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ANNALS- SCOTTISH SOCIETY OF ANAESTHETISTS



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**THE
ANNALS
OF THE
SCOTTISH
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ANAESTHETISTS**

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SCOTTISH SOCIETY OF ANAESTHETISTS

COUNCIL FOR 1990-91

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REGIONAL REPRESENTATIVES

		Retires
Aberdeen	Dr. I. Levack	1993
Dundee	Dr. A. Shearer	1991
Edinburgh	Dr. I. Armstrong	1993
	Dr. J. McClure	1991
Glasgow	Dr. B. Stewart	1993
	Dr. P. Wilson	1992
Inverness and North	Dr. S. White	1992

PROGRAMME FOR 1991

Registrar's Prize: Entries to be submitted to the Secretary by 28th February, 1991

Annual General Meeting: Peebles Hydro Hotel, 19th-21st April 1991

Registrars' Meeting: "Paediatric Symposium", Kelvin Conference Centre, Glasgow, 31st May 1991. Details from: Dr D C Miller, Yorkhill Hospital

Scientific Meeting and Gillies Memorial Lecture: Royal College of Physicians, Edinburgh, 15th November, 1991

Golf Outing: To be arranged

PRESIDENT'S NEWSLETTER



This year has seen continuing turmoil and debate throughout the N.H.S. in general as well as in our own specialty. The vexed question of self governing hospitals, with its many implications, is still widely discussed. To date no definite decisions have been made in Scotland

Funding remains a matter of concern. Despite increasing sums of money being allocated to Health Boards, overspending with the subsequent demands for increased "cost efficiency" is a major problem for most Health Boards.

At the time of writing, Mr K Clarke has been replaced as Minister of Health by Mr W Waldegrave. As suggested in the B.M.J. of 10th November, the appointment of this new Minister, whose style is quite different to that of his predecessor, may signal a welcome period of quieter medicopolitical activities. Whether battle for the Prime Ministership currently taking place when decided, will result in changes in health policies remains to be seen.

Your council has addressed itself to many matters during the year, those giving rise to most discussion being the Career Registrar grade, the Consultant Contract, and Assistance for the Anaesthetist.

Another matter of great concern, especially in the current litigious climate, is the document setting out a model form for consent to examination, investigation, treatment and operation. This proposed form of consent has important anaesthetic implications, particularly regarding the person obtaining consent and his/her knowledge of, or lack of knowledge of, anaesthesia whether regional or general, or both. Council has instructed the Honorary Secretary to write to the SJCC expressing concern about the form in its present wording.

To date there has been no further developments

following the disbanding of the Anaesthetic Subcommittee of the N.M.A.C. and so far no advice has been sought from the Society. These matters will be fully discussed at the next A.G.M.

The meetings of the Society continued during the year and have been uniformly successful and enjoyed by the participants. The change in the format at the A.G.M. whereby reports from the various committees were precirculated, proved a welcome innovation, and by allowing time for ingestion, encouraged more measured debate. It is hoped this will continue.

The social and sporting activities at Peebles were enjoyable as usual and I hope members will continue to give their support to this meeting.

In May the Registrars' Meeting was held in Edinburgh, and in November the Scientific Meeting took place in Dundee. On behalf of the Society I would like to thank John McClure and Alfie Shearer for the very successful organisation of these meetings and also the speakers for their excellent presentations.

It must almost be unique for a member of the Society, however distinguished, to deliver a lecture at both the scientific meetings. I am pleased to note that Professor A.A.Spence not only gave the Gillies Memorial Lecture in Dundee but also presented a paper at the Edinburgh meeting on the College of Anaesthetists.

As President, I was invited to represent the Society at two functions. Firstly, I attended a lecture given by the Assistant Curator of Fine Arts, followed by dinner, at the Burrell Collection to celebrate Glasgow's year as European City of Culture. This was the occasion of the combined meeting of the Glasgow and West of Scotland and Edinburgh and East of Scotland Societies of Anaesthetists. Secondly, I attended the Sir James Young Simpson Memorial Lecture at the Royal College of Surgeons of Edinburgh which was given brilliantly by Dr J F Nunn, and I attended the dinner which followed. Both these occasions were rather unique and I was privileged to represent the Society.

I have sadly to record the deaths of three members this year. Dr W N Rollason of Aberdeen died in April. Dr Imray noted this at the A.G.M. Dr R N Sinclair of Glasgow died in May, and Dr W J Leishman of Stirling died in August. Dr Rollason and Dr Sinclair were Past Presidents of the Society in 1973 and 1958 respectively.

Finally, I wish to thank all Members of Council for their unflinching support, and especial thanks to the Honorary Secretary, Peter Wallace, who has successfully and knowledgeably managed the affairs of the Society, to Douglas McLaren, Honorary Treasurer, who has wisely managed the Society's finances, and to John Murray, Editor of the Annals, who masterminded the new and pleasing Titlepage for the 75th Anniversary which Council has decided should continue throughout the 1990's.

EDITORIAL

The changes to the "Annals" with a new title, cover page, and colour photographs in last year's anniversary edition have been well received and Council have agreed to continue these changes. Less welcome which eagle eyed readers will have noticed were two errors in the lists of Past Presidents and Guest Lecturers, Dr D B Scott's name was omitted as President in 1983, and Professor John Norman as Guest Lecturer in 1982. These omissions were the responsibility of the Editor who offers his sincere apologies.

Following the articles from the History of Anaesthesia Society meeting last year, this edition carries an article on the Victoria Infirmary, Glasgow, and the Editor hopes that there might be a regular feature of historical interest in coming years. Council have also agreed to include summaries of the second and third prizewinners essays for the Registrars Prize as well as the winner's essay, and this has been incorporated this year.

We are going through a time of unprecedented change in our professional environs with changes in management systems, resource management initiatives, contract changes, Trust Hospital

status and implementation of "Achieving a Balance" amongst others, impinging to a greater or lesser extent on our everyday work. Our Society with its broad base of regional representation within Scotland has an important role to play in harnessing opinion and offering guidance in meeting the challenge of these changes.

Also changing at this time is the Executive of the Society. It has been a privilege to have been involved in the affairs of the Society in this way and our thanks are due to all who have helped in these last four years. We wish the new Executive from Aberdeen every success for the next four years. Finally I would like to express my personal thanks to Council and the Society for their unstinting support to me as Editor especially in the introduction of computerised production of the Annals, and also for readily agreeing to the changes in the format of the erstwhile Newsletter. It may be of interest that over 50% of the material in this edition was supplied on "floppy" disc - your Editor's contribution to energy conservation!

ANNUAL GENERAL MEETING

Another highly successful Annual General Meeting took place in Peebles Hydro from 20th to 22nd April. The numbers attending continue to increase each year and the Society can probably now fill the whole hotel over the weekend. One continuing pleasing feature is the cohort of members attending from south of the border - many have been Guest Lecturers who, having sampled the delights of a "Peebles" weekend, return regularly.

The new arrangement of having all the Trade Exhibition together in the ballroom with a reception there on the Friday evening has been welcomed by all, especially the Trade Exhibitors, and is to continue. There was a healthy turnout on the golf course on

Friday afternoon when an early troublesome wind died away to leave pleasant golfing conditions. The winner was Dr Martin Payne, with the President, Dr Greg Imray, a close second. In the fishing competition a new name (although a regular attender) surfaced as the winner, Dr Don Robertson. Once again as on the previous year Dr Iain Davidson was at the oars in the successful boat!

The next A.G.M. promises to be just as successful as previous ones but in order to ensure accommodation it is advisable to book early.

WITH A GOSSAMER TOUCH

It is a great honour to become President of the Scottish Society of Anaesthetists which is now seventy six years young. I feel even more honoured since I am only the third woman President following Dr. Alison Ritchie in 1955, and Dr. Margaret Muir in 1962. Needless to say, I hope and trust that I shall not be the last. It is perhaps appropriate in this year of 1990 when Glasgow is the European City of Culture, that a Glaswegian born and bred and a graduate of that great centre of culture, the University of Glasgow, should be the President of this prestigious society. I well remember our past President standing here last year and commenting on the subjects he might have chosen for his Presidential Address ranging from the Bon Accord Lemonade Company of Aberdeen to anaesthesia for castration of pigs and finally showing us in video a real life version of *Apocalypse Now* in the North Sea. I do not have such a dramatic choice of subjects but since much of my professional career has been involved with obstetric anaesthesia, I have chosen an aspect of this to talk about today.

The quality of obstetric care is one criterion of the level of civilisation achieved by any society. This would, of course, include analgesia and anaesthesia for labour. In passing it is interesting to note that when Sir James Young Simpson of Edinburgh introduced chloroform as an analgesic for labour in 1847, he met with powerful opposition from the male chauvinistic and calvinistic Church of Scotland. It took the Royal seal of approval to stifle this opposition and make the use of analgesia and anaesthesia in labour socially and medically acceptable and thus civilised. Queen Victoria is credited with saying during her eighth pregnancy in 1853 "We are going to have the chloroform". This is somewhat reminiscent of another very famous lady, Prime Minister Margaret Thatcher, who said over a century later "We have become a grandmother", but presumably without the aid of chloroform.

Shortly after the very early use of both ether and chloroform for surgical operations, these agents were used as anaesthetics for the then rare

operation of Caesarean section. Caesarean section is one of the oldest operations in surgery with its origins lost in antiquity and mythology. From Virgil's Aeneas and the Judaic Talmud to Shakespeare's Macduff, poets have referred to "the child from his mother's womb untimely ripped". The references are so frequent it is accepted that the operation must have been carried out. From mediaeval times on midwives carried out almost all deliveries and this included the rare and usually fatal operation of Caesarean section. Even the origin of the name is doubtful but it is thought not to be associated with the Caesars of Rome but less romantically comes from the Latin caesura meaning a cutting, and *seccare* meaning to cut.

The first successful documented operation seems to have been carried out in 1500 by a Swiss sow-gelder, one Joseph Nuffler, who used his own castrating instruments and knowledge to deliver his wife abdominally. It is said almost certainly anecdotally that Frau Nuffler not only survived but went on to have several subsequent and successful pregnancies although the mode of delivery is not recorded. Accounts of the operation and results are mainly apocryphal and the first definitive account of the operation and its results was given by a French obstetrician M. Mauriceau in the mid 17th century. He noted that the operation was carried out in the living only in rare and desperate circumstances and was nearly always fatal. In previous centuries the operation had been occasionally carried out in the dead in order to baptise the child. This appalling maternal mortality continued well into the 19th century. In Paris, for instance, in the ninety years from 1780 to 1870 no survivors were recorded. In Great Britain and Ireland in the 1860's the maternal mortality was around 85%, and in New York it was about 80% at the same time. The causes of death were not surprisingly haemorrhage, infection (usually peritonitis), and shock. Anaesthesia was primitive as it was before 1847 and consisted of alcohol in some form. There is a report in 1879 by an African explorer who witnessed a Caesarean type of

delivery with the mother under the influence of banana wine intoxication. The explorer stated that the operation was successful but whether banana wine had anything to do with the survival is not known. Haemorrhage was not surprising since the operation before the mid 19th century did not include suturing of the uterine incision, and it was a quick "cut and run". The incidence of sepsis occurred from all the reasons relevant to the time. The destructive operation of craniotomy was preferred to the abdominal delivery of the child. The sacrifice of a possibly living child was perhaps understandable considering the prevalence of large families and a high infant mortality rate.

In the 1870's and 80's there were technical advances firstly by Porro of Italy in amputating the body of the uterus thereby removing the source of the haemorrhage and hopefully decreasing the likelihood of infection, but of course preventing any further pregnancy. Then Kehrer and Sangster of Leipzig in 1882 adopted the practice of suturing the uterine incision. This improvement in technique was said to have reduced maternal mortality by 50%. No specific acknowledgement of the benefit of general anaesthesia was made but it can be safely assumed to have made a significant contribution to this dramatic reduction in mortality. This latter operative technique of suturing the uterine incision was taken up enthusiastically by Murdoch Cameron who became Professor of Midwifery at Glasgow in 1890. He worked at the Royal Maternity Hospital from 1887 to 1920 during which time the new hospital was opened in 1908 in what had been the oldest street in Glasgow, the Route en Roi, which had become known as Rottenrow. Over eighty years later it is still standing looking remarkably like the artist's impression of 1908. There is a plaque on one wall of the main operating theatre commemorating Cameron's early successes, success meaning both mother and child survived. The ensuing publicity did much to popularise the operation. The first three successes were rachitic dwarfs, one of whom was only four feet tall and had a conjugate at the pelvic brim of only 4cms, the normal being 11cms. Murdoch Cameron learned that one was not married so he promptly arranged the nuptials and the two other were her bridesmaids. Nowadays Professors of Midwifery would have to add marriage brokerage to their other duties if they wished to follow Murdoch

Cameron's footsteps. After the successful operation Cameron's house surgeon produced a bottle of champagne and invited Cameron, the matron and the mother to join in a toast to the baby's health. The mother pushed the unfamiliar and presumably unpalatable drink away and asked for some "good soor dook" or buttermilk. By 1890 fourteen successful operations had been carried out in Glasgow and by the turn of the century the operation had ceased to attract popular attention. One could almost compare this with the publicity surrounding the first heart transplant in this country, the operation now being rarely newsworthy. For these first cases there is no record of anaesthetist or agent but chloroform given by another staff member is likely. By the end of the nineteenth century maternal mortality had dropped to around 10%. The later part of the nineteenth century saw many exciting advances in medicine, some of which are relevant to this paper e.g. in 1853 and onwards Woods of Edinburgh produced several prototypes of the modern hypodermic needle and syringe. 1885 and 1890 saw the isolation of cocaine and then of the alkaloid itself and its local anaesthetic properties were noted although it was not until 1884 that its topical anaesthetic action was noted. Quincke carried out the first lumbar puncture in 1891 and in 1898 August Bier in the German city of Kiel performed the first intentional spinal anaesthetic. Again, as self experimentation, he persuaded his assistant Hildebrand to inject cocaine solution into his (Bier's) back to attempt to reproduce the effects. This did not produce any effects since most of the solution was lost because the syringe and needle were badly fitting. Bier in turn injected cocaine solution into Hildebrand's back and into his subarachnoid space and within seven minutes he developed motor and sensory loss in the lower half of the body and limbs with no response to stimulation such as striking the shins with an iron bar and violent tugging of the pubic hair. Anaesthesia lasted for about forty five minutes. Bier and Hildebrand dined rather well later that evening, both had headaches the following day but as Hildebrand's lasted for some days, he must have had the first recorded post-dural puncture headache. Bier is also credited with the invention of the steel helmet worn by German soldiers in the first world war! Spinal anaesthesia became quite popular in the early twentieth century and indeed had been recommended as

anaesthesia for Caesarean section by Munro Kerr, obstetrician of Glasgow, and others, but the American obstetrician Williams, in his "Textbook of Obstetrics" 1929 edition, gave a more guarded comment not only on the bloodless field but also on the high mortality rate. Unfortunately he gave no figures to illustrate this statement.

The success of spinal anaesthesia in other fields depended on the recognition of three important factors. Firstly, the use of cocaine-like agents with local anaesthetic action, the toxicity of cocaine having become widely recognised. Secondly the crucial importance of sterile techniques, and thirdly, a reliable sign of entry to the subarachnoid space. Originally spinal anaesthesia was attempted using a needle attached to a syringe loaded with local anaesthetic solution and the failure rate was high. Doctor later Professor Sir Robert Macintosh amongst others, pointed out that a hollow needle used alone allowed CSF to escape and this was a definite positive sign. The procedure may well have been abandoned had this simple observation not only been made but followed.

As far as the United Kingdom was concerned spinal anaesthesia was virtually abandoned following the Woolley and Roe cases of 1947 with the subsequent litigation. Woolley and Roe, you will recollect, were two patients on the same operating list given spinal anaesthesia who developed paraplegia immediately post-operatively. The ampoules of local anaesthetic were stored in phenol to sterilise them and it was eventually concluded that some phenol had entered the ampoules through invisible cracks and that this was the cause of the disastrous effects on these unfortunate patients. These events cast a dark shadow over spinal anaesthesia and much expertise in the technique was lost in this country. This was also a salutary lesson on what a tiny amount of a substance like phenol can do to the spinal cord. The cause of spinal anaesthesia was not helped by the publication in 1950 of an article in Surgery, Gynaecology and Obstetrics which blamed spinal anaesthesia for the incidence quoted on less than adequate evidence. Fortunately a number of papers followed rapidly to defend the safety of spinal anaesthesia. However, with increasing interest in regional techniques, better and less toxic drugs, and greatly improved sterilising methods, spinal anaesthesia has enjoyed a renaissance in this

country over the last decade or so. One can agree with the writer of Ecclesiastes who wrote in Chapter I, verse 9 "There is nothing new under the sun". There is also increasing evidence to show that regional techniques may mitigate some of the undesirable metabolic responses to surgery especially that in the lower abdomen. Over the same time epidural anaesthesia has become a fairly widespread technique not only for analgesia in labour but also as anaesthesia for Caesarean section. In 1980 at Glasgow Royal Maternity Hospital 70% of our patients had epidural anaesthesia for Caesarean section whilst only 30% had general anaesthesia. From 1981 onwards spinal anaesthesia made its reappearance at Rottenrow for Caesarean section. Of course anatomically speaking it is but one little step from the epidural space to the subarachnoid space as all anaesthetists very well know!

I would like now to present the results of a series of Caesarean sections carried out at the Royal Maternity Hospital under spinal anaesthesia personally by myself or in a few instances by a registrar in training under my direct supervision. The patients were followed up by me for 4 - 5 days post-operatively. While the series is really two series, one consisting of 110 patients in 1986 and the other of 100 consecutive patients in 1989, I have in fact combined the results since the only difference in them was that a 25g spinal needle was used for lumbar puncture in the first series whereas a 26g needle was used in the second series, the 26g needle having become available in the interval between the series. The 29g needle is of course now available but since each needle costs about ten pounds, and I have found it very difficult to use, I won't comment further. A 32g needle is now being evaluated. The patients were planned elective Caesarean sections. The reasons for the sections were usually previous Caesarean section, cephalo-pelvic disproportion, breech presentation, multiple pregnancy or pregnancy-induced hypertension with or without intra-uterine growth retardation. There were several other reasons such as patients with diabetes, a patient with systemic lupus erythematosus (with anticipated difficult intubation), another with symptoms highly suspicious of a cerebral arterio-venous malformation in whom any Valsalva manoeuvre was contra-indicated and the obstetrician simply said "I'm feart". Another had

widespread arthropathy and had had multiple orthopaedic operations including bilateral hip replacements, and another had the H.E.L.P. syndrome i.e. haemolysis, elevated liver enzymes and low platelets. The other patients were generally very fit.

We are fortunate to have a highly favourable climate of opinion regarding the "awake section" from obstetricians and midwives alike who, of course, see the patients first at the ante-natal clinic and can discuss this form of anaesthesia with the patient when elective section is planned. When the patient is admitted to hospital this aspect is reinforced by the sisters and midwives who, in the view of the patients, are only one step down from the Almighty, and finally by the pre-operative visit from the anaesthetist. You can imagine it is a rare and brave patient who would insist on a general anaesthetic against such a volume of opinion. I did see a patient a few months ago who said to me: "I actually thought I would like a general anaesthetic but I understand you don't really do them here!" This is not quite the case of course. The only premedication is the H₂ receptor antagonist ranitidine 150mg orally at night and in the morning at least two hours pre-operatively.

In an effort to make the operative delivery seem as normal as possible, each patient walks to theatre in her slippers and dressing gown complete with spectacles and dentures (if worn) and accompanied by husband, boyfriend, mother, sister, girlfriend or even the woman next door! Only one of them of course comes into theatre. E.C.G. and non-invasive automatic B.P. monitoring are connected to the patient. A large I.V. cannula is sited in a convenient vein for pre-loading of about one litre of fluid, and the spinal is administered in the chosen way and interspace, usually L1/2 or L2/3. The subarachnoid space is smaller in term pregnancy due to the enlargement of the epidural veins, and it is well recognised that a dose of local anaesthetic reduced by about 30% is sufficient for pregnant patients who are at or near term. Therefore gentle precision and careful control of the needle are absolutely essential, with a "gossamer touch" as Bromage said so succinctly. In this series of patients 0.5% plain isobaric bupivacaine was used in all patients who were kept in the left lateral position until the obstetricians were ready and then turned supine with a left lateral tilt of the operating table.

The patient details were as follows:

Age 28.5 (17-42) years. Height 158.7 (141-172)cms. Weight 72.5 (44-125) kg. Gestation 38.5 (26-42) weeks.

The dose of bupivacaine was 2.5 ml except that those patients who had not reached 32 weeks gestation were given 3-3.25ml since the uterine enlargement before the third trimester does not affect the epidural veins. 2ml of bupivacaine were given to the very short (141cm) patient. In all of these cases the level of spinal block was entirely adequate for the surgery. The onset of the block was taken to be when the patient felt tingling in the feet - on average after 1 minute (0.5-2 mins), and the block was complete in 6.2 minutes (3-11 mins). The average height of the block was to T4 which is accepted as the correct level for anaesthesia for Caesarean section. There was one patient who achieved a block height of C3. She complained of some difficulty in breathing but on close observation no respiratory paralysis was seen and with reassurance the patient remained calm, and with an effort so did I! There were technical reasons for this very high block.

The pre-spinal systolic B.P. was 120 (90-158) mmHg and the lowest post-spinal systolic B.P. was 82 (67-110) mmHg. Ephedrine was given in 3mg intravenous bolus doses in response to a trend of fall in the B.P. or if the B.P. was less than 100mmHg systolic or if the patient suddenly became pale. The average dose of ephedrine was 13mg and varied from 0-40 mg. The injection delivery interval was 8.5 (3-14) mins, and the duration of operation was 43 (20-80) mins. Some 9 patients (4.3%) required intra-operative analgesia; the drug of choice was alfentanil in divided doses. This may be compared with some 31% of our patients requiring intra-operative analgesia whilst undergoing elective Caesarean section under epidural anaesthesia in 1985. Also worthy of mention is that about 7 months ago I attended a meeting of the Obstetric Anaesthetists Association and Dr. Andrew Doughty, doyen of epidural anaesthesia in the U.K., stated that to his knowledge four patients are currently suing their anaesthetist for pain and discomfort felt during Caesarean section under epidural anaesthesia. You could have heard a pin drop in the auditorium after this statement was made.

A doppler study of flow velocity in the umbilical artery before, and at 5, 10 and 15 minutes post-spinal was carried out in our maternity unit and it showed no deleterious effect on the umbilical artery flow; nor was any ill-

effect noted in any neonate. 210 mothers were delivered of 222 babies. There were 200 singletons, 9 sets of twins and 1 set of quads. Recovery time taken to knee flexion was rapid and averaged 176 (85-345) minutes and many patients expressed pleasure at the rapid recovery of motor power especially those who had previously had a section under epidural anaesthesia.

I think many anaesthetists may be discouraged from undertaking spinal anaesthesia in obstetric patients because of the risk of spinal headaches. Of the 210 patients studied 11 (5.2%) developed typical spinal headache. There was no difference in the incidence following the use of a 25g or 26g needle. These 11 patients were offered and accepted autologous blood patching. They were all dramatically cured following injection of up to 20ml of blood. I would regard such active management of spinal headache as an essential part of the whole procedure bearing in mind that these are young women who have just been delivered and wish to get to know and care for the new baby. It is difficult and disappointing if the patient is confined to bed with an untreated spinal headache. Having a spinal headache did not discourage these patients, with one exception, from saying they would have a spinal again for a subsequent section provided blood patching was available.

As part of the post-operative check I asked the patients for their comments regarding their anaesthetic. 97% of the patients made comments like: "Delighted", "Brilliant", "I would recommend it to anyone", "My husband was thrilled" and so on. The patient "not sure" was the one whose block reached C3 and she felt that she had difficulty in breathing which she found alarming. Of the two who thought they would prefer general anaesthesia for another section one said she had felt extremely apprehensive beforehand and despite prompt and adequate treatment for some hypotension had felt nauseated for some time. The other patient developed a spinal headache and the epidural blood patch was difficult to do and, although successful, she felt (being a midwife of course) that neither spinal nor epidural anaesthesia would be adequate for her on another occasion. She was the patient I referred to a few moments ago. I am indebted to a colleague for this final comment made by a 17 year old as her spinal anaesthetic took effect "Hey, wait a minute, ma legs is gone

pure dead mental!" The advantages of spinal anaesthesia include rapidity of onset, intense analgesia, low dose of drug, quick recovery, decreased metabolic response to surgery (perhaps), avoidance of general anaesthesia, early bonding between mother and baby, and both mother and partner may witness the delivery if desired. The disadvantages of spinal anaesthesia may be the rapidity of the B.P. changes, the quick recovery (in some circumstances) and the risk, albeit small, of spinal headache. These disadvantages are mitigated by prompt treatment.

These are the results of a close look at 210 patients having spinal anaesthesia for Caesarean section. Many other spinals have been carried out in our unit by myself and consultant colleagues as well as various registrars rotating through the maternity unit and the results are broadly similar. Our experience extends over a decade and the numbers of patients having spinal anaesthesia has rapidly increased especially in the last 5 years, and from 1987 more spinals were given for Caesarean section than either general or epidural anaesthesia. The actual numbers for the decade were - general anaesthesia 1442 (23.5%), epidurals 3089 (50.3%) and spinal 1615 (26.2%). Over the last 5 years most patients who had Caesarean section with epidural anaesthesia were emergency cases who had an established epidural for analgesia in labour and were topped up for the surgery. Indeed, in 1989 only 4 patients had elective epidural anaesthesia and 11 patients had elective general anaesthesia for Caesarean section. This technique is popular with obstetricians and midwives, both in theatre and in the recovery ward and it is very popular with patients. My message of today is to those involved with obstetric anaesthesia, if you have not yet taken the plunge into spinals for Caesarean sections, do so with the gossamer touch and you will have happy colleagues and most importantly delighted patients.

I wish to acknowledge the assistance of the Wellcome Unit for the History of Medicine, University of Glasgow, in the preparation of the historical aspects of this paper.

GROWTH POINTS IN ANAESTHESIA



An expert is someone who comes from afar with slides. It may be that the further away he comes from the greater an expert he is. Under the terms of this proposition I do not rate very highly since my place of work is in a neighbouring country. The greater the lack of expertise the more a speaker needs a framework on which to hang his address and under the general heading of Growth Points I wish to talk to you about :-

- Reorganisation
- Audit
- Awareness
- Monitoring
- Day Surgery

A growth point is an area at which cell division is localised and here the term is intended to refer to those parts of our specialty where change is occurring most rapidly. The subjects listed above are all areas where there is action and on which most anaesthetists have definite opinions.

Reorganisation

I will grasp the nettle of reorganisation first. It is not appropriate that I should engage in political argument but I think it is true to say that most doctors are opposed to most, but not all, of the Government's proposals for changes in the NHS. "Well, they would be wouldn't they" is the frequent response to this but a reasoned and detailed response to our concerns has so far been lacking.

In his Devil's Dictionary, Ambrose Bierce defined a Conservative as a politician who was enamoured of existing evils. In favour of our present Government it can certainly be said that this definition, elegant though it is, does not apply to them. Radical means favouring or tending to produce extreme or fundamental changes and this seems to be a better description of the Government's proposals. The same author that I have already quoted to you considered radicalism to be the conservatism of tomorrow injected into the affairs of today. I hope that in this case he was wrong. A Health Service financed with parsimony by Government but controlled (or pretending to be controlled) by Market Forces seems to be a formula for getting the worst of both worlds. The people most in need simply cannot generate a Market Force.

It would be a serious error to think that restraints on Health Service expenditure are just a feature of the policies of the present government. Opinion polls tell us that a large majority of people would like to have more money spent on the Health Service and would actually be prepared to pay for this but, even so, a way of regulating the demand has to be found. The question is whether the Purchaser-Provider mechanism is going to give this regulation. One thing is certain - it is going to insert a couple more tiers of bureaucracy into the system, and major tiers at that. This must put up the cost of treatment of each individual patient and if no more money is available to finance the bureaucracy then there is that much less for patient care - it must be reduced.

The model seems to be wrong. The model in use is that of a supermarket. The supermarket is driven by profit, a government financed Health Service cannot make a profit - the idea is inappropriate. Patients are not analagous to customers in a supermarket - "customers are people salesmen tell lies to". (This quote comes from a letter to a national newspaper by a professor of mathematics who was told his department had to sell itself to the students who were his customers.) The comment is severe but has some weight. Acting as if your mainspring is to minimise costs in order to maximise profits when in fact you don't make profits is nonsensical. The Purchaser-Provider relationship is imaginary, notional is perhaps a better word. It is hard to see any good coming of it, there is certainly the potential for a good deal of harm. Is any of this appropriate for a meeting such as this? Well, the imposition of a lumbering bureaucracy

engaged in imaginary bargaining must affect our working conditions so that I believe it is not unreasonable for me to speak of it.

Audit

Audit is part of the Government's New Deal in which many doctors see some virtue. It has been saddled with a name - Resource Management Initiative - which is a prime example of Management Speak - being a random assemblage of three popular buzz words equally meaningful (or meaningless) in whatever order they are placed. It is important that we should not be put off by these absurdities. We find it both useful and interesting to know how much our activities cost but I fear our Managers see Audit as a tool that may be used to compel us to alter our practice to save money, with patient welfare taking second place. Recent public arguments about using propofol when thiopentone will do exemplify this in a small way.

Audit will cost a great deal of money, not only for computers but also for people to run them and the fear is that, as with the Purchaser-Provider notion, the cost will diminish the money available for patient care. It should be emphasised that Audit itself does not save money, on the contrary it spends it and it must be a matter of difficult judgement to decide how detailed an auditing process should be and whether or not the procedure is worthwhile.

We already have some audit information of interest and on which we can act. It concerns our usage of inhalational agents on which Northwick Park Hospital spent almost 50,000 pounds last year. There are about 190 District General Hospitals in England and Wales and they are far from being the only users of anaesthetic agents. An expenditure of £10 million per annum for these agents is a conservative estimate.

The eclipse of halothane has been almost complete although I believe there are pockets of resistance. We now use it only for children and before our ENT unit arrived we had become quite habituated to the use of enflurane. Going back to halothane brought sharply to our attention how much better an agent halothane appeared to be.

Why does enflurane appear so slow? The reason is the limitation on overpressure. Overpressure is the elevation of inspired concentration above maintenance levels by which we rapidly establish anaesthesia with inhalational agents. MAC for halothane is 0.74%, if for a short time the patient breathes 5% (the highest concentration most vaporisers will deliver) that is 675% of MAC and the blood and brain concentration rises rapidly. In the case of enflurane MAC is 1.68 - 5% is only 290% MAC and approach to an anaesthetising brain concentration is that much slower. Even 7% is only 416% of MAC.

There is another restriction on overpressure with enflurane: at brain concentrations corresponding to an end-tidal concentration of 2.5% stimulatory effects -

seen as tonic movements - may be seen. On two occasions recently quite severe twitching has been noted in patients in whom overpressure had been applied using high concentrations of enflurane when the patient was apnoeic after propofol induction. In both cases the twitches were ascribed to propofol. It should be added that hyperventilation increases the stimulatory effects of enflurane.

Isoflurane is free of these problems but has its own in that it is irritant. Try using it for day care anaesthesia on a group of bronchitic old men for cystoscopy if you want an effective reminder of this. The volume of inhalational agents used is a direct function of the fresh gas flow (FGF). In a previous survey at Northwick Park I concluded that the average FGF used was 8 litres/min. (This is no longer the case). The fact that the Manley ventilator is the one most commonly used in the United Kingdom does not help - complete non-rebreathing is the rule. The coming of routine end-tidal CO₂ monitoring has helped here. Adjusting the FGF to produce normocapnia has caused a big reduction in FGF.

Unfortunately this swing has been more than offset by the large scale use of the Bain system for spontaneously breathing patients. As has been recently discovered, this practice is almost universal in the U.K. and certainly should not be. Authorities differ remarkably in their recommendations for FGF with the Bain system and spontaneous breathing but 2-3 times the alveolar ventilation (10 - 15 L for a 70 Kg man) are average figures.

The situation is not helped by difficulty in establishing whether or not rebreathing of CO₂ is occurring. This is because in the Bain system the site from which one would normally sample gas is swept out by fresh gas coming up the inner tube and erroneous readings have been shown to result. Sampling from within the endotracheal tube is necessary. To determine if rebreathing is occurring with the Magill system the optimum site for sampling is at the expiratory valve. A small housing is necessary.

If the attraction of the Bain system is the convenient placement of the expiratory valve and a Lack system is not available, then can I remind you that it is quite simple to make up a two tube version of the Lack by attaching the patient's end of a Magill system without valve to one arm of a Y piece from a circle system and to the other arm a length of standard corrugated tubing terminating in a Heidbrink valve. The valve is as conveniently placed as with the Bain or even more so. Using capnography to 'fine tune' the FGF with these systems - Bain for IPPV and Magill (or variant) for spontaneous breathing enables surprisingly low flows to be achieved, four litres/min or lower is not uncommon. There is a little evidence that smooth walled tubing is slightly more efficient than the standard corrugated, perhaps it reduces turbulence and

assists in separation of the fresh and dead space gas from the alveolar gas.

Further reduction in FGF going below alveolar ventilation requires chemical (or other) absorption of CO_2 . At present we have only soda lime or Baralyme but there are other possibilities, Zeolites or molecular sieves for instance, more expensive than soda lime but self renewing.

Once the FGF is reduced to a level requiring soda lime things begin to change. The most important change is that the concentration of agent inhaled by the patient differs from that delivered by the vaporiser. As I am sure you all recall - if the vaporiser is outside the circle i.e. in the FGF then the concentration in the circle is less than the vaporiser is delivering. The lower the FGF the greater is the difference. This situation increases the risk of awareness if muscle relaxants are being used.

If the vaporiser is in the circle the inspired concentration depends on the gas flow through the vaporiser. With spontaneous ventilation some negative feedback occurs, increasing depth of anaesthesia depresses ventilation and inspired concentration falls but with IPPV the concentration rises steeply to dangerous levels.

Those who are experienced and expert with low flow anaesthesia can cope with these problems but nowadays we must conclude that an anaesthetic gas meter is necessary if low flow anaesthesia is to be used. Such a meter should have a fast enough response time to look at end tidal concentrations at normal respiratory rates. How fast is that? Well, the subject is complicated by a lot of variables, I/E ratio variation for one, method of measuring and expressing response time for another. As an approximation a 10-90% response time of 600 milliseconds permits end-tidal readings at 25 breaths/min. It is surprising that respiratory rates of 30/min or even more are commonly seen with spontaneously breathing patients. If assumptions are made about the I/E ratio - usually taken to be 1/1 at high rates - and if the response time of the meter is known, then the error, i.e. the difference between the meter's lowest reading and the true end-tidal measurement can be estimated.

The significant advantage in having a continuous read-out of end-tidal anaesthetic concentration is that after the first few minutes of an anaesthetic it is a measure of anaesthetic partial pressure in the brain. This point will be discussed further under the heading of awareness.

The savings on volatile agents depend entirely on how far the FGF is reduced. With a completely closed circuit the consumption of volatile agents is between 10 and 15% of what it is with an open circuit such as that of a Manley ventilator and a minute volume adjusted to produce normocapnoea. You might be interested to know that we have measured the actual

uptake of liquid anaesthetic during the first thirty minutes of anaesthesia at 1.3 MAC to be halothane 4.88 mls, enflurane 8.43 mls and isoflurane 3.89 mls. These figures are without N_2O and normalised to 70 Kg body weight.

Completely closed circuits have a number of interesting attributes, more interesting, in fact, than economy in agent usage but I doubt that the time is ripe to advocate their universal use. There are a number of unfamiliar problems not found with more conventional systems, denitrogenation of the patient and making the machine really gas tight are two of them. Others are that the performance of the closed system is in a number of ways quite different to the ones we are used to. I have time to give you only one example of this. We all take it for granted that the more a patient breathes (or is ventilated) the more anaesthetic he gets and the more soluble the agent the greater this effect. This does not occur with the completely closed circuit. If the patient takes up a lot of anaesthetic with one breath there is less to take up next time round. With the closed circuit there is interaction between the patient and the system.

This contrasts with the conventional open system in which the patient samples from a gas stream of fixed composition which streams past him and out into the atmosphere. Nothing he does influences the composition of this gas, there is no interaction between patient and system.

These considerations apply only to completely closed systems. It is extremely straightforward to establish anaesthesia in the usual way with a high gas flow and then when a near steady state has been achieved in 5-10 minutes move to a low flow. Fresh gas flows of 1-2 litres are easily achieved. Oxygen and anaesthetic agent monitoring should be employed. It is not always easy to use such low flows with face masks but the introduction of the laryngeal mask has overcome that problem.

Time forces me to dismount from this particular hobby horse but before I do so I have to paint in a cloud on the horizon. You can see from the figures I have given you that the widespread use of low flow anaesthesia would significantly diminish sales of volatile agents. In the average hospital a reduction of 50% is easily obtainable. There is reason to believe that if such a significant diminution was brought about then the manufacturers would simply increase their prices to maintain their profits. Under existing regulations they would be entitled to do this and indeed, if they were not I have no doubt they would declare that it was no longer worth their while to manufacture the agent.

One further sobering thought, owing to some obscure commercial principle any new inhalational agents will cost more than the old ones - I have little doubt this will apply to Desflurane. It is quite possible that a good agent exists among the huge number of simple

organic compounds of which trichlorethylene was an example (if you remember it). Such compounds might indeed be metabolised, perhaps extensively so, but in the absence of fluorine would be harmless and, indeed, might be physiological substances such as, for instance, ethyl alcohol.

It is sad to reflect that no research is going on to find such a compound and if one were found it would be cheap and easy to make and no pharmaceutical firm would have the slightest interest in selling it. Would there, I wonder, be any sale for an Old Fogey's tie, an orange stripe for cyclopropane on a Waxolene Blue background for Trilene, other letters or formulae could be added to taste.

Awareness

I now wish to venture some remarks on the subject of Awareness. The expression "awareness during anaesthesia" is a contradiction in terms. "Failure of anaesthesia" would be better. This subject appears to be a growing point, certainly more cases are being reported and are becoming the subject of legal proceedings. Reading about this subject one gets the impression that some anaesthetists (and others) are beginning to take the view that awareness is an unavoidable hazard of anaesthesia. Attention is being directed towards "counselling" (whatever that might be) after the event rather than careful examination of the causes with the intention of avoiding the occurrence in future.

I wish to advance the view that awareness can only occur as a result of error or incompetence on the part of the anaesthetist. Techniques whose use is associated with a risk of awareness are only justifiable under the most exceptional circumstances.

Clearly it is the paralysis produced by muscle relaxants which is the factor responsible for incidents of awareness. If the patient were not paralysed he would move and anaesthesia would then be deepened. It is therefore good advice to minimise doses of relaxants and to avoid their use altogether unless there is good reason.

It is worthwhile to consider this point in a little greater detail. If an unparalysed patient does not move on incision could he be aware? This is an important point for a number of reasons, one being that we have extensive data on the partial pressure of inhalational agents in the brain which produces immobility on incision (the MAC data). I believe that most anaesthetists would agree that if the unparalysed patient does not move on incision he is not aware. This is in fact the simple bedrock test on which anaesthesia is founded.

Having said that, it must also be said that there is one carefully recorded case in which it seems indisputable that an unparalysed patient breathing nitrous oxide and halothane and not moving, nevertheless remembered remarks that were made during the operation by staff

in the operating theatre. Note, however, that he felt no pain and his only recall was of the words spoken. This case, together with quite a body of other evidence, suggests that during anaesthesia which is otherwise adequate, spoken words may enter the brain and be stored in memory and subsequently recalled. The chances of this happening are increased if the words have immediate reference to the patient ("salient" is the term used) such as notice of a dire emergency - "He's gone blue and his heart's stopped" or a more personally offensive remark such as "she looks like a stranded whale".

This recall of spoken words may be commoner than we imagine - how many patients are interrogated on this subject seven days or more post-operatively? (The time interval may be important). Also, it is not clear what depth of anaesthesia is needed to block this recall phenomenon. In the original and well known experiments of Levinson the subjects were anaesthetised with ether to a level which produced EEG signs of deep anaesthesia.

We can however make a distinction between the recall of spoken words and awareness which we must take to mean that in addition to remembering words the patient recalls lying on the operating table and being aware of (feeling) the operation in progress. A very different situation.

The state of anaesthesia is reached when the partial pressure (reasons for preferring this term to concentration are given later) of the anaesthetic agent at the site of action in the brain exceeds a critical value. One cause of awareness incidents - and some of the worst ones - is when the anaesthetist thinks there is an adequate concentration at the site of action when, in fact, there is none or almost none. The commonest cause of this is an oxygen bypass being left on accidentally.

How accurately can we know the concentration or partial pressure at the site of action? It is here that inhalational agents have a major advantage over intravenous ones. The site of action is unknown but most would agree that it lies within the central nervous system, part of the vessel rich group and equilibrating rapidly with the arterial blood. The end-tidal (alveolar) concentration of the volatile agent can be continuously measured and is a good measure of the arterial concentration.

The appropriate measure of concentration for volatile agents is the partial pressure, it is the partial pressure which anaesthetises you. When the brain is in equilibrium with the end-tidal gas then the partial pressure at the site of action is known. This is so even though the solubility of the agent at the site of action is unknown.

With intravenous agents the situation is quite different. The arterial concentration resulting from an injection or infusion is hard to predict accurately, chiefly

because of the great variation in apparent volumes of distribution. Not only can it not be accurately predicted, it can also not be continuously measured. If the arterial concentration could be known that would still not give us the concentration at the site of action whose solubility characteristics for the agent are not known.

This important difference between inhalational and intravenous agents is brought out by considering the spread of MAC measurements in the population and comparing them with the spread of induction dose for intravenous agents. Professor Eger claims a standard deviation of slightly less than 10% for MAC determinations, a remarkably close tolerance for biological data. This means that the AD 95 (or ED 95) is about 120% of 1 MAC. The chief reason for this close tolerance has already been given. In contrast is data for the induction for thiopentone, which shows an S.D +/- 74%. This figure comes from the very big series of patients used to investigate the induction dose for thiopentone published by Professor Dundee in 1982. Propofol seems to be about the same although such large numbers are not yet available.

Because of this the technique of so-called total intravenous anaesthesia in paralysed patients is fraught with the risk of awareness. I suspect that the only reason there are not more problems - perhaps I should say disasters - in this area is that total intravenous anaesthesia by continuous infusion is often carried out under a cloak of 70% nitrous oxide. This is 70% of 1 MAC and its use does guarantee loss of awareness in a high proportion of patients. In this connection note that we are on the steep part of the population curve. 50% nitrous oxide has been shown to be inadequate to produce anaesthesia in caesarean section and the Health Authority in Wigan has had to pay up because of this.

MAC awake is a point lacking the precision of MAC - it indicates responsiveness rather than awareness but it seems to lie at about 0.5 - 0.6 MAC. As we know from the isolated forearm work, responsiveness is not a reliable indicator of awareness (by which I mean awareness which can be recalled as such - there really are semantic problems in discussing this subject).

Nevertheless it does seem that loss of awareness occurs at brain partial pressures of anaesthetic less than 1 MAC, how much less is problematical. Recent experiments at Northwick Park suggest that rather less than 0.5 MAC of isoflurane causes loss of consciousness in unstimulated volunteers but no doubt a surgical stimulus concentrates the mind and would raise this figure.

In the eyes of the Defence Unions the use of any inhalational agent is adequate protection against awareness without reference to the concentration used. Is this a reasonable view? Well the lowest calibrated concentration marked on a Fluotec halothane vaporiser

is 0.5% which is 0.65% of a MAC, when 0.66% of a MAC of nitrous is added a total of 1.31 MAC is obtained. This indicates a deeper level of anaesthesia than the AD 95 and clinical experience shows that ventilation with this mixture guarantees lack of awareness. That, of course, is no more than my opinion but enquiry into one published series which appeared to contradict this statement revealed that in the halothane group of patients the halothane was sometimes turned off if the blood pressure fell below a pre-determined level.

This brings me to the next stage in this discussion. If lack of awareness can be guaranteed by just making sure enough agent is present, why not do just that and routinely employ a minimum of 1.3 MAC. The problem here is that in some cases this depresses the cardiovascular system too much. This is not helped by having the minimum halothane concentration available as high as 0.65 MAC (0.5%) but strangely enough the minimum concentration marked on the Ohmeda enflurane vaporiser is 0.2% (which is only 12% of 1 MAC) and the calibration goes up in 0.2% steps to 1%. Clearly therefore fine tuning of enflurane anaesthesia is possible to a degree which is not possible with halothane.

Isoflurane vaporisers could be made with the same fine gradations as the enflurane ones but since the saturated vapour pressure of isoflurane is the same as that of halothane, I suspect that it was easier to issue halothane vaporisers with an isoflurane label than design a new vaporiser. Consequently isoflurane goes in coarse gradations starting at 17% of 1 MAC. There has been a slight improvement with the newer Ohmeda vaporisers which start at 0.3%.

Before leaving the subject of awareness it is necessary to make some reference to the intraoperative use of opiates by anaesthetists. I find that confusion exists in the minds of many anaesthetists on this subject.

An analgesic is, by definition, a drug which diminishes the feeling of pain, this implies awareness. If a paralysed patient shows signs that make you think he may be feeling pain then anaesthesia must be deepened at once and that means more anaesthetic agent. The most that opiates can do is to mitigate a terrifying situation. To quote the title of an editorial in *Anesthesiology* - "Narcotics are not expected to produce unconsciousness and amnesia".

The signs that might indicate awareness are those of autonomic overactivity, chiefly adrenergic. In fact narcotics are not very good at blocking those signs. Perhaps blocking is not the right word, what we are trying to do is stop the autonomic discharge from being initiated rather than prevent its manifestation.

The inefficiency of opiates compared to anaesthetics at blocking autonomic responses is exemplified by the work of Roizen et al. with 170 unpremedicated patients. They found that adrenergic responses to

surgical stimulus were blocked in 50% of patients by 1.45 MAC of halothane and 1.6 MAC of enflurane, that is to say 1.1% of halothane and 2.8% of enflurane, concentrations usable in clinical practice. By contrast the dose of morphine required to produce the same degree of ablation of adrenergic effects was found to be 1.13 mgms/Kg - that is 79 mgms in a 70Kg patient. This is a dose which would necessitate a period of post-operative ventilation. All patients in these experiments received 60% nitrous oxide.

Opiates do reduce MAC but there appears to be a 'ceiling' to this effect. Experimental work suggests that however much of a pure agonist opiate is given, MAC cannot be reduced more than about 66%. With opiates having mixed agonist/antagonist actions the maximum reduction of MAC is considerably less.

One good reason for giving narcotics during the course of an operation is to produce analgesia in the immediate post-operative period. This requires long acting opiates - methadone, for instance. It does not seem sensible to use opiates whose analgesic action lasts only twenty minutes or less but whose emetic and respiratory depressant actions persist for hours.

It may be that we must revise the classical triad of anaesthesia, in which analgesia is one of the three essential components. The triad concept is descended from the idea of "balanced anaesthesia" advanced by Lundy in 1926. However, the analgesic component in Lundy's balanced anaesthesia was to be obtained by spinal or regional block using local anaesthetic agents and not by opiates. This in turn goes back to the work of Crile (1910). Unlike opiates in small or medium dosage, local anaesthetics do effectively prevent the adrenergic response to surgery as long as their action lasts. It is fascinating to read Crile's original paper. He states that "under inhalation anaesthesia the nerve impulses from the trauma reach every part of the brain, the cerebrum that is apparently anesthetized as well as the medulla that is known to remain awake". These impulses produce physiologic exhaustion of the brain cells. "Inhalation anaesthesia is, therefore, but a veneer, a mask that covers the deep suffering of the patient. If the nerve paths connecting the field of operation and the brain be blocked there is no discharge of nervous energy from the trauma and consequently no exhaustion however severe or prolonged the operation". If we substitute "stress response" for "discharge of nervous energy" in this last sentence it remains in agreement with current views.

Monitoring

Monitoring In connection with this talk I have asked a number of colleagues what they thought had been the biggest change in their working environment in the last few years and almost all mentioned monitoring in their first few words of reply. It is now accepted that a range of monitoring equipment is necessary for us to

do our work, indeed it is verging on a legal requirement and the manufacture of monitoring equipment has become a growth industry. Should a top-heavy anaesthetic machine fall over 15,000 pounds worth of damage may be caused. Already we have junior anaesthetists saying quite firmly that they cannot anaesthetise a particular patient without a pulse oximeter. Questions about the pros and cons of various forms of monitoring are common examination questions. Capnography usually wins in viva questions on the most useful form of monitoring and I agree with that answer.

Things have come a long way since the late Professor E.A. Pask used to tell us that the best monitor would be an adhesive to stick the anaesthetist's finger to the patient's pulse. It occurs to me that we now have that Best of Monitors in the form of Super Glue. Perhaps someone would like to put Pask's suggestion into practice, it would be worth at least a letter to Anaesthesia if not a communication to the Anaesthetic Research Society.

We must accept that this irruption of monitoring is for the best on balance. An adverse feature is the tendency to rely on monitors rather than looking at the patient direct. I have heard of a case in which the closing stages of an operation were rudely interrupted by anaesthetists performing external cardiac massage when an ECG lead dropped off. I suspect that the biggest impact of the monitoring boom will be seen when all monitors are routinely connected to a printer and this print out is as essential a part of the patient's notes as the surgeon's operation note. The availability of such detailed and accurate records has great potential for research. For instance I am very sceptical when told of what sound like quite serious cases of awareness in which the anaesthetic record chart shows no sign of abnormality - automatic record keeping will settle this point.

From my remarks on low flow and closed circuit anaesthesia you will see that a strong case can be made for adding an anaesthetic gas analyser to the list of essential monitoring equipment. For the reasons already given these instruments should have a fast response time and in this respect a number of the existing analysers (mostly working by infra-red absorption) are not quite adequate.

A consequence of having an anaesthetic gas analyser in routine use is that the calibration of vaporisers become less important. All that is required of the vaporiser is that the concentration it delivers should go up in a steady increase (? logarithmically) as the knob is turned. Anaesthetic gas analysers require regular calibration with standard gas mixtures and there is room for improvement in the supply of accurate calibrating gas standards.

The tendency now is to provide a single box carrying all the monitoring modalities. This is an excellent idea

as long as the different sections can be removed separately so that a breakdown of one section does not mean that the whole instrument has to be removed.

Another adverse feature of some of the latest monitoring equipment is that a stream of air is constantly drawn in as a reference gas for the oxygen analyser. This air is mixed with the sampled gas from the anaesthetic system and if returned to that system presents problems with closed circuit or very low flow anaesthesia.

There is one other point worth raising before leaving this subject. It is generally agreed that induction is one of the danger points in anaesthesia and the introduction of more intensive monitoring has made it increasingly irrational to induce anaesthesia in an anaesthetic room with little or no monitoring and then go into theatre and put on the whole monitoring outfit after the major danger time is past. This fact has made some people say that the day of the anaesthetic room is over and that patients should now be brought down to theatre and plonked on the table beneath the operating lamps (as they are in America) so that they can be wired up before induction. Indeed at least one paper has recently appeared saying that patients don't mind this.

Well, I would be sorry to lose the anaesthetic room, it has for so long been a distinctive feature of British anaesthesia, it is after all our castle and we have all heard of places where bolts have been fitted to anaesthetic room doors to keep out intrusive surgeons. Perhaps a solution can be found by the use of telemetry, monitoring leads to go a small box which moves with the patient, perhaps on the pillow. The link with the monitoring display is by radio or perhaps infra-red link. Monitoring could continue as the patient is moved into theatre and into the recovery room if necessary.

It is worth pointing out that the anaesthetic room is essential for maintaining the relatively rapid turnover of patients which is a feature of many British operating lists. If the anaesthetic room is to go then the average District General Hospital will need a suite of 20-30 operating theatres like its American counterpart. This would have serious cost implications.

Perhaps there is scope for a scholarly thesis on the Anaesthetic Room with maps showing the distribution of anaesthetic rooms in hospitals throughout the world. I suspect they followed the Union Jack but am fairly ignorant about their frequency in Europe and Asia. Of interest would be an examination of the correlation between the presence of an anaesthetic room and the use of the Magill circuit.

Anaesthesia for Day Care Surgery

The next growing point is Day Surgery, which is certainly going to increase greatly for reasons which are almost entirely financial. The greater availability

of nursing staff between 9 a.m. and 5 p.m. is also a factor. We may find that more than 50% of our surgery is being performed on patients who go home the same day. This is not an ideal situation - I believe that most people who have a hernia or varicose veins operated on would rather spend at least one night in hospital. The chief reason for this is the ready availability of suitable analgesia but nursing care of other aspects of post-operative morbidity and simple reassurance are other important factors. Perhaps one of the differences that will emerge between the NHS and the private sector will be the greater proportion of day care surgery in the former.

To take the matter further, if we are to continue to follow American trends we shall find patients for major surgery being 'worked up' as outpatients or day cases at most and then admitted for their major operation on the morning of surgery. I believe most of us would be against this but it is hard to find any really powerful arguments to oppose it for many cases.

Returning to day care surgery, coping with such a large increase in the workload will require an upgrading of our selection and assessment procedures. The pre-anaesthetic clinic has only proved viable in a few places so far. The chief reason for this lack of enthusiasm has been the need to bring the patient up to hospital for a second out-patient visit (in addition to his surgical one). Some way round this needs to be found - for instance if surgical clinics could be split into pre- and post-operative clinics then an anaesthetic assessment clinic could be held in conjunction with the pre-operative one. This does assume that the surgical waiting list is not very long.

An alternative proposal would be that patients come up to a pre-anaesthetic clinic if the answers to a postal questionnaire indicated that a more detailed assessment was necessary. General practitioners might perhaps play a part in administering the questionnaire.

The other component of day care surgery requiring attention is post-operative care. The ideal would be a post-operative visit during the evening of the day of operation by the general practitioner - if he had played a part in the pre-operative assessment as well, that would increase his involvement in the case. Alternatively a visit by a nurse who had been part of the surgical team at the operation would be useful as he or she would have familiarity with and access to the anaesthetists and surgeons involved. Failing any of this the value of a routine post-operative telephone call on the first post-operative evening should be assessed. Returning from organisational matters to anaesthetic techniques for day case surgery - it is a pity that a number of the standard local anaesthetic procedures - spinal, epidural, brachial plexus blocks etc. are not suitable for day case anaesthesia. One reason is that they are unpredictable in duration and also that they

occasionally have complications which can easily be dealt with in hospital but not at home.

At this point it is relevant to introduce the growing point of new drugs. A new, shorter acting local anaesthetic agent might have potential for overcoming the drawbacks of local anaesthesia for much of the day case surgery which I have just mentioned but there do not seem to be any close-to-market developments here. Propofol is a fairly new intravenous agent which is currently the best we have for day care. Its recovery characteristics are excellent both as regards speed of awakening, absence of hangover and also the very low incidence of nausea and vomiting. Indeed, it has been plausibly suggested that the drug has an anti-emetic action. However, propofol as a sole agent is not entirely satisfactory. If you try to produce surgical anaesthesia with propofol on its own by continuous infusion, the blood pressure tends to become uncomfortably low and I have to overcome my prejudices and admit that there may be a case for narcotic supplements, although the influence of this on post-operative nausea and vomiting requires investigation. Personally I would need persuading that such a supplement had any advantages over 70% nitrous oxide. It is in the area of inhalational agents that developments promising for day care are taking place. As I expect you know, two "new" agents are currently undergoing clinical trial. They are sevoflurane and desflurane. Neither are new, in fact desflurane was one of the batch of fluorinated ethers synthesised by Ross Terrell in 1963 from which enflurane and isoflurane were selected. Professor Eger is on record as saying that the reason for taking desflurane (I653) down from the shelf in 1987 was the desirability of finding a better agent for the increasing amount of day case surgery. The potential suitability of both these agents lies in their low blood solubility, which means they will be fast in induction and education.

Sevoflurane is a fluorinated methyl-isopropyl ether having a blood solubility of 0.6, this is close to that of cyclopropane and means that its behaviour as regards speed of induction will be the same as that agent. MAC for sevoflurane is about 2% and its general performance as an anaesthetic agent appears satisfactory. With an SVP of 160 mmHg, sevoflurane can be administered with conventional vaporisers and is non-irritating and there is no reason why it should be expensive to produce. The only problem with sevoflurane concerns its chemical stability, it is degraded by the powerful alkali in soda-lime. Soda-lime in a closed flask at 54°C degrades isoflurane not at all, halothane 2.2%/hr and sevoflurane 57%/hr. It is not clear how important this is clinically; at room temperature the rate of degradation is low and it is not clear to what extent these degradation products would, in clinical practice, be absorbed in the soda-lime nor to

what extent they are toxic. Nevertheless degradation products of fluorinated anaesthetics have been implicated in hepatotoxicity. Inability to use soda-lime with sevoflurane would impose a severe but not necessarily fatal limitation on the use of the agent. In line with its lack of stability with soda-lime, sevoflurane undergoes biodegradation to a similar degree as enflurane. The agent is now completing a large scale clinical trial in Japan and one is under way in the United States. Desflurane is a fluorinated methyl-ethyl ether closely similar in structure to isoflurane (one fluorine atom replacing chlorine). The blood solubility of 0.42 compares with 0.44 for nitrous oxide and means that the agent is, in theory, superior to sevoflurane in speed of induction and very rapid awakening after many hours of anaesthesia is to be expected and clinical reports do support this. However, desflurane is irritating to breathe at concentrations above 1 MAC (7%) and this presents a considerable limitation on the use of overpressure in producing rapid induction, sevoflurane may have the edge here. It should not be thought that desflurane breaks any records for low blood solubility in anaesthetic agents. Acetylene and ethylene, both of which have been extensively used clinically, are both considerably less soluble in blood than desflurane.

Unfortunately both are inflammable. Desflurane is currently undergoing clinical trial and the results to date are good. Its stability with soda-lime is as good as isoflurane and its extent of biodegradation may be less. There are two other important points about desflurane, a reason given for not proceeding with desflurane when it was first synthesised was that its synthesis, involving fluorine, was difficult and expensive. It seems likely that it will be expensive now unless a different method of manufacture can be found. The second point I have kept till last, the saturated vapour pressure of desflurane is 664 mm at 22°C. That is to say it is close to or above its boiling point at normal room temperature. This means that special vaporisers must be designed for its use. Currently a heated and pressurised vaporiser is being used, direct injection into closed or low flow systems seems a likely possibility.

My time is up and it only remains for me to thank you for listening so patiently to the buzzing of bees in my bonnet.

Predicting Difficult Intubation

A Review of published work and a Report of a Prospective Study comparing two methods of predicting difficult intubation



Origins of Tracheal Intubation

The insertion of tubes into the human trachea dates back to the sixteenth century. Versalius is reputed to have inflated the lungs of a Spanish nobleman "shortly after his exitus lethalis". The nobleman's heart started to beat again (1).

It was not until July 1878 that the trachea was intubated for the purpose of administering anaesthesia. This was performed by William MacEwen, surgeon to the Glasgow Royal Infirmary, on a fifty-five year old plasterer suffering from an ulcerating epithelioma of the tongue. The patient was awake at the time of intubation and then anaesthetised with chloroform before the extensive resection was commenced. MacEwen described his method: "This was accomplished by introducing the finger into the mouth, depressing the epiglottis on the tongue, and so guiding the tube over the back of the finger into the larynx" (2).

Chevalier Jackson, an American laryngologist, popularized the method of direct laryngoscopy for tracheal intubation in the early years of this century (3). His work led to the development of the compact battery-powered laryngoscope, so familiar today.

With the advent of muscle relaxants in the 1940s, tracheal intubation became commonplace. It was soon evident that a proportion of apparently normal patients proved exceptionally difficult to intubate.

Difficulty in intubation

The first detailed description of difficult intubation appeared in 1956. Cass, James & Lines (4) reported the case histories of four patients in whom intubation had

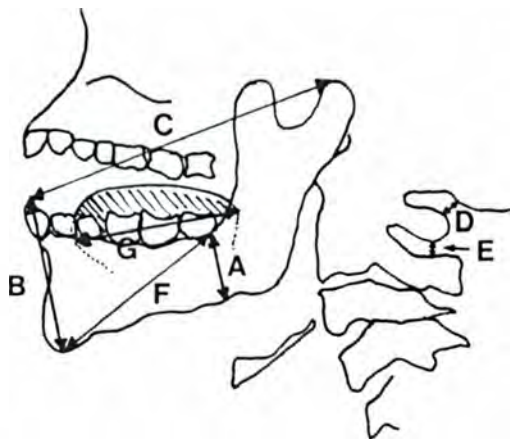
been difficult and one patient who proved impossible to intubate.

They reiterated six possible causes of difficult intubation originally described by Macintosh:

1. Short muscular necks with a full set of teeth.
2. Receding lower jaws with obtuse mandibular angles.
3. Protruding upper incisors due to relative overgrowth of the premaxilla.
4. Poor mobility of the mandible, due to temporo-mandibular arthritis or trismus.
5. Long high-arched palate associated with a long narrow mouth.
6. Increased alveolar-mental distance.

Assessment of the airway

White and Kander (5), two ENT surgeons, studied 13 patients in whom direct laryngoscopy had been difficult. Radiographs were taken of the mandible, maxilla and cervical spine in the lateral, antero-posterior and submento-vertical views. These were compared with similar radiographs taken on 13 patients in whom direct laryngoscopy had been easy.



They found that there was significantly increased posterior "A" and anterior "B" depth of the mandible in the patients in whom laryngoscopy had been difficult. To take account of skeletal size, effective mandibular length "C" was expressed as a ratio to posterior depth "A". If this ratio was less than 3.6, then White and Kander

predicted that laryngoscopy would be difficult. They postulated that this increased mandibular depth resulted in reduced soft tissue displacement at laryngoscopy, thereby hindering exposure of the larynx.

White and Kander also found that the gaps between the occiput and C1 "D", and between C1 and C2 "E" were reduced in the difficult group. This was further explored in 1983 by Nichol and Zuck (6). They suggested that in patients with a reduced atlanto-occipital gap, attempts to extend the head result in forward bowing of the cervical spine, lifting the larynx from view. They recommended pre-anaesthetic assessment of head extension at the atlanto-occipital joint to provide warning of likely difficulty with laryngoscopy.

In the same year, Van der Linde, Roelofse & Steenkamp (7) reported a study in which they compared xerographs of 13 patients in whom laryngoscopy had proved difficult, with those of 13 controls. They were unable to demonstrate any significant difference between the two groups, and so could not duplicate the results of White and Kander.

Routine preoperative radiography is clearly impractical. The objective of these radiographic studies was to identify anatomical variants associated with difficult intubation. Clinical tests could then be evolved to predict the difficult airway. It is not surprising that these studies were confirming the clinical features described by Macintosh.

The radiographic odyssey was continued in 1988 by Bellhouse and Dore (8), who compared 19 difficult patients with 14 controls. Difficult laryngoscopy was defined as the inability to see any more than the epiglottis. The best discriminatory variable was head extension. The best additional predictor was the ratio of mandibular space "F" to total length of the tongue "G". Bellhouse and Dore proposed four simple bedside predictors. These were:

1. Failure to see the soft-palate in the seated patient when the mouth is fully opened and the tongue protruded.

2. Failure to see the uvula under the conditions mentioned in 1. (This is the Mallampati class 3 airway - vide infra.)

3. Atlanto-occipital extension reduced by more than one-third.

4. Recessed chin, so that less than 2.5 cm lies in front of the line of vision.

Bellhouse and Dore suggested that if 1. is present, or if 2. and 3. or 2. and 4. are present, then the patient probably has a 20% chance or greater of being hard to intubate. They acknowledged that this had not been subjected to formal evaluation.

Patil, Stehling & Zander (9) recommended measuring the distance between the lower border of the mandible and the thyroid notch, in the midline with the patient's neck fully extended. The normal measurement is 6.5 cm or more. Patil et al suggested that if the distance is 6.0 - 6.5 cm and the patient has prominent teeth, a small mandible or restricted head and neck movement, or if the distance is less than 6.0 cm without any of these abnormalities, then it must be presumed that laryngoscopy will be impossible.

The beauty of this technique is its simplicity. A single measurement encompasses the additive effect of both limited head extension and small mandible on difficulty of intubation. Unfortunately, no supporting data were provided. Nevertheless, this test is worthy of further examination.

In 1983, Mallampati (10) reported an observation he had made on a female patient whom he had previously had great difficulty in intubating. He found that the soft palate was barely visible despite the mouth being wide open and the tongue protruded. Mallampati suggested that a disproportionately large tongue would overshadow the larynx, making laryngoscopy difficult. At the same time, the tongue would be likely to mask the faucial pillars and posterior part of the soft palate.

Therefore, concealment of the faucial pillars and uvula might be a useful sign in predicting difficult intubation. He proceeded to test this hypothesis in the first prospective trial of a predictive sign for difficult intubation.

Mallampati and co-workers reported this trial in 1985 (11). Two hundred and ten patients were assessed pre-operatively. The visibility of pharyngeal structures was rated by instructing the patient to open the mouth and protrude the tongue maximally while in the sitting position. This manoeuvre was repeated to reduce the chance of erroneous observation. The view obtained was classified as shown in Table I.

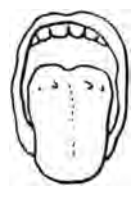
Class 1 Faucial pillars, soft palate and uvula could all be seen.

Class 2 Faucial pillars and soft palate could be seen, but uvula was masked by the base of the tongue.

Class 3 Only the soft palate could be seen.



Class 1



Class 3

Laryngoscopy was performed by the same individual who performed the pre-operative classification. Difficult laryngoscopy was defined as inability to see more than the corniculate cartilages. Mallampati found a significant correlation between the view of the pharyngeal structures and grade of laryngoscopy. Fourteen of the fifteen patients in whom no more than the soft palate could be seen (class 3 airway) were difficult at laryngoscopy.

It is surprising that, in contrast to all of the previous studies, Mallampati chose to ignore head and neck movement and concentrated entirely on the view of the pharynx. It is unlikely that a test which is based on mouth opening and tongue size will correctly predict the difficult laryngoscopy due to a rigid cervical spine.

Samsoun and Young (12) published a retrospective study of seven obstetric and six surgical patients who could not be intubated. The view of the pharyngeal structures in each patient was classified according to a modification of the Mallampati criteria, with the addition of a fourth class in which the soft palate cannot be seen.

Six of the seven obstetric patients and all of the surgical patients were reported to have Class 4 airways. It was not possible to deduce the number of patients who would be falsely predicted to be difficult. This is a key factor in determining the usefulness of a diagnostic test.

A landmark in the quest for a predictive test appeared with the publication of a paper by Wilson and colleagues in 1988 (13). In their initial study, anatomical measurements and assessments of features which might predict difficult intubation were made prospectively on each of 633 patients undergoing non-emergency surgery. Laryngoscopy was graded at intubation according to the scale in Table II.

Table II

Grade 1	Almost all of cords
Grade 2	Only half of cords
Grade 3	Only arytenoids
Grade 4	Only epiglottis
Grade 5	Not even epiglottis

Grades 4 and 5 were chosen as the criteria for difficult laryngoscopy. Linear discriminant analysis identified five risk factors which provided significant discrimination. A simple scoring system was then devised using the five predictive factors at three levels (Table III). The sum of the scores for each factor gives the "risk sum". The scoring system was then evaluated in a prospective study on 778 patients.

Using a risk sum of two or more as a predictor, Wilson correctly diagnosed 75% of the difficult laryngoscopies. This was at the expense of a false positive rate of 12.1 percent.

Table III

Risk Factor:	Level:
Weight	0 < 90 kg
	1 90 - 110 kg
	2 > 110 kg
Head and neck movement	0 Above 90 degrees
	1 90 +/- 10 degrees
	2 Below 90 degrees
Jaw movement	0 IG \geq 5 cm or SLux $>$ 0
	1 IG $<$ 5 cm and SLux = 0
	2 IG $<$ 5 cm and SLux $<$ 0
Receding mandible	0 Normal
	1 Moderate
	2 Severe
Buck teeth	0 Normal
	1 Moderate
	2 Severe

IG = inter-incisor gap measured with the mouth fully open.

SLux = maximal forward protrusion of the lower incisors beyond the upper incisors.

A Comparison of Two Methods of Predicting Difficult Laryngoscopy

Our study was designed to compare two tests, those of Wilson and of Mallampati. We decided to examine inter-observer variation because this important aspect had not previously been explored. Finally we wished to assess whether the tests could be either modified or combined in order to improve their predictive value.

Patients and Methods

751 patients, 448 females and 303 males, scheduled for elective surgery were examined pre-operatively. Each was assessed for Mallampati class and Wilson risk sum, by one of four independent observers.

Complete data were available on 675 patients.

Age ranged from 16 to 87 years with a mean of 46.6 years. Weight ranged from 30 to 133 kg with 38 patients weighing 90 kg or more, and one patient weighing more than 110 kg.

Mallampati Class

The Mallampati class was determined as previously described

Wilson Risk Sum

The Wilson risk sum was then ascertained.

Laryngoscopy

At the time of laryngoscopy, the intubating anaesthetist (who was blind to the pre-operative score), graded ease of laryngoscopy according to the laryngeal structures visible (Table II).

Wilson's grading system was used to ensure comparability of results. This system is similar to that used by Mallampati, with the addition of a fifth category.

Analysis

The data were analysed using simple two by two tables to calculate sensitivities, specificities, positive and negative predictive values for the two tests.

Receiver operating characteristic (ROC) curves were constructed from the sensitivities and specificities for different thresholds to enable comparison of the two tests.

The scores were then broken down by observer to assess interobserver variation. Significance was tested using the Chi-square test.

Results

Incidence of difficult intubation

Results for the Wilson and Mallampati tests are

summarised in Tables IV and V respectively and Figures 1 and 2.

Fig. 1 Wilson score in prediction of difficult laryngoscopy

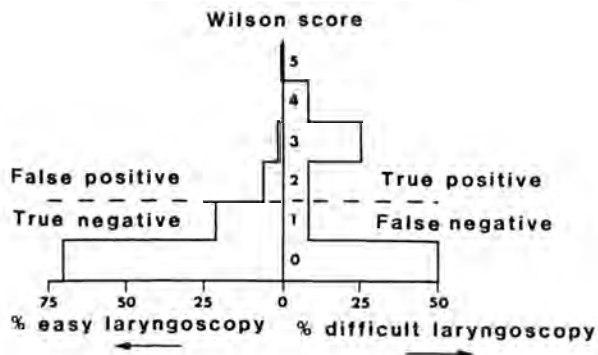
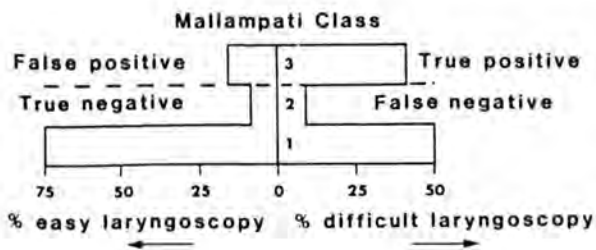


Fig. 2 Mallampati Class in prediction of difficult laryngoscopy



Twelve patients were scored grade four or five at laryngoscopy, giving a rate of 1.8 percent. Of these, five had a Wilson risk sum of two or more, and five were Mallampati class three.

Sensitivities & Specificities

A Wilson risk sum of two or more, or Mallampati class three as predictor of difficult laryngoscopy, gives a sensitivity of 0.42 and a specificity of 0.92 for the Wilson test, and a sensitivity of 0.42 and a specificity of 0.84 for the Mallampati test (Table VI).

Table IV

	Laryngeal View					
	1	2	3	4	5	
Wilson	0	388	70	11	5	1
Risk	1	104	35	6	0	1
Sum	2	26	13	1	1	0
	3	4	3	2	3	0
	4	1	0	0	0	1
	5	1	0	0	0	0

Table V

	Laryngeal View					
	1	2	3	4	5	
Mallampati	1	398	84	17	5	1
Class	2	49	4	2	1	0
	3	76	33	0	3	2

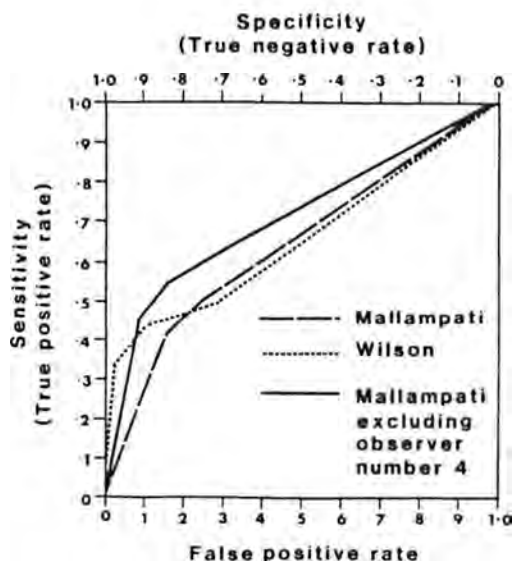
Table VI

	Sensitivity	Specificity	PPV	NPV
Wilson	0.42	0.92	8.9%	98.9%
Mallampati	0.42	0.84	4.4%	98.8%

ROC Curves

ROC curves (Figure 3) allow visual comparison of the tests.

Fig. 3



Receiver operating characteristic curve for Wilson and Mallampati tests

Interobserver variation

Figures 4 and 5 illustrate the breakdown of scoring for Mallampati class and Wilson risk sum by observer. It is clear that scoring of Mallampati Class by observer four was atypical. This is statistically highly significant using the Chi-square test ($p < 0.0005$). There was no significant difference in scoring Wilson risk-sum. It is uncertain whether this finding reflects the population of anaesthetists as a whole, or whether it was merely an aberration on the part of that particular observer. If the observations of that individual are excluded from the analysis, then the results for the Mallampati test were comparable with those for the Wilson test (Figure 3).

FIGURE 4 MALLAMPATI CLASS BY OBSERVER

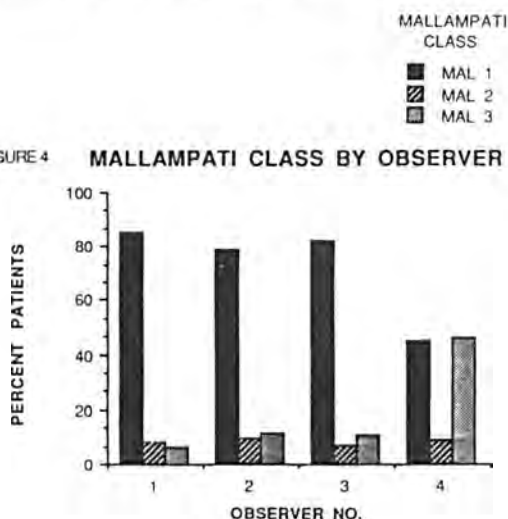
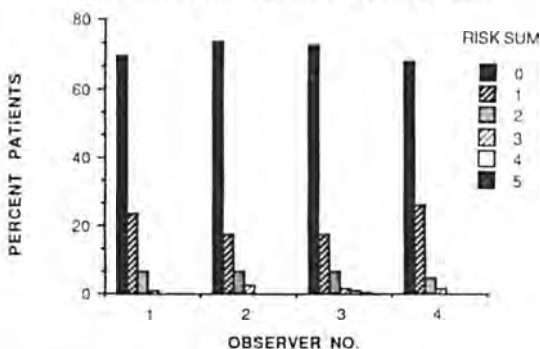


FIGURE 5 WILSON RISK SUM BY OBSERVER



Discussion

Grade of laryngoscopy rather than difficulty of intubation was chosen as the end-point to maintain comparability with previous studies. Grades of difficult intubation (awkward, difficult, very difficult) are ill-defined, and therefore more subjective than an anatomical classification.

The incidence of difficult laryngoscopy (grades 4 and 5, in which no more than the epiglottis could be seen) was 1.8 percent. This compares with 1.5 percent in the prospective study of Wilson. Mallampati reported an incidence of 13.3 percent. However they included laryngoscopy grade 3 in their difficult group. If these patients are excluded, the incidence was 4.3 percent. One of the major difficulties in studies of difficult laryngoscopy is its low incidence. Positive and negative predictive values are sensitive to the incidence of the condition being diagnosed and are not, therefore, simply a function of the diagnostic test.

Sensitivity & Specificity

Taking a Wilson risk sum of two or more as a predictor of difficult laryngoscopy, the sensitivity (true positive rate) was 0.42 and the specificity (true negative rate) was 0.92. This means that only 42 percent of the difficult patients were correctly predicted by the test. Of more practical interest is the positive predictive value. This is the proportion of patients predicted to be difficult, who in fact prove to be difficult. The positive predictive value for a risk sum of two or more was 8.9 percent. That is, ten out of eleven patients predicted to be difficult had a straightforward laryngoscopy.

Taking Mallampati class three as a predictor of difficult laryngoscopy, sensitivity, specificity and positive predictive value were 0.42, 0.84 and 4.4 percent respectively. Therefore, in order to correctly diagnose the same number of difficult patients, twice as many patients were predicted to be difficult by the Mallampati test compared with the Wilson risk sum.

The relative accuracies of the two tests can be appreciated visually by examining the ROC curves. The upper left-hand corner denotes the perfect test, that is with a sensitivity of 1.0 and a specificity of 1.0 (no false positives or false negatives). In comparing tests, the ROC curve which encloses the largest area is the more accurate (14). The curve for the Wilson test has the larger area under the curve when comparing both tests for all four observers. It is interesting to note however that when observer four is excluded, the curve for Mallampati is substantially improved. Caution must be applied to the interpretation of these ROC curves, with so few points plotted.

Weight

Our results suggested that the weight component of the Wilson risk-sum was unnecessary. We speculated that the effects of obesity on difficulty of laryngoscopy, such as restricted neck extension and mouth opening, could be distinguished by the other predictors. If this is the case, then removal of weight might sharpen the test. An interesting finding in Wilson's initial study was that weight was the least valuable predictive factor. We found that in removing weight from the risk-sum, the sensitivity remained unchanged at 0.42, but the specificity increased from 0.92 to 0.94. Positive predictive value improved to 10.9 percent. It is not possible to comment on the validity of this in patients weighing more than 110 kg, as our

study included only one patient in this group. However, we propose that weight be dropped from the Wilson test and that this warrants further consideration.

Implications for the Anaesthetic Service

If it is accepted that a Wilson risk sum of two or more is used as the criterion for predicting difficult laryngoscopy, 8.2 percent of patients assessed will fall into this category.

Several techniques are available for managing the difficult intubation. There is a general trend towards securing the airway under local anaesthesia with the patient awake (15). Flexible fiberoptic laryngoscopy is becoming the most widely accepted method of achieving this.

However, if it is decided that all patients predicted to be difficult should undergo elective fiberoptic intubation, then this procedure will be performed unnecessarily on one in thirteen of all patients requiring tracheal intubation, an awesome proposition.

A solution might be to create a two-tier response. In the fit, fasted patient scheduled for elective surgery, a risk-sum of two would alert the anaesthetist to the possibility of an awkward intubation. Extra precautions could then be taken.

In the same situation, a risk-sum of, perhaps, four or more would be an indication for elective fiberoptic intubation.

A different scenario demands an alternative approach. The emergency case with intestinal obstruction, to be anaesthetised by a relatively inexperienced junior has the potential for catastrophe. In this situation, a risk sum of two or more might be an indication for summoning senior assistance and proceeding to elective fiberoptic intubation.

It may be of some comfort that with a patient scoring less than two, the anaesthetist would be very unlucky to be confronted with a difficult laryngoscopy. This is because the negative predictive value for the Wilson test was 98.9 percent, that is only one in a hundred patients predicted to be straightforward laryngoscopies proved to be difficult.

Failure to intubate the trachea and maintain oxygenation remains a significant cause of perioperative death due to anaesthesia. This has been shown repeatedly in studies of anaesthetic mortality.

The Report of a Confidential Enquiry into Perioperative Deaths (16) found that of the three deaths wholly attributable to anaesthesia, one was due to inability to intubate the trachea and one was due to "relative deficiency in a particular tracheal tube" (further details were not given). Similarly the Report on Maternal and Perinatal Deaths in Scotland 1981-1985 (17) identified one of the three deaths directly due to anaesthesia as being caused by failure to achieve tracheal intubation.

It is clear that there can be no room for complacency. The best tests we have for predicting difficult laryngoscopy fall far short of the ideal. Until we can predict the difficult patient more accurately, a two level response may be one answer to the problem, together with developing expertise in fiberoptic laryngoscopy and in the management of the failed intubation.

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Propofol Infusions for Children Undergoing Radiotherapy

Propofol by infusion would seem an ideal agent for sedation in children undergoing daily radiotherapy treatment, which may extend to seven weeks, as the procedure is not painful but does require immobility for the 10-20 minutes of treatment. During the 30-60 seconds per field of irradiation the child must be completely alone in the room.

Five children aged 2 - 3.5 years, weighing 10-20kg, with a total of 91 anaesthetics, were described. The child, fasted and unpremedicated, was induced by propofol bolus, pulse oximetry attached and the infusion commenced. Once settled the child was taken to the treatment area and positioned for radiotherapy, while monitoring and closed circuit television cameras adjusted. Craniospinal irradiation required the prone position while the supine position was used for irradiation of head and lungs. Three of the children had central venous access (Portacath or Hickman line), the other two had a peripheral cannula. Recovery times were calculated from the time of completion of the last irradiation / cessation of propofol infusion until the child was able to respond verbally.

The first child had ketamine 3-4mg/kg for 2 of the weeks, and propofol for the other 4 weeks. During the second 2 week block of propofol minor adjustments were made to the induction dose and final infusion rate to see if recovery times could be shortened. The doses required were predictable on a weight basis with induction doses of 3-4mg/kg, smaller children requiring the larger dose. The following infusion rates were used:

- 1) Initial infusion rate - 20mg/kg/hr (first 10 minutes)
- 2) Intermediate infusion rate - 10mg/kg/hr (if the procedure is to last longer than 5-20 minutes)
- 3) Final infusion rate - 5mg/kg/hr (for last 5-10 minutes)

No tolerance was noted with propofol but there was a gradual decrease in pulse rate during the infusion. Airway maintenance and oxygen saturations while breathing air were well maintained.

In case 1 mean recovery time with ketamine was 18 minutes but was considerably shorter with propofol - 10 minutes then 8 minutes for the second 2 week block. Recovery time does not correlate with total dose/kg/unit of time, it reflects the general well being of the child. Two of the frailer children had mean recovery times of 13 minutes and 16 minutes. The other two children had a mean recovery time of 6 minutes. Ketamine recovery was, as expected, slow and sleepy with a further drowsy period in the ward but the propofol pattern was characterised by sudden waking, sitting up and being able to eat right away. In fact the need for children to stay in the ward prior to discharge has been abandoned with consequent savings. The children have a light breakfast in the radiotherapy department and play for half an hour before going home or returning to the children's hospital.

With the advantages of a quick recovery and minimal residual effect propofol should be considered as an alternative to ketamine for children undergoing radiotherapy.

REGISTRARS PRIZE - Third

DR S RIDLEY

COST OF INTENSIVE THERAPY. A description of methodology and initial

The increased emphasis on efficient use of resources has focused attention on the relationship between the costs and benefits of health care programs. Because of the wide variety of illnesses treated on general intensive therapy units, average costs derived from total expenditure and number of patient-days will mask large costs differences between individual patients. Therefore a preliminary study was designed to calculate the daily cost of intensive therapy on an individual patient basis.

The fixed (equipment, supporting services and land opportunity), semi-fixed (staff) and marginal (treatment) costs of 20 critically ill patients were calculated. Fixed costs were calculated using figures provided by the Common Services Agency, the Health Board, and the equipments' annual equivalent cost. The staff costs, both medical and nursing, were allocated using a nursing dependency scoring system. The marginal costs were obtained from the various laboratories and departments supporting the ITU.

The results show that there is wide variation in intensive therapy costs. The average daily cost of a spontaneously breathing patient was £399 (95% confidence interval (CI) = 338 - 460) while that for a ventilated patient was £726 (CI= 656 - 795). The mean daily cost for survivors was £444 (CI=371 - 517)

while that for non-survivors was £926 (CI=840 - 1012). The average total cost per patient was £1980 but this varied between a mean of £2028 for survivors and £1389 for non-survivors, a reflection of the shorter admission of non-survivors. The average cost of each patient leaving the ITU alive should be increased by £347 to account for the costs incurred by the four patients who died. The cost of intensive therapy is high, being three to five times that for general ward care.

High total costs are associated with increased severity of illness and higher marginal (treatment) costs are associated with increased semi-fixed (staff) costs, suggesting that case-mix and treatment policies will influence ITU expenditure.

The high cost of treating those patients who are less ill and do not require ventilatory support is important. It has been previously shown that only a small proportion of patients admitted for observation and monitoring actually require active "intensive therapy" interventions and as a result have a lower mortality. Such patients may be more appropriately managed on a high dependency unit where the staff costs will be lower. The high cost of intensive therapy should act as a stimulus for the more widespread use of either careful case selection or accurate predictive models for ITU outcome.

THE EVOLUTION OF ANAESTHETIC SERVICES IN THE VICTORIA INFIRMARY, GLASGOW

A BRIEF HISTORY ON THE OCCASION OF THE HOSPITAL'S CENTENARY

Dr. A. G. Macdonald

The foresight of the early Governors of the Victoria Infirmary was quite remarkable. In spite of the widespread adoption of anaesthesia in hospitals all over Scotland in the 1890's, anaesthetics were administered by a variety of untrained and probably terrified medical and sometimes non-medical personnel. In 1898 the Governors in their Annual Report confirmed that they had appointed an anaesthetist, Dr. David Lamb, to the staff. His duty was "to examine carefully every patient before he or she undergoes an operation, and to determine whether an anaesthetic should be administered and if so, what anaesthetic should be used". This was, they stated, for the greater safety of patients and was the first appointment of its kind in Scotland. This was indeed advanced thinking, the pre-operative assessment of all patients being still to this day one of the most important functions of the anaesthetist. In those days the idea of one person assessing all patients was revolutionary. It is likely, therefore, that Dr. Lamb, a brilliant Glasgow graduate of 1890, began to administer most if not all of the anaesthetics himself, dovetailing his general practice duties around his hospital commitment. He was a well respected national figure in anaesthesia and he was elected President of the Scottish Society of Anaesthetists in 1922. He remained in post in the Victoria Infirmary until 1922, and then became a governor of the hospital until 1946. He died in 1960, aged 91.

Further appointments were made in 1906, 1919 and 1927 (Dr. John Stirling), all General Practitioners who attended morning operating sessions in the Victoria.



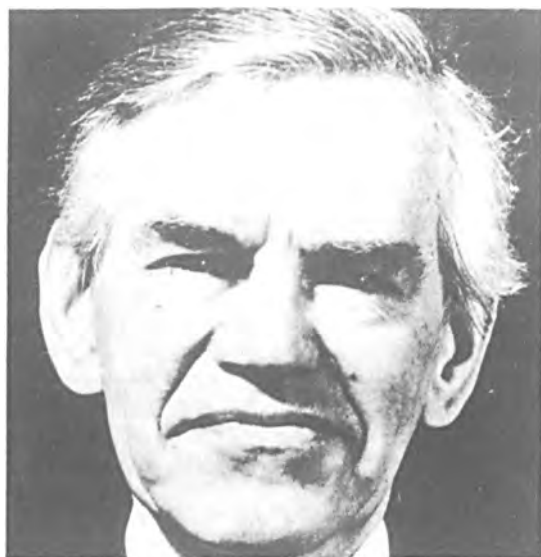
Dr. I. M. Campbell Dewar

The next full-time appointment was that of Dr. Ian M. Campbell Dewar, a 1927 Glasgow graduate, who had made a unique decision early in his career that he wished to practise anaesthesia. He was almost certainly the first doctor in Scotland to enter the specialty without first doing general practice or any other specialty. He went to London to gain additional experience at the shoulders of Boyle, Shipway and Magill, and other pioneers of the time, and returned in 1929 to take up his appointment as anaesthetist in the Victoria Infirmary, and later on to become its Director of Anaesthetic Services.

During his forty years in the hospital standards of clinical anaesthesia rose impressively, and mortality during surgery fell dramatically. This was the result of several factors: firstly, his own personal clinical skill, which by all accounts was exceptional; secondly, the appointment in 1934 of a wholtime resident anaesthetist, a Dr. Livingstone from Aberdeen, another pioneering move for the Victoria Infirmary, and the first such appointment in Glasgow; and thirdly, the adoption in 1935 of an inspired policy whereby all anaesthetics, both elective and emergency, were administered by one of five visiting anaesthetists on a one in five rota, again a first for the Victoria. Dr. John Stirling, Dr. Ian Dewar, Dr. Ann Pillans, Dr. Craig Borland, and Dr. Gordon McLeod (father of Mr. Roddy McLeod, later a consultant surgeon in the Victoria) were the five anaesthetists concerned. All of these were wholtime specialist anaesthetists with the exception of Dr. McLeod, who also did general practice.

Dr. Dewar was a natural leader, and his stature was recognised by his election as President of the Glasgow and West of Scotland Society of Anaesthetists in 1947, and subsequently as President of the Scottish Society of Anaesthetists in 1954. We are very fortunate indeed to have some of his early recollections recorded in his brief but absolutely brilliant contribution to the 1984 Newsletter of the Scottish Society of Anaesthetists, its 25th Anniversary issue. The entire article provides a fascinating insight into the difficulties of being an anaesthetist in the early days. Parts of that article are quite hilarious and should not be missed. Sadly Dr. Dewar died in April 1989.

Dr. Albert Christie, an Aberdeen graduate, was appointed in 1939 with duties which included the provision of an anaesthetic commitment to the Intensive Care Unit to supervise the artificial ventilation service for patients with respiratory failure from any cause. He also played an important role in the hospital in the development of E.N.T. anaesthesia, or as he characteristically called it "throat and nose"! In this setting, he was the acknowledged master of blind nasal intubation, a skill which has largely eluded the modern anaesthetist. He built up an impressive series of patients undergoing laryngectomy, an experience which he presented as his Presidential address to the Glasgow and West of Scotland Society of Anaesthetists in 1955.



Dr. Albert Christie

Dr. Christie had an infectious and convulsive sense of humour which was enhanced by his natural ability to relapse into any one of a selection of north-east dialects at the drop of a theatre cap. Many a long, dull case was enlightened, and the flagging spirits of the theatre staff enlivened, by his silent Gene Kelly dance routine, or his mute impersonation of Al Jolson, with mop-handle as microphone.

Dr. Roy Sinclair, a Glasgow graduate, was appointed in 1944. He was an experienced all-round anaesthetist with a special interest in anaesthesia for cardiothoracic surgery, gained initially at Ruchill Hospital and then at Mearnskirk Hospital. He was vastly experienced in subarachnoid blocks, and his M.D. thesis was entitled "Neurological sequelae of spinal anaesthesia". He brought additional distinction to the Victoria Infirmary by becoming Honorary Secretary and Treasurer of the Scottish Society of Anaesthetists when the Society was revived after the



Dr. Roy N. Sinclair

war years. He was elected its President in 1958, and subsequently became President of the Glasgow and West of Scotland Society in 1961. Dr. Sinclair died in May 1990.

Dr. Malcom Shaw, another Glasgow graduate, born in Jura, was appointed to the Victoria Infirmary in 1954. He too brought publicity and credit to the Victoria by becoming the longest serving Honorary Secretary and Treasurer of the Scottish Society of Anaesthetists, a post he held from 1957-1963.

His distinguished contribution to the specialty was recognised by his election as President of the Scottish Society in 1969, having already been President of the Glasgow and West of Scotland Society in 1966. His particular brainchild was the initiation in 1960 of the Scottish Society of Anaesthetists Newsletter, now the Annals of the Scottish Society of Anaesthetists, and being its Editor for the first seven years. During this time the Newsletter rapidly grew in size and stature, enhancing the sense of national unity by reporting anaesthetic activities from all over Scotland. It was a rare example of a journal which was read from cover to cover, being full of interesting quotes and anecdotes, such as:

"For every feather I get in my cap, I have two taken out of my tail".

Following J.Y. Simpson's success with chloroform in childbirth, a wag of the day suggested a coat of arms for him consisting of a new-born baby with this legend underneath, "Does your mother know you're out?"



Dr. Malcolm Shaw

Dr. Shaw and Dr. Sinclair, together with Dr. Lawrie from Perth, played a leading role in the negotiations which took place in 1957 between the Scottish Society and the Crown Agent in Edinburgh concerning the redefinition of the criteria for the reporting of "anaesthetic death". This was an important advance in Scottish anaesthesia, as the term "anaesthetic death" had always given the misleading impression that the death had been caused by anaesthesia. Not only that, there had been many anomalies and variations in the manner of reporting such deaths. For example, in some parts of Scotland notably in

hospitals in Aberdeen and Lanarkshire, one or two police constables in uniform would come to interview the anaesthetist who had signed the form. This interview might take place in his hospital by appointment, or at his home. In either situation it was highly embarrassing for the luckless anaesthetist, and the criminal overtones which the procedure conveyed did nothing for his personal standing. As a result of these negotiations the procedure for reporting deaths was revised. The less prejudiced term "Death associated with surgery and/or anaesthesia" came into use, and the form which required to be completed and returned to the Procurator Fiscal had to be signed by both the surgeon and the anaesthetist.

The appointment in 1950 of Dr. Kenneth Grigor, a native of the Black Isle, was another pivotal landmark in the expansion of anaesthetic services, and resulted in the introduction of hypothermic techniques and cardiopulmonary bypass to the cardiac surgical unit at Mearnskirk Hospital, one of two Regional Centres in the West of Scotland at that time. He had travelled to Leiden, Amsterdam and Paris, and to the Brompton and Hammersmith Hospitals to learn these new skills, and had then returned to pioneer, along with Mr. Bert Barclay and his team of cardiac surgeons, the provision of major cardiac surgery. His dedication to this special work was crucial in providing the high standard of patient care necessary both during and after this type of surgery. His experiences in anaesthetising 180 cases of thoracoplasty provided the trigger for his scientific analyses of the causes of "Post-operative Atelectasis", the title of his M.D. thesis awarded in 1952 with high commendation. Dr. Grigor became Consultant in Charge of the department on Dr. Dewar's retiral in 1969 and under his guidance the department, while still maintaining its high standard of clinical practice, began also to place high priority on more academic departmental teaching and the establishment of rotations and secondments of junior staff to other hospitals for specialist anaesthetic training in paediatrics, neurosurgery, faciomaxillary surgery etc. This rapidly evolved to the point where the training programmes for both junior registrars and senior registrars were given full approval by the Hospital Recognition Committee of the Faculty (now College) of Anaesthetists. These high standards have been maintained ever since, and the anaesthetic training schemes in the Victoria Infirmary are now regarded as equal to the best



Dr. Kenneth Grigor

in Scotland. Dr. Grigor's influence in these achievements was crucial. His election as President of the Glasgow and West of Scotland Society of Anaesthetists in 1957, and of the Scottish Society of Anaesthetists in 1970, is testimony to the very high respect in which he was held throughout Scotland.

In 1971 a one week course on anaesthesia and related topics was initiated for all medical students during their eight week intensive surgical training at the Victoria Infirmary during their final year. This was the first formal undergraduate course in anaesthesia in Glasgow. It proved to be a big success and other hospitals quickly followed suit.

Another new development about that time was the establishment of a Pain Relief clinic. Pain relief was already being provided in the wards of the Victoria Infirmary and Philipshill Hospital by Dr. Sinclair on an ad hoc basis, but this formal clinic was set up under the supervision of Dr. Woolfred Sniper and Dr. Anne Laughland, both totally dedicated to providing a comprehensive service on the south side of Glasgow. This was the first such clinic in Scotland, and was the catalyst for setting up other similar centres all over Scotland. Both Dr. Sniper and Dr. Laughland were founder members of the Glasgow Pain Group, and Dr. Laughland was its first Honorary Secretary. Dr. Sniper deserves special mention as a resourceful and innovative clinician who was unsparing in his contribution to the demanding and expanding need for treating intractable pain.



Dr. Woolfred Sniper

All the anaesthetists mentioned have retired, but at the time of writing five of them are enjoying healthy and active retirement, a great advertisement for the specialty, and a contradiction to the concern about the possible harmful effects of longterm exposure to anaesthetic gases.

The present members of the department comprise a relatively young team of 14 Consultants who include specialists in obstetric anaesthesia, pain relief and intensive care; one Associate Specialist; four Senior Registrars; and sixteen junior staff at Registrar or S.H.O. grade. This team works hard to keep abreast of anaesthetic progress on every front, clinical practice, academic teaching, meaningful research and administrative and committee duties. It endeavours to maintain the high profile and fine standards attained by its illustrious forebears in the Victoria Infirmary.

REGISTRARS' MEETING

EDINBURGH ROYAL INFIRMARY, MAY 25th



Participants at Registrars' Meeting

The Registrars' Meeting this year took place in the Seminar Room in Phase I of Edinburgh Royal Infirmary and was ably organised by Dr J McClure. Following a welcome by the President of the Society, Dr I Kirkwood, the Chairman for the morning session, Dr McClure, introduced the speakers who each spoke on an aspect of Anaphylaxis to Anaesthetic Agents.

The first speaker was Dr J McG Imray, immediate Past President of the Society, who questioned whether anaphylaxis to anaesthetic agents was a cause for national concern. Some articles and correspondence had appeared recently in national journals and the incidence of anaphylaxis in various studies was described. The value of RAST testing and the place of screening for potentially susceptible patients was discussed. The advice given by the Association of Anaesthetists and the emergency management of anaphylaxis was described, and Dr Imray concluded by giving some preliminary results of a survey he was carrying out in Scotland which suggested that the actual incidence of anaphylactic reaction to anaesthetic agents was perhaps less than other surveys had assumed. Dr J A Wildsmith followed this with a look at the differential diagnosis of Adverse Drug Reactions. These may occur as the result of a type I hypersensitivity reaction, from an abnormal-physiological response or from drug interactions. This presents diagnostic difficulties which was illustrated by two case reports. The Laboratory Investigation of Drug Anaphylaxis was then presented by Dr P L Yap, and the molecular mechanism of allergic reaction described. Specific IgE antibodies sensitise mast cells which then release vasoactive substances. While allergen specific IgE tests were available Dr Yap concluded that at present laboratory investigation in this area was not very helpful.

Following a period of questions on these three papers the President of the Society, Dr I Kirkwood, introduced the prizewinners in the Scottish Society of

Anaesthetists Registrars Prize competition who each gave a 15 minute presentation of their winning papers. First prize went to Dr J Oates for a paper on Difficult Intubation which is printed in full elsewhere in the Annals. Dr L Aldridge was awarded second prize and Dr S Ridley third prize. Summaries of their papers also appear elsewhere in the Annals.

After lunch which was served in the Florence Nightingale Building Professor A A Spence chaired the afternoon session and introduced firstly Dr I Power who spoke on Non-steroidal Anti-inflammatory Drugs describing their mechanism of action, analgesic efficacy and side effects. He presented the results of a survey of 100 patients comparing the use of ketorolac and diclofenac with morphine. Dr Patrick Armstrong then gave a talk on Nitrous Oxide and in particular the connection between nitrous oxide and vitamin B12. He described the history of the connection between the two and the biochemistry of vitamin B12. Recent work in Edinburgh Royal Infirmary on tests for abnormal folate metabolic pathways suggested that these pathways were activated at lower concentrations of nitrous oxide than previously thought. This was followed by a presentation on the Management of Ruptured Aortic Aneurysm by Dr Alistair Lee. He presented figures for the work of the Regional Vascular Unit in Edinburgh Royal Infirmary and the mortality from this condition, and then showed a video on the management of such cases. There was a lively discussion on all three papers before the President introduced the final speaker for the day, Professor Spence. He gave an informative talk on the background to the development of the Faculty (now of course the College) of Anaesthetists and explained, in his usual polished manner, why we need a College and what its functions are in education, examination and maintenance of standards.

The meeting was brought to a close by the President, Dr Kirkwood, who warmly thanked all those who had helped to make it a successful Registrars' Meeting.



Participants at Registrars' Meeting

SCIENTIFIC MEETING

DUNDEE, NOVEMBER 23rd, 1990

The annual Scientific Meeting of the Society was held in Lecture Theatre 1, Ninewells Medical School, Dundee on 23rd November and was very ably organised by Dr Alfie Shearer. Over 100 people attended and were welcomed by Dr Sandy Forrest, Chairman of the Division of Anaesthesia at Ninewells Hospital. The morning session was chaired by Dr Shearer and had the general theme of information collection with, not surprisingly, the use of computer technology prominent.

After an excellent lunch in the nearby dining room the President, Dr Isobel Kirkwood, chaired the afternoon session in which aspects of cardiopulmonary resuscitation were covered. Following tea Professor Alistair Spence delivered a stimulating and absorbing Gillies Memorial Lecture and was then presented with the Gillies Memorial Vase. The President brought the day to a close by thanking all who had contributed to another successful Scientific Meeting.

Data Collection for Research into Chronic Pain

Dr I K Crombie

Under the auspices of the North British Pain Association a survey was undertaken of the patients attending outpatient clinics in five teaching and five district general hospitals. The major problems facing the study were the volume of data which could be collected, and the difficulty of collecting it in busy clinics. Patients with chronic pain often present with problems which are long standing. They may have had many previous investigations and treatments and several further treatments may be attempted. Past experience had shown that collecting comprehensive data was not practicable, so a one page data form for completion by consultants was developed. Data were collected on demographic characteristics, referral source, and the nature of the presenting problem in terms of site, type of tissue, likely cause and possible diagnosis. To minimise the burden on consultants, data processing and analysis for all centres were carried out in Dundee. Large differences were found between centres in the proportions of patients referred by general practitioners, and there were also differences in the referrals from hospital specialties. The types of patients seen also varied between clinics and this variation could not be accounted for by differences in sources of referral. Another finding was that in some clinics patients were seen only a few times before discharge, whereas at other clinics patients with similar problems would be seen many times. These differences between clinics could reflect differences in the appropriateness of referral or discharge, or differences in the extent to which patient

need is being met. These issues are currently the subject of further research.

Developing a theatre management system

Dr I G Gray

Until recently operating theatres have been a neglected backwater, in information technology terms, producing only a very basic monthly return of crude data of questionable accuracy.

A theatre information system (Financial Information Project, FIP) has been introduced and further developed in Dundee. It is a paper driven system, requiring data entry by nurses, anaesthetists and surgeons, as appropriate, during the patient's progress from theatre reception to recovery. Coding of surgical operations, and a newly developed system of coding for anaesthesia and major items of disposable equipment are entered at the time of surgery. Experience of introducing, maintaining and reviewing the system during the first year in Ninewells is described and problems discussed.

Management reports on utilisation and efficiency are easily produced and ultimately costing of theatre use and individual operative procedures will be available. The minimum data set for review of anaesthetic practice proposed by the College and Association of Anaesthetists can be generated from the system and information available from the anaesthetic codes and user-definable research-box codes allows junior staff to prepare and review their own training records accurately and comprehensively. The information available on surgical and anaesthetic practice facilitates morbidity-mortality review, "occurrence" follow-up and monitoring of trends in drug use.

Future developments include an operation scheduling module, linked to PAS systems, to improve theatre utilisation, the ultimate aim being to offer the patient a firm date for surgery when seen in out-patients.

Local developments in anaesthesia related software

N Wynne Carter

A University Medical Computing Unit is not a common creature. We grew out of a laboratory data management system development team formed in the late sixties. When the broader interest in computing awakened we attracted clinical colleagues looking for computing solutions to data collection and analysis problems. In response we then evolved a then novel non-dedicated approach to creating file designs and analysis tools on our minicomputer.

When our local anaesthetists in the Intensive Care Unit first approached us looking for data storage facilities and remote access to the laboratory system

we provided the first "serious" microcomputer, the SIRIUS, and wrote a one-off dedicated software package for data recording, summary, retrieve and analysis. We then went on to provide a general purpose derivative of our "mini" concepts as an integrated P.C. based package. This has since been used to create a wide variety of hospital based patient management and research systems. Indeed, it now also forms the basis of a new "White Paper" multi-user General Practice system.

The ITU system was re-implemented on an early version of this system and will shortly be upgraded to operate under the latest redeveloped version. Dr Shearer in Ninewells has used this system to perform his Unit's returns and other audits for a number of years. In parallel we were also asked by the Anaesthetic Department to devise an aid to the preparation of the duty rota for the forty or so anaesthetists. The mark 1 version was again somewhat dedicated but a rewritten version recently introduced now offers a more flexible package which is also being used in the Radiology Department, and it too attracts interest from elsewhere.

Patients' desire for information about anaesthesia

Dr G L Hutchison

Patients in Hamilton, Ontario, and in Dundee, Scotland, were asked to complete a pre-operative questionnaire examining their wish to receive information about anaesthesia. Fourteen pieces of information were presented, and the patients were asked to indicate whether they felt that they had a right to know, would like to know, or preferred not to know each item.

In both Canada and Scotland, patients under the age of 50 had a greater desire for information than those who were older ($p < 0.0001$). In Canada, female patients were more positive in their desire for information than males of the same age ($p < 0.05$). Previous experience of anaesthesia did not alter patients' desire for information.

The priority assigned to each piece of information was remarkably similar in both countries. Details of dangerous complications of anaesthesia and surgery were consistently rated of low priority, especially among older patients. Only 13% of Scottish patients over the age of 50 felt that they had a right to know or would like to know about dangerous complications. Information about common complications was viewed more favourably than information about dangerous complications. High priority was assigned to information about pain and pain relief, and to landmarks to recovery such as eating and drinking and being allowed out of bed. Both countries rated meeting the anaesthetist pre-operatively as the highest priority of all.

Audit of Cardiopulmonary Resuscitation

Professor H D Tunstall-Pedoe

Experience of organising and implementing a multi-centre study of results of cardiopulmonary resuscitation are described. Resuscitation is a multi-disciplinary subject, which does not fall naturally under the remit of a particular specialty. Carrying out a hospital audit involves persuading different disciplines to collaborate. Recruitment of hospitals for this study involved protracted negotiations, in some cases fruitless, through sensitivities between specialties. Eventually 12 hospitals collaborated for 12 months or more. Results show that about 40% of all cardiopulmonary arrest events lead to immediate resuscitation, there is 26% survival at 24 hours, 16% at hospital discharge, and 11% at one year. Best results in men were in those aged 35-44 and in women 25-34, but the fall off in survival with age was not very rapid, so that even above age 85 one in twenty was alive at one year. A similar story relates to the number of defibrillations, with a fall off in survival above five shocks, but not sufficiently great to suggest that resuscitation should be stopped at this point. Results underline the cost-effectiveness of resuscitation, but also the need for audit, to tell us what is happening, difficult though it is.

The anaesthetists' role in CPR training

Dr M F Thomson

The College of Anaesthetists in their 1990 document "Academic Departments of Anaesthesia: an undervalued resource" emphasised the singular skills that anaesthetists have to offer in the training of cardiopulmonary resuscitation (CPR). In 1987 the Royal College of Physicians published a series of recommendations regarding the training of undergraduates, postgraduates and other personnel. The progress which has been made in Dundee in attempting to satisfy these recommendations is described.

Fourth year medical students are now given a six hour course consisting of lectures and practical tuition. The practical part of the course consists of basic CPR, advanced airway care, dysrhythmia recognition with defibrillation, and instruction in oxygen therapy and central venous pressure measurement. Undergraduates are now examined in the Final Surgical examinations by members of the Department of Anaesthetics. The first year to be examined following completion of the course showed a significant pass rate increase and it is hoped this trend will continue.

Further developments, it is hoped, will include spot testing of house officers, training of all medical staff and continuous audit of performance at cardiac arrests. It may be necessary to have certified competence in CPR a mandatory requirement for graduation and registration.

Prehospital emergency care - the role of paramedics and helicopter transportation

Mr G Kelly

The development of the Ambulance Service in the 19th and 20th centuries was briefly described. The Saint Andrew's Ambulance Association was founded in 1882 and further developed particularly during the two World Wars until in 1948 legislation was introduced whereby Local Authorities were required to make provision for Ambulance Services. Reorganisation of the Scottish Ambulance Service in 1986 into Emergency and Non-emergency vehicles released resources to enable the introduction of advanced training with modern equipment. Patient Transport Service training consists of three weeks at the National Training College followed by further training "on the job". Accident and Emergency Staff training takes a further nine weeks with a subsequent

period of twelve months "on the job" before qualifying in all aspects of prehospital emergency care. Qualified Ambulance Personnel can subsequently apply for Paramedic Training which consist of pre-clinical and clinical training and clinical practice. Qualified paramedics are competent in cardiac monitoring, defibrillation, intubation, intravenous infusion and drug therapy. As well as advances in personnel training, developments have occurred in ambulance transport with purpose built paramedic units ergonomically designed to suit advanced patient management requirements. In some urban areas motor-cycles are being used to minimise delays due to traffic congestion, and in remote areas the helicopter Air Ambulance has revolutionised the provision of prehospital care. Three examples of the value of this form of transport for the critically ill concluded the talk.



After the Scientific Meeting

WHITHER BREATHING ?



I am the first to give this lecture of whom it could be said that Dr John Gillies did not really know him. It was a close run thing however. In 1954 the Association of Anaesthetists' Annual Meeting was held at the Russell Hotel. In those days they had some difficulty in obtaining enough papers for the programme and I was volunteered by my chief, Dr Tony Pinkerton. I reached the venue in a state of near petrification, not helped by finding that I was first on the programme. Dr Pinkerton was both kind and protective and did his best to introduce me. "Let's say hello to John Gillies", he said, and we approached the great man. We were on the point of shaking hands when some noisy, important people came along. There was much shouting and laughter and shaking of hands followed by an invitation to the bar. Then they all walked off. If John Gillies did not know me I certainly knew him. Having had the privilege to follow, albeit in an inadequate way, some of his footsteps, I feel that I have come to know him better in the years since his death.

There is no argument that he is the founder of the modern Department of Anaesthetics in the Royal Infirmary and in the University of Edinburgh. We still use the same visitors book and it is impressive to see the entries for the early years. Everyone who was anyone visited, from all over the world. Two weeks ago we had a very successful (first time out of London in November) meeting of the Anaesthetic Research Society in Edinburgh and some of us took the opportunity to look back at the early entries from visits of the Society to the City. A small group, but carefully selected. Dr Gillies was a leader there too. John Gillies was Simpson Reader in Anaesthetics. There was no Chair. Apart from Glasgow, academic development to the level of professorship in Scotland had been appalling. In spite of all the excellence that had gone on for so many years the proper establishment of a Chair in Edinburgh did not occur until 1984. In spite of that there is every reason to believe that John Gillies was not only hugely respected but highly influential within University circles. I like to note that in 1947, on the occasion of the centenary of the discovery of chloroform, there was an honorary degree ceremony in which one of the recipients was the President of the Association of Anaesthetists of Great Britain and

Ireland - a highly appropriate but surely also remarkable gesture in view of the overall standing of the specialty in Britain at the time and the very high standard demanded by the University in respect of these honours. I cannot avoid concluding that John Gillies had a major hand in this.

The Minnitt and Gillies textbook (successor to Ross and Fairlie, the Edinburgh - Glasgow partnership) was the standard work in anaesthetics in its time. R. J. Minnitt was also a remarkable man in many ways. He worked in Liverpool. John Gillies' contacts with him extended to more than the preparation of their textbook because both served on the Board of the British Journal of Anaesthesia, in the last days of Joseph Bloomfield's time as editor and also in the post-war renaissance headed by Dr Falkner-Hill and Professor T.C. Gray. John Gillies had strong links with the Association of Anaesthetists and eventually became its President.

Accordingly he felt the need to retire from the Board of the British Journal of Anaesthesia when Anaesthesia was launched.

I am pleased to tell you that the British Journal of Anaesthesia is flourishing also. Some of the papers may not be so easily understood as they were in John Gillies' time but the standing and circulation of the Journal is better than ever. As an aside I would also record that the Board of the Journal also met in Edinburgh two weeks ago and had the privilege of doing so in James Young Simpson's dining room at 52, Queen Street.

John Gillies was also strongly associated with the founding of the Faculty of Anaesthetists, becoming Vice Dean. Serendipity dictated that I should be the last Vice Dean. There is neither triumph nor catastrophe in this, simply the fact that my period of office spanned the creation of the College of Anaesthetists when Deans gave way to Presidents.

All these activities, the formation of a framework for teaching and research, the furtherance of literature and the sustaining of a national body to ensure quality assurance in the specialty were the very breath of life to anaesthesia in the U.K. The College of Anaesthetists recently acquired a new crest in which the supporters are John Snow and Joseph Clover. These two figures embody the concept of British anaesthesia as an amalgam of science and craft. We profess learning, reasoning and deduction matched to professional skill. In spite of that I am despondent that so many of the changes in practice evolve through processes in which scientific reasoning has not featured.

Notable examples include the confusion surrounding halothane. This agent has been of enormous importance to the safe practice of anaesthesia in all of my professional lifetime. The Americans set out to attack it almost from its introduction but they were forced to conclude, particularly through the National Halothane Study (1), that the drug had a remarkably good record. Hepatologists have long been fond of attacking it for its occasional association with serious liver injury but many of them overlook the fact that many commonly used drugs have a much more

profound hepatotoxic effect than halothane and are often implicated in so-called halothane cases. The worst excesses have come from the Committee on Safety of Medicines, a body charged with improving safety but which, on two occasions, most recently in 1986, produced damning commentary on halothane without adequate data to justify their position (2). They have never followed their assertions with published data and it now seems unlikely that they will do so. In many minds, however, the drug stands condemned.

Isoflurane, also, has been under a cloud by virtue of the "coronary steal" phenomenon. I remain mystified at the findings of Reiz (3). The elegant animal models designed by two important groups (4,5) show that the steal phenomenon can be demonstrated in the laboratory with precision and reliability. Most, including these authors, agree that the animal models bear only a remote relationship to the clinical problem in a patient with myocardial ischaemia. The proof of the pudding would appear to me to be in the eating. We have a large number of patients with severe myocardial ischaemia in the central belt of Scotland yet the use of isoflurane has proceeded with apparent safety for a number of years now. Once again the threat of risk has been overstated.

Another example is the proliferation of guidelines - amounting in the United States at least to dictats - in relation to the use of electronic monitoring devices. Superficially monitoring may seem to be so obviously associated with improved safety that to urge caution in its use might seem like a vendetta against motherhood and apple pie. On the other hand we should recognise that the efficiency of most monitoring techniques (let alone their use in combination) has never been clearly established. The particular concern is to know how ergonomically sound are the strategies contained in the various criteria that have been published. Even if there were little support for such a reactionary position, at the very least there should be concern at the extravagant claims from studies such as North American "closed claims" studies in which it is deduced that the case for the published monitoring criteria is already established (6). The arguments of the Harvard anaesthetists seem to me particularly unfortunate when they claim that the introduction of monitoring criteria has already led to the reduction in deaths associated with anaesthesia (7). While we must all hope that there has indeed been a real reduction, although the numbers do not stand up to critical scrutiny, have no other factors changed? In particular the explosion of interest in safety that has occurred in recent years, coupled with an increased awareness of what can go wrong as a result of negligent action has led to a much tighter and disciplined approach on the part of everyone who practises in the operating room. Is that the real benefit that has come to us? I commend to you a useful annotation by Dr Arthur Keats which reflects the issues I have raised (8).

Pain relief after operation.

Having touched on the breath of life for our specialty in a metaphorical sense I would like to mention one or two aspects at a more literal level.

For all of my time in anaesthesia there has been intense research interest in the relief of pain by a variety of drugs, and the literature is full of reports of the studies. Yet so little of what has been found is

applied to treatment of our patients. I imagine that everyone in this room has become aware of the recent initiative of the College of Anaesthetists with the Royal College of Surgeons of England in producing a consensus report on postoperative pain (9). This does not produce new facts but develops what I hope are logical arguments out of existing knowledge. Clear recommendations are offered in relation to strategies for postoperative pain relief in hospitals; the need for pain policies and the charting of pain are simple measures that could be introduced almost overnight and without cost. At a more sophisticated level the Report argues for the development of pain teams on the model that has already been successful in several hospitals in Britain and America. The Report offers no "best buy" because it is clear from surveys of the literature on pain relief by pharmacological methods that no drug or technique is completely safe. Current evidence, although incomplete, would point to patient controlled analgesia with opioids as a useful way forward. In any case, it does look as if the practice of postoperative pain relief will continue to be based on opioids and there is concern at their effects on breathing patterns. Relatively fixed tidal volumes can occur and also apnoeic episodes which may result in quite profound decreases in arterial oxygen saturation. The Colleges' Report has focused particularly on these problems calling for greater willingness to provide appropriate monitoring of the patient's respiratory status, but recognising that existing technology is not yet adequate for long term surveillance (24 to 48 hours). The report also recommends the greater use of high dependency facilities as an aid to such close scrutiny of breathing activity.

Breathing in anaesthesia

The last example that I want to consider is that of the respiratory mode during anaesthesia. I find this a little difficult to present because it is necessary to build a straw man and then destroy it. In any case there is a common view in our specialty that spontaneous breathing during anaesthesia is dangerous. My research suggests that people who hold these views believe that the maximum safe period for spontaneous ventilation is about 15 minutes (certainly not more than 30). Beyond that time they believe that the lungs begin to collapse and/or the patient is at risk of becoming exhausted. Others - presumably of a slightly more scientific bent - confine themselves to complaining that the end-tidal CO₂ increases. They are the ones, presumably, with the minimal monitoring! That is not the whole story. In some of our neighbouring countries and beyond (particularly Holland, Belgium and Japan) there is not only a wish to avoid spontaneous breathing in anaesthesia - most of the practitioners are without the skills to give an anaesthetic with spontaneous breathing. There is no greater stimulus to dogmatism than the defence of a limited repertoire! I should say that I assume that this audience does not share these mistaken impressions. I simply wish to speak over your heads to those in the darkness outside.

A few baseline facts.

1. Anaesthetic agents are respiratory depressants. Thus when they are given to spontaneously breathing subjects hypoventilation results. In consequence tissue CO₂ tensions of 8 kPa or greater are not at all unusual.

Indeed I would regard that as part of the normal response to anaesthesia. These changes are not harmful provided they are not progressive. Such hypoventilation is reversible and is therefore different from respiratory failure caused by disease. Thus when there is increased neurostimulation, as occurs in association with a surgical operation, or when tissue tension of the inhalation anaesthetic is decreased, hypoventilation will become less marked.

2. The retention of CO₂ has no serious disadvantages at the levels we are considering. In the presence of a drug like halothane, disposition to the commoner cardiac arrhythmias may be greater but that is all and, again, the effect is dose dependent. In comparison with the same anaesthetic conditions in which ventilation of the lungs is used the cardiac output is if anything better maintained. In practice there are no adverse effects on the operating conditions for most types of surgery in adults. I mention particularly the fact that I prefer to allow spontaneous ventilation in patients undergoing thyroidectomy in whom there is an obvious need for an operating field that is not congested with blood.

3. The circumstances in which progressive hypoventilation can occur are well known (a variety of respiratory diseases, neuromuscular blockade gross CNS depression, obesity, ribcage deformities). All of these are an indication for artificial or controlled ventilation or the avoidance of general anaesthesia altogether. My remarks today are directed to the patient who does not suffer from these conditions.

4. Although the anaesthetised spontaneous ventilating patient undergoes these changes in gaseous homeostasis it is not absolutely necessary to monitor what is occurring in respect of end-tidal, CO₂ value. Thus those deprived of minimal monitoring need not despair totally! There are at least 9 very good clinical signs in terms of the breathing pattern and cardiovascular status that will give good warning if ventilation and CO₂ homeostasis is beginning to be out of control.

The legitimate menu of indication for artificial ventilation of the lungs can be easily agreed: the need for neuromuscular blockade, thoracotomy and circumstances in which the precise control of CO₂ tensions is necessary. To these we add the special problems of the small child and, of course, those with various disease conditions. In the 1960's in the course of unravelling the effects of anaesthesia on respiratory function, the distinguished group of anaesthetists, then in Boston, proposed that progressive miliary atelectasis was a feature of the anaesthetised state (10). Subsequent investigations were never able to support the idea which is generally held to be discredited. Of relatively recent time more sophisticated methods have been forthcoming to examine lung function and some of these have been applied to the issue of the lung during spontaneous and artificial ventilation in anaesthetised patients (11).

Similar assurance can be given in respect of the work of breathing during anaesthesia. As a proportion of the total metabolic demand the work of breathing is relatively unimportant, but more positive reassurance can be given by the fact that respiratory muscles do not just cope with the work of breathing under anaesthesia but have considerable reserve to generate additional power when called on to do so (12).

My reason for labouring the issue of spontaneous breathing is essentially practical. Most people in this audience will realise that the two biggest legal issues in anaesthesia are disconnection of breathing systems with consequent brain injury or death, and inadvertent awareness during anaesthesia. Both of these problems are associated exclusively with use of artificial ventilation of the lungs. When such problems occur it is always a tragedy. But the awfulness is many times increased if the conditions that brought about the tragedy were not necessary in the first place. The academic quality of those practising anaesthesia in this country, and the framework in which they practise is better than it has ever been. I am sure that John Gillies would recognise and rejoice in that. I have attempted this afternoon to stress the fact that we have inherited from him and his contemporaries a practice that is not just a craft activity but a scientific activity based on knowledge and reasoning. I have illustrated some lapses in the hope that we can be better stewards of the heritage by practising what we profess.

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Highland Region

As elsewhere 1990 has been a year of change in management philosophies with Resource Management imminent in all Departments with business plans, capital charging, drawing up of contracts, medical audit and College requirements all demanding attention. Long overdue expansion of the Anaesthetic services to the Maternity Department at Raigmore seemed to be forthcoming with a new Consultant post advertised only to be withdrawn on "political grounds" after possible candidates had been north to look round. On the positive side we congratulate Dr Suzy Dempster on passing the Final Fellowship (and her driving test!). She is now a trainee in General Practice on the West Coast but we hope only temporarily lost to Anaesthesia. We welcome Dr Trevor Maze as Registrar and hope that the Gulf crisis will be resolved before he is called up again to active Naval service. We are also pleased to report that the Senior Registrar rotation with Tayside is proving successful. Day-case surgery is underway via Waiting List Initiative funds and we have enjoyed having Dr Angus Martin back from retirement to get this off the ground. Finally the Highland Health Board has decided to resolve the situation in Golspie by appointing a locum Surgeon and locum Anaesthetist.

South East Region

Lothian Health Board have been put in the invidious position of having to make massive savings in a very short period. Of the five options put forward, it has adopted option 2, a management version of musical chairs, otherwise called rationalisation. For most of us it involves listening for when the music stops and watching out for what chairs have been removed. It must be in the patients' best interests. After all, the notepaper says it: "putting patients first". All however is not gloom and uncertainty. This year has seen the opening of the long overdue Bangour Hospital called St. Johns at Howden, or as most of us know it, Livingston. Rising to the challenge of the times, Dr Nick Gordon has taken over from Dr Iain Davidson as Chairman of the Division of Anaesthesia. In like manner and mind, new CARs include Dr David Wright at the Western General Hospital and Dr Jane Chestnut at St John's at Livingston, sorry Howden. Meanwhile recently married and with usual good humour, Dr Calvin Hider continues as CAR in the Royal Infirmary. This year has seen the departure of a number of friends. Dr Sheila Robertson retires this year from the Borders General Hospital. Dr Collette Clark is moving to the Southern General in Glasgow. This is a sad loss and we wish her well. However, if I had the same problems with my central heating, I'd have done the same. Dr James Wilson hasn't had any

problems with his central heating but has decided to go part-time. He may be in the hospital less, but he still lets us know his views as only he can. On the other hand Drs Martin Payne, Donald Galloway, David Noble and John Lew have obviously had trouble with their central heating. Martin and Donald have made a joint assault on Carlisle as consultants. Dr David Noble adds his name to the Northern Lights in Aberdeen, and John Lew has taken things to extremes by moving to Hong Kong. Dr Ann Whitfield, for totally different reasons, has itchy feet and bought a return ticket to the USA valid for a year. We hope she remembers the postcard. With the departure of friends we also welcome new ones. Dr Margaret Longsdale has obviously heard of the view from Ward 17 over the Forth and has moved across the Tay to the Victoria Hospital in Kirkcaldy. Edinburgh too has seen new arrivals with Drs Tony Pollock and Duncan Weir moving east to the Royal Infirmary. Mini-tracheostomy has taken on a totally new meaning at the City Hospital. Not to be left out, the Royal Hospital for Sick Children has strengthened its staff with the appointment of Dr Louise Aldridge as consultant. Our College representation has also seen some changes this year with Dr Jimmy Meek, Victoria Hospital, Kirkcaldy, and Dr Ian Armstrong, Western General Hospital, Edinburgh, becoming College Tutors. Movement amongst our Senior Registrars continues unabated. Our globe trotters this year include Dr Patrick Armstrong off to South Africa and Dr Michael Brockway off to Perth in Australia. Meanwhile at home work has continued with the appointment of Drs Karen Humphreys, Lachlan Morrison, Colin Young and Nicholas Scott to Senior Registrar posts, and Dr Ann McRae as Research Fellow. Midsummer is often busy, especially on the golf course. A glorious Friday in June saw Dr Michael McBrien, S.H.O. at the Western General, win the golf trophy. I would feel it only proper to remind aspiring consultants of the career structure and that the rules of handicapping are complex.

Tayside

At Ninewells Hospital there were two highlights in 1990 for the Department of Anaesthesia. We played host to a prelector's visit in June, and to the Annual Scientific Meeting in November. The prelector was Dr Alan Aitkenhead from Leicester who spent a week with us giving lectures and tutorials. His visit was extremely well received and very successful. The November meeting of the Society attracted 110 delegates and we are grateful to all for their support. We entered the sea of change with new consultant contracts, the proposed directorate system, business plans, and the resource management initiative, all of which occupied a lot of attention and effort in 1990. Our division, however, kept an even

keel under the masterful chairmanship of Dr Sandy Forrest, now also representing Anaesthesia at the University. Considerable progress was made on these important issues and several other developments and achievements can be reported.

The theatre computer system became established in the main suite at Ninewells Hospital, under the supervision of Dr Iain Gray. As a result information was freely available for individual as well as management purposes and expansion of the system to the rest of the theatres in the Dundee General Hospitals Unit was planned. The treatment of pain in Dundee also made substantial progress in 1990. The acquisition of dedicated accommodation and nursing staff made a big difference to the operation of the pain clinic, and the recognition of acute pain as worthy of a consultant session was a significant breakthrough. Meanwhile the North British Pain Association research fellow continued the work in the field of epidemiology of chronic pain. Posters and papers from this work were presented at meetings in Australia, Poland and the United States as well as several meetings in the U.K. Another area of progress was in the extended training of ambulancemen. The scheme, initiated by Dr Mel Thomson in 1989, was particularly successful and led to the possibility of wider application. Dundee also had two successful candidates in the Fellowship examinations at the College of Anaesthetists. We congratulate Dr Sally Crofts and Dr Alisdair Mackenzie.

There were many staff changes in Tayside during 1990. Three senior registrars in Dundee were appointed to consultant posts. Locally, Dr Grant Hutchison was promoted to a post previously held by Dr Ian Lawson but now including anaesthesia for thoracic surgery and sessions at Stracathro Hospital. Dr Margaret Lonsdale moved south to a consultant post at the Victoria Hospital, Kirkcaldy, and Dr John Colvin was appointed to a new consultant post in Dundee including intensive care and, for the first time, acute pain. All three were first class senior registrars and we congratulate them on their appointments. Filling two of these senior registrar posts, Dr Mick Serpell moved up within the department and Dr William McClymont joined us from the Western Infirmary, Glasgow. Three registrars left the department, Dr Gill Hood to Cardiff as a senior registrar, Dr Gerry Keenan to the General Infirmary, Leeds, as a clinical research fellow in cardiothoracic anaesthesia, and Dr Eileen Forrestal returned to her native Ireland as a registrar in Dublin. The implementation of "Achieving a Balance" recommendations progressed with the appointment of 5 of the planned 10 career registrars for Tayside. The rotation at this grade between Dundee and Perth was also established. The career registrars appointed were Dr Cliff Barthram and Dr Jacqui Donnelly promoted from within the department, Dr Charles Wallis from St John's Hospital, Howden, Dr Damien Carson from Perth Royal Infirmary and Dr Rose Jankowski from the Victoria Infirmary, Glasgow. Dr Joyce Stuart

vacated an S.H.O. post to become a registrar at Hairmyres Hospital and two new recruits, Dr Phil Lacoux and Dr Stephen Haggerty joined the department in August. In Perth, Dr Peter Coe was appointed Faculty Tutor while the department was sorry to lose the services of two part-time clinical assistants after many years of valuable work. Dr Mary Macmillan retired and Dr Stewart Ripley gave up anaesthesia in order to cope with the increased challenge of the changes brought by the White Paper in his general practice. At registrar level Dr Damien Carson moved to Dundee. Dr John McDonagh joined the department as a Type 3 S.H.O., the first in Tayside. Three new S.H.O.s, Dr Gillian Tweddell, Dr Dewi Williams and Dr Charlie Marshall, started in Perth replacing Dr Eleanor Guthrie, Dr Carl Humphries and Dr Chris Garrett who left to join S.H.O. rotations in Glasgow, Leicester and Nottingham respectively. On the golf course the highlight of the year was at Banchory on 25th September when Dr Farquar Hamilton holed his tee shot at the 220 yards second hole.

Grampian

There has been expansion in our NHS department over the past year in a bid to keep up with increasing surgical appointments and to maintain theatre sessions previously covered by our academic department. Since 1976 the latter had been part of the University Department of Surgery in the capable hands of Dr C R Dundas (Senior Lecturer). Dr A C Norton (Lecturer) has taken up a consultant post in Lincolnshire at Pilgrim's Hospital, Boston and Dr Kathleen Ferguson is to become Senior Registrar after her second year's productive tenure of the British Journal of Anaesthesia Research Fellowship studying the effects of anaesthesia on protein metabolism. We welcomed the consultant appointments of Drs Stephen Lawrie from Glasgow Royal Infirmary and David Noble who returned to his alma mater after a lectureship in Professor Spence's department in Edinburgh. Our senior registrar establishment is now six. Dr Gordon Byers has taken up post following his year's sojourn to Nova Scotia (Isaac Walton Killam Hospital, Halifax). Dr Graham Johnston has returned from six months attachments to Great Ormond Street and Yorkhill Hospitals respectively, and Dr Colin Rodgers has rallied to the call of the RAMC(V) during the Gulf crisis. Dr Fiona Fox (a former Association of Anaesthetists Research Fellow) achieved a higher degree (MD) for her thesis entitled "Lung Water in Pregnancy and the Early Puerperium Research assistant posts have been held by Drs Martin and Ronald. The former has had a productive year in the Department of Environmental and Occupational Medicine and has been awarded the Registrar's Prize of the Emergency Medicine Research Society for his work on protective smoke hoods. Dr Ronald has embarked on a one year study of postoperative analgesia techniques funded by Rhone-Poulenc Sante.

We were saddened by the death of Dr Norman Rollason, our former Consultant in Administrative Charge. Dr Rollason retired in 1981 and is a Past President of the Society. Woodend General Hospital has now become the Regional Centre for elective orthopaedic surgery and will absorb the Aberdeen element of Stracathro when the unit moves in April 1991. The Woodend "Annexe", originally an Emergency Medical Service Hospital during the last World War, a thoracic surgery unit until 1966 and latterly home of ophthalmology and gynaecology, was razed to the ground in April. The concentration of all acute services onto the Foresterhill site has been the major "fait accompli" during the last year. Meanwhile there has been much audit, debate and critical appraisal as part of a multidisciplinary feasibility study on the merits of Grampian becoming a self governing Hospital Trust in 1991.

Western Region

Glasgow

Glasgow has had an eventful year with the publication of the Strategy Review. Many changes are envisaged over the next few years in the Anaesthetic Services in the City and the Divisions await with interest the implementation and implications of the various changes. The White Paper is beginning to be enacted with discussions ongoing on such topics as Clinical Directorates, Trust Status and, of course, the Consultant's Work Plan. Before describing staff changes in the City, foremost mention must be of Professor Donald Campbell's election as Visitor to the Royal College of Physicians and Surgeons of Glasgow. This is a most prestigious and significant honour for an anaesthetist and we all extend our warmest congratulations and best wishes to him.

Regarding senior staff changes, at the Royal Infirmary three consultants have retired, namely Dr. Isobel Kirkwood, Dr. Alick Reid and Dr. Geoffrey Parbrook. In addition Dr. W.C. Richards and Dr. Eric M. Robertson have left to seek pastures new in Stirling and the Netherlands respectively. New appointments as consultants to the Royal have been Drs. A.D. Colquhoun, D. Paul, A. Patrick and A.W. Winter. Dr. T. Laycock is spending a year at Ann Arbor in Michigan.

At the Western Infirmary there have been no consultant retirements. Three of their senior registrars have been appointed as consultants - Dr. John McDonald to the Southern General Hospital, Dr. Derek Paul to the Royal Infirmary and Dr. Saxon Ridley to Norwich. In addition Dr. Ian McMenamin is about to spend a year in Australia, Dr. Sofie Chaudri is off to Perth for six months, and Dr. Jacky Church is off to Romania for one month.

At Stobhill Drs. Roddy Unkles and George Dow have retired and have been replaced by Dr. Dev Sewnauth and Dr. Colin Miller. Drs. Freda Fleming and John McDonald have retired from the Southern General Hospital with Drs. John McDonald and Collette Clark

having been appointed to their vacancies. Dr. Janet Easton has announced her retirement as consultant neuro-anaesthetist at the Institute of Neurological Sciences. Following new consultant appointments in recent years at the Royal Hospital for Sick Children, specialist Intensive Care facilities have been enhanced with twenty four hour consultant anaesthetic cover now being provided. In addition the hospital has been in the vanguard of day case surgery in Glasgow, such that there have been significant reductions in the waiting list.

No consultant retirements have taken place at the Victoria Infirmary. Dr. Janet Pollock has been appointed to a senior registrar post based initially at the Victoria Infirmary. Three senior registrars are currently abroad - Dr. Alex. MacLeod in Richmond, Virginia, Dr. John Sinclair in Toronto and Dr. Kenneth Lamb in Cape Town. We await their return with interest.

To all our colleagues who have retired over the last year we send our appreciation and best wishes, and to those appointed to new posts we wish them every success.

Argyll and Clyde

The Division of Anaesthesia from the Royal Alexandria, Paisley organised and hosted the first of a series of College Postgraduate Study Days to be held outside London. A large audience enjoyed an excellent programme of lectures encompassing recent advances in different aspects of anaesthesia and intensive care.

Ayrshire and Arran

Dr. David Eveleigh, despite a short return to work, has been forced to retire on grounds of ill-health. Dr. Boyd Meiklejohn from Leicester has been appointed to his post.

Forth Valley

An additional consultant post at Stirling which the Health Board eventually sanctioned in the spring has been filled by Dr. Wanda Richards. In late summer we were all shocked by the sudden death of Dr. Bill Leishman. Bill was a well-respected colleague and friend who will be sorely missed, particularly in the sphere of dental anaesthesia. His replacement is Dr. Mark Worsley from Edinburgh. Also at Stirling Dr. Prasad Kasthala has been appointed to a staff grade post. At Falkirk Dr. David Simpson has been appointed as College Tutor.

Lanarkshire

Dr. Liz McGrady has filled the vacancy on Dr. Pink's retirement in Monklands, and Dr. Tom Fraser is making a good recovery after his "replumbing job" and we wish him well.

There is little to report from Dumfries, Hairmyres or Vale of Leven.

GOLF OUTING

An enthusiastic band of golfers travelled north to Aberdeen in June for the annual golf outing which was held at Royal Aberdeen Golf Club (Balgownie) on the 22nd. Those who could spare the time had an informal round at Cruden Bay Golf Club on the 21st and were universal in their praise of this delightful course. However the visit to Balgownie the next day was a more testing outing which was nevertheless most enjoyable. The drizzle which had been persistent remarkably abated around tee-off time

and by the afternoon the sun made a late but welcome appearance. Local knowledge perhaps helped the President, Greg Imray, to lift the Scott Trophy in the morning, with Alick Reid unlucky to come second again. The afternoon competition was a North versus South affair with the North team the victors. The customary dinner of excellent standard followed in the evening at which Greg Imray was congratulated for having organised such a successful outing.

AUTUMN FISHING OUTING

The Lake of Menteith was, once again, the venue for this enjoyable annual event on the 29th August. A pleasant day (for most participants) came to a close with a meal in the Lake Hotel and the presentation of the prizes. Attending were Drs Alistair Cameron, Bill Easy, Iain Davidson, Nick Gordon, Don Robertson, Jim Straton and Adrian Tully. Noting the conspicuous absence of a certain professional person from the City of Culture (Kultcher), one member was heard to express the view that, although the gentleman in question had contributed little to the total catch in recent years, he did serve to elevate the tone of the occasion. While it was not directly attributable to his inability to attend, it must be reported that, following two separate incidents in one boat, the aforementioned tone declined deplorably. The first involved a well known consultant and the plastic receptacle

which, under normal circumstances, serves as "baler". The details of the event, which gave rise to much bad language on the one hand, and considerable merriment on the other, are, sadly, unreportable. The coarseness of the invective without, understandably, quite the same degree of personal feeling, was almost equalled by another member of the Society when an allegedly dead fish, large of course, leapt from his hand and, as he watched incredulously, disappeared from view in the waters of the Lake. Nick Gordon comfortably won the competition with four fish weighing six pounds and was awarded the "Menteith Mug" by Kevin Roberts of Abbott Laboratories. The prize for the biggest fish certainly went to Vale of Leven, both Bill Easy and Alistair Cameron being in contention, and a re-weigh was scheduled for later in the evening. Don Robertson.

Peebles 1990



NORTH EAST OF SCOTLAND SOCIETY OF ANAESTHETISTS

Meetings are held at 7.30 for 8p.m. in the Postgraduate Medical Centre, Stracathro Hospital, Brechin, unless otherwise notified.

1990

Thursday 25th October
Research and Development in the Pharmaceutical Industry
Dr.J.B.D.Palmer, Director of Department of Respiratory Medicine, Glaxo

Thursday 29th November (Aberdeen)
Oxygenation in the Perioperative Period
Professor J. Gareth Jones, University of Leeds

1991

Thursday 21st February
Registrars' Papers

Thursday 21st March (Dundee)
Paediatric Anaesthesia
Dr.P.Morris, Consultant Anaesthetist, Royal Manchester Children's Hospital

Thursday 16th May
Annual General Meeting and Presidential Address

GLASGOW AND WEST OF SCOTLAND SOCIETY OF ANAESTHETISTS

1990

Friday October 26th
Combined Meeting with Edinburgh and East of Scotland Society of Anaesthetists. Burrel Gallery, Glasgow

Tuesday November 20th
Dr.R.Mitchell, Director, Glasgow and West of Scotland Blood Transfusion Service
"Recent Advances in Blood Products"

1991

Wednesday January 23rd
Members' Night - presented by the Division of Anaesthesia, Victoria Infirmary, Glasgow

Wednesday February 20th
Dr.D.J.Hatch, Consultant in Anaesthesia and Respiratory Measurement, Hospitals for Sick Children, Great Ormond Street, London

Thursday March 21st
Presidential Address - Dr.T.L.Fraser

Thursday April 25th
Annual General Meeting

May

Annual Golf Outing - date and 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.

Notice of each meeting will be sent to members.

EDINBURGH AND EAST OF SCOTLAND SOCIETY OF ANAESTHETISTS

1990

Tuesday October 2nd
Mr.D.Cruickshank, Chief Executive, National Health Service in Scotland
"What is a Chief Executive for?"

Friday October 26th
Combined meeting with Glasgow and West of Scotland Society of Anaesthetists at the Burrel Gallery

Tuesday November 6th
Professor C.Haslett, Edinburgh University
"Cellular Mechanisms of Acute Lung Injury"

Tuesday December 4th
Dr.M.Morgan, Royal Postgraduate Medical School, Hammersmith Hospital
"Spinal Opioids"

1991

Tuesday January 8th
Dr.R.H.Ellis, St.Bartholomews Hospital
"Early Ether Anaesthesia: The Patients"

Tuesday February 5th
Presidential Address - Dr.I.T.Davie

Tuesday March 5th
Associate Members' Prize Presentation

Saturday March 9th
Annual Dinner
University Union, Teviot Row House, 7.30 for 8.00p.m.

Tuesday May 7th
Annual General Meeting

Unless otherwise stated meetings are 7.30 for 8.00p.m. in the Main Hall, Royal College of Surgeons, Nicolson Street, Edinburgh.
Members are reminded that submissions for the Associate Members' Prize should be in the hands of the Honorary Secretary before Christmas 1990.

REGISTRAR'S PRIZE

The Society annually awards a prize of 250 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 125 pounds or a third of 75 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 contenders 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 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 and those of a partner 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 of its source. Acknowledgment to colleagues etc. should not be included.

The prize for 1990 was won by Dr.J.Oates of the Victoria Infirmary, Glasgow for his paper entitled "Predicting Difficult Intubation".

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