Chairman of Division.

Borders

The big news in the Region in 1988 was the opening of the Borders General Hospital at Huntleyburn near Melrose. The hospital opened to patients in April 1988 and the Maternity Unit opened for deliveries in August 1988 with major implications for the Anaesthetic Service. Further developments include the opening of an Intensive Care Unit and the establishment of an Oral Surgery service. New appointments are Dr.Nigel Leary (1988) and Dr.Janet Braidwood who commences her post in 1989 replacing Dr.Miles Millhench who has returned to Ireland as a Consultant.

GRAMPIAN REGION

The death of Dr.J.W.L.Parry after a short illness, came as a shock to his many friends and colleagues. Dr.Parry took up his appointment as Consultant Anaesthetist in Aberdeen Royal Infirmary in 1966 having trained as an S.R. at Great Ormond Street and University College Hospital, London. He was a member of the Society of Paediatric Anaesthetists and a staunch supporter of the Scottish Society of Anaesthetists - it is only four years ago since he was the Grampian Region representative for the Society. As a memorial his friends and colleagues have commissioned a portrait of Dr.Parry and this will be presented to Mrs.Parry early in 1989.

The announcement by Michael Forsyth M.P. that the new cardiac centre for Scotland was to be situated in Aberdeen was enthusiastically welcomed by the Grampian Region. The expansion of this specialty in the North East will go a long way to offset the tendency to locate special interests in the central belt of Scotland.

Dr.D MacLeod, Lecturer at London Hospital Medical College who is at present seconded for six months to Duke University Medical Centre North Carolina, is to take up the post of Consultant Anaesthetist in Aberdeen in February.1989. Dr.Janet Braidwood (S.R.) has been appointed to a Consultant post at the Borders General Hospital, Melrose.

Dr.Pradeep Ramayya has completed his H.P.T. training in Aberdeen and has returned with his family to Hyderabad, India. During his period as an S.R. he became Secretary of the Intensive Care Computer Group and made a significant contribution to the Aberdeen Intensive Care Unit System (ABICUS) now installed in the ITU - his expertise in computing will be sorely missed.

Dr.Kathleen Ferguson (Registrar) has been awarded the British Journal of Anaesthesia Fellowship for 1989 and is to carry out research into the effect of anaesthetic agents on protein synthesis. Dr.Gordon Byers (Registrar) has left for one year to work in the Isaac Walton Killam Hospital, Halifax, Nova Scotia.

New Senior Registrars: Dr.Jane Burns - previously a registrar at Glasgow Royal Infirmary; Dr.Graham Johnston - previously registrar at Aberdeen.

Final Fellowships were attained by Drs.C.Taylor, K.Ferguson and R.Dewar.

FISHING OUTING

"Triumph at Menteith - A Fishy Story"

Morale was restored and reputations vindicated when seven Gentlemen of the Society foregathered on September 7th and, with their fishing rods, hip flasks, and other necessary impedimenta, took to the boats on the Lake of Menteith. The weather was ideal, the scenery idyllic, and both sport and conversation afloat were of the expected standard. No member of the Society fell overboard, 19 trout were triumphantly weighed-in at 28lbs 10 ozs, and the day was made complete with a meal and refreshment at the nearby Lake Hotel. Attending were Drs. Alistair Cameron, Nick Gordon, Donald Miller, Donald Robertson, Lt.Commander Sean Tighe, and Professor Donald Campbell. The honours went to a jet-lagged Nick Gordon who won the competition, and the prize, with a catch weighing 5lbs 2 ozs. The day was sponsored by Abbott Laboratories and a proposal that it become an annual event in the Society Calendar was unanimously endorsed by the participants.

D.H.Robertson

GOLF OUTING

Another successful and enjoyable golf outing took place on the 30th June with 19 members attending. The venue was the prestigious Buchanan Castle Golf Club at Drymen with its magnificent clubhouse, and the excellent organisation of the day's events was arranged by Douglas Arthur and Peter Wallace. Although the early weather was dull it cleared up and the threatened rain did not materialise, and a most enjoyable day was had by all.

The morning Stableford was keenly contested as always and the Scott trophy was won by Bill Kerr. Tom Goudie was second , and Farquar Hamilton and Douglas Mclaren shared third place. Once again the afternoon East versus West contest saw a nail-biting finish until honours were shared with the contest halved.

The 1989 outing takes place on 22nd June at Glenbervie Golf Club near Falkirk which hosted the Scottish P.G.A. Championships and is also a pre-qualifying course for the Open Championship.

ANAESTHETIC SERVICE ACCOMMODATION IN DISTRICT GENERAL HOSPITALS

SCOPE

1. This Note gives guidance on accommodation which may be needed for the administration of anaesthetic services in a District General Hospital. The actual provision required must be determined in accordance with whole hospital policies as it may be possible to share some facilities with other hospital departments.

GENERAL CONSIDERATIONS

2. Anaesthetic services are now tending to be organised on a group basis with the staff concentrated in one hospital but providing anaesthetic cover for all the hospitals in the Group.

3. Although the primary function of the anaesthetic service is the careful preoperative and postoperative care of patients presented for surgical and other procedures and the provision of safe and efficient anaesthesia in the operating theatres, and other places like labour rooms and radiology departments, it has in many hospitals acquired other responsibilities such as:

a. The care of patients in postoperative recovery areas.

b. The administrative charge of intensive therapy units.

c. The provision of emergency resuscitation services inside and outside the hospital.

d. The care and maintenance of respirators and anaesthetic apparatus.

e. The provision of blood gas analysis service in theatres and ITU.

f. The preoperative assessment of out-patients.

g. The management of intractable pain.

4. The list is not intended to be exhaustive and may be expected to grow as anaesthetists become more closely involved in the care of patients in hospital. Furthermore, anaesthetists, like other consultants, are responsible for training medical, nursing and technical staff, and may be engaged in research.

5. To enable the anaesthetic service to discharge its growing responsibilities efficiently, it needs an operational base in the district general hospital. This should be located as close as possible to both the operating department and the Intensive Therapy Unit, and should provide facilities for:

a. Organising and administering the service and for rapid communication between duty anaesthetists.

b. Office work by consultants and other medical staff.

c. Rest and study by staff on duty or on call.

d. Storage and maintenance of respirators and specialised anaesthetic equipment if satisfactory and convenient provision is not made elsewhere in the hospital.

e. Blood gas analysis if satisfactory provision is not made elsewhere in the hospital.

f. Staff training.

g. Overnight accommodation for on call staff will normally be provided in a centralised area convenient to clinical areas.

ACCOMMODATION REQUIRED

6. The amount of accommodation required will depend on the number of staff, anaesthetists, assistants and technicians which it is intended to employ but it should include the elements indicated in paragraphs 7 to 14.

7. *General Office* This room will act as the centre from which the service is administered, and will accommodate the clerical staff responsible for keeping the duty roster, summoning anaesthetists on duty or on call, keeping records, providing secretarial services for consultants etc. In view of its multiple uses this office should be approximately twice the size of a unit secretary's office.

8. *Offices* These should be provided on the scale of one per head of the service and one for every two other W.T.E. consultants. Not all offices need be in the anaesthetic unit; a

proportion could, if preferred, be in a central office suite, elsewhere.

9. *Staff Lounge/Study Area* Primarily this is a room where anaesthetists can rest. It should be able to be used for tutorials and also accommodate essential anaesthetic papers and journals.

10. *Workshop and Store* A small workshop with a bench and cupboards with an adjoining store may be required for carrying out maintenance and running repairs on respirators and anaesthetic equipment, and for temporarily storing items under repair, if adequate accommodation is not conveniently available elsewhere in the hospital.

11. *Laboratory* Where suitable laboratory space is not otherwise available (e.g. in the operating department or I.T.U.), a small laboratory may be required. An examination couch should be provided to enable occasional patients from the wards to be clinically examined.

12. *Lavatory/Cloakroom* On account of the on call service required of the department a single lavatory of its own will be required, capable of either male or female use. Cloakroom facilities should be available for junior staff.

13. *Cleaners' Room* It is unlikely that the modest size of the anaesthetic department will justify the inclusion of its own cleaners'room, particularly as it is almost certain to be located near a more comprehensively serviced department whose cleaning facilities it could share.

14. *Seminar Room* The number of staff employed in a group anaesthetic service will seldom be sufficient to justify the sole use of a standard seminar room, but there should be convenient access to a shared seminar room for the formal training sessions.

15. *Telephone* Telephone facilities for internal and external calls will form part of the hospital telephone system and will normally be provided in the offices, the laboratory and the workshop.

SCHEDULE OF ACCOMMODATION

		Sq.m	AREA	Sq.ft.
16.	a. General office	24.5		260
	b. Office 3 at 16.5m²	49.5		530
	c. Staff lounge	23		250
	d. Workshop and Store 16.5m² + 4.5m²	21		230
	e. Laboratory	17		180
	f. Lavatory	4.5		50
	g. Circulation	46.5		500
	Totals	186		2000

GLASGOW AND WEST OF SCOTLAND SOCIETY OF ANAESTHETISTS

1988
Friday, October 28th
Combined Meeting with Edinburgh and East of Scotland Society of Anaesthetists at the City Hospital, Edinburgh.
Dr.J.W.Chappelow. Senior Psychologist R.A.F. Institute of Aviation Medicine, Farnborough.
"Accident Prevention".
Tuesday, November 29th
Professor Walter S. Nimmo, University of Sheffield.
"Morbidity and Mortality following Anaesthesia".
1989
Thursday, January 19th
Members Night - Presented by Members of the Lanarkshire Divisions of Anaesthesia.
Wednesday, February 15th
Dr. Tom Ogg, Addenbrookes Hospital, Cambridge
"Implications of Day-stay Anaesthesia and Surgery".
Wednesday, March 22nd
Presidential Address - Dr. Donald Braid
"A Long Look at Learning".
Thursday, April 13th
Annual General Meeting.
Wednesday, May 17th
Annual Golf Outing - Venue to be confirmed.
Unless otherwise stated, meetings will be held in the Royal College of Physicians and Surgeons of Glasgow, 242, St. Vincent Street, Glasgow.

NORTH EAST OF SCOTLAND SOCIETY OF ANAESTHETISTS

Meetings are to be held at 7.30 for 8 p.m. in Stracathro Hospital, Brechin, unless otherwise notified.
1988
Thursday, 27th October
Profiles in Regional Anaesthesia
Dr.J.A.W.Wildsmith
Thursday, 24th November
Lasers in Medicine - Science Fact or Science Fiction
Mr.J.A.S.Carruth
1989
Thursday, 2nd March
Registrars' Prize Papers
Thursday, 30th March
Losing our Faculties
Dr.A.Adams, C.B.E.
Thursday, 18th May
Annual General Meeting and Presidential Address

EDINBURGH AND EAST OF SCOTLAND SOCIETY OF ANAESTHETISTS

1988
Tuesday, October 4th
Professor J.E.Utting, Liverpool University
"Awareness and Anaesthesia"
Friday, October 28th
Dr.J.W.Chappelow, RAF Institute of Aviation Medicine
"Accident Prevention"
Joint Meeting with Glasgow and West of Scotland Society, City Hospital, Edinburgh.
Tuesday, December 6th
Professor G.Fink, University of Edinburgh, Brain Metabolism Unit.
"Steroid Control of Brain Function: Implications for our Understanding of Anaesthesia".
1989
Tuesday, January 10th
Dr.J.E.Charlton, Royal Victoria Infirmary, Newcastle-upon-Tyne.
"Neural Blockade - Diagnostic and Therapeutic".
Combined meeting with Edinburgh Pain Management Group.
Tuesday, February 7th
Professor J.F.Smyth, Edinburgh University, Department of Clinical Oncology.
"The Treatment of Cancer - Is it really worthwhile?"
Tuesday, March 7th
Members' Night. Associate Members' Prize Presentation.
Saturday, March 18th
Annual Dinner. University Union Teviot Row House, 7.30 for 8 p.m.
Tuesday, May 2nd
Annual General Meeting.
Unless otherwise stated, meetings are 7.30 for 8 p.m. in the Main Hall, Royal College of Surgeons, Nicolson Street, Edinburgh.

REGISTRAR'S PRIZE

The Society annually awards a prize of 150 pounds for the best original paper or essay submitted by an anaesthetist in Scotland, holding the grade of Senior Registrar or under. A second prize of 75 pounds or a third of 50 pounds may be awarded for other papers of particular merit at the discretion of the assessors. It is not necessary that the Registrar be a member of the Society.

The conditions attaching to the award are as follows:

1. The paper or essay must be original i.e. it should not have been read previously at any meeting or published in any journal. The winning of the prize is in no way a bar to the subsequent publication of the paper in another journal.
2. It is desirable that papers submitted show evidence of personal work, but papers consisting of surveys of the literature are eligible for consideration. The Council of the Society wishes to stress that intending competitors should not be discouraged through fear of their efforts being judged elementary. It is fully realised that junior anaesthetists in some peripheral hospitals may not have opportunities to deal with special types of cases or to employ advanced anaesthetic techniques.
3. Papers for adjudication (4 copies) *must* reach the Secretary by the end of February at the latest.
4. The winner of the prize will be required to give a digest of the paper at the Annual General Meeting of the Society towards the end of April. His/Her expenses for the meeting will be met by the Society.

The Secretary places all entries in the hands of the Award Committee which consists of the President, Vice-President and Past President. The members of the Committee have expressed the desire to be able to adjudicate without knowing the name or hospital of the writer; it is requested therefore that the name, address, etc. of the entrant be submitted on a separate covering page. This will be retained by the Secretary, but otherwise the essay itself should give no indication as to its source: acknowledgment to colleagues etc. should not be included.

The prize for 1988 was won by Dr.D.Maclean of the Royal Infirmary, Edinburgh for his paper entitled "Maximum expiratory airflow during chest physiotherapy on ventilated patients, before and after the application of an abdominal binder".

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