

NEWS LETTER

LIBRARY
UNIVERSITY OF GLASGOW

28 APR 1987

6108-30538



THE SCOTTISH SOCIETY
OF ANAESTHETISTS

Founded
20th February, 1914

December 1985
No. 26

SCOTTISH SOCIETY OF ANAESTHETISTS

COUNCIL FOR 1985-86

Office-Bearers

President	Professor Sir GORDON ROBSON
Past-president	Dr H. Y. WISHART, Glasgow
Vice-President	Dr A. I. MACKENZIE, Law Hospital
Hon. Secretary	Dr W. F. D. HAMILTON, Dept. of Anaesthesia, Ninewells Hospital, Dundee
Hon. Treasurer	Dr I. G. GRAY, Dept. of Anaesthesia, Ninewells Hospital, Dundee
Editor of the Newsletter	Dr W. A. MACRAE, Dept. of Anaesthesia, Ninewells Hospital, Dundee

Regional Representatives

		Retires
Aberdeen	Dr C. R. DUNDAS	1987
Dundee	Dr M. MILNE	1986
Edinburgh	Dr N. H. GORDON	1987
	Dr D. G. LITTLEWOOD	1988
Glasgow	Dr A. D. McLAREN	1988
	Dr J. COLLINS	1986
Inverness and North	Dr R. JOHNSTON	1986

PROGRAMME FOR 1986

Registrar's Prize: Entries to be submitted to the Secretary by 28th February, 1986

Annual General Meeting: Peebles Hotel Hydro, 25th-27th April, 1986

Registrars' Meeting: Ninewells Hospital, Dundee, June 6th, 1986.

Scientific Meeting and Gillies Lecture: Western Infirmary, Glasgow, November 21st, 1986.

Golf Outing: Lanark Golf Club, June 10th, 1986.

President's Newsletter



Our ever efficient Honorary Secretary, Dr Hamilton has furnished me with copies of the President's Newsletter extending back for ten years and they are fascinating to read as vignettes in the affairs of the Society and Scottish anaesthetists.

The problems over the years do not really change significantly, they merely shift in their emphasis, and the Society has an excellent record of achievement of change for the better. The "political" function of the Society is maintained by the officers and they exert by highly informed pressures in the correct places, a quiet, unobtrusive activity. They have been active in the manpower problem which in the training grades in medicine has come rapidly to the front in the past year and we would all agree that its solution is now overdue. Anaesthesia has been the most rapidly expanding specialty at consultant level for many years and so has been spared the worst of it and most trained anaesthetists have been able to find adequate posts within the N.H.S. Now, however, the specialty is facing the spectre of overproduction with the strongest competition at all the stages of training. Reasonable competition is good for standards but it is quite unreasonable to train five or six people for every single consultant post, as happens in some specialties. With this prospect in sight a comprehensive area by area review of hospital medical staffing establishments has been set up and is proceeding rapidly throughout Scotland. The anaesthetics part of this review should

now have been completed. Surgery, obstetrics and gynaecology, and psychiatry reviews are in progress but the whole service will be surveyed. We await the reports with great interest. The Association of Anaesthetists of Great Britain and Ireland published a pamphlet in August 1984 entitled "Implications of reductions in junior staff and The Consultant-only hospital" which certainly is worth re-reading before entering any discussions about "rationalisation" of staffing in your hospital.

The National Health service has been under re-organisation, intermittently but far too frequently, for many years, the latest trick being the introduction of Griffiths' style managers. As a serving consultant I get the strongest impression now that administration is the most important part of the health service instead of being merely the enabling part of it which helps doctors to treat patients in hospitals which, after all is the purpose of hospitals. Scotland most usually does things with less fuss than we do south of the border and I hope that the new management system will be more sensitively introduced and more sensibly implemented than appears to have been the case in some English regions. As an anaesthetist in charge of a clinical department I am now a budget holder and I await with keen anticipation the day when I have to inform my surgical colleagues that we won't be operating until the next financial year. However, joking apart, it is good for all doctors to be aware of what they spend and to have due regard for economy, and to plan their own priorities for use of the money available, which will never be enough. There is, however, very little scope within a service specialty to limit the use of resources, especially when one must never cut corners in safety provision. Management is now, however, the keynote for the future, not administration.

The Association of Anaesthetists of Great Britain and Ireland has now occupied its new house at 9 Bedford Square, London, which provides a United Kingdom home for anaesthesia. Fund-raising and planning have been huge and successful efforts for the Association's council. The Society made a donation to the appeal which provide a Trafalgar style chair with plaque and an engraved Caithness glass decanter.

The Registrars' and Scientific meetings once again emphasised how alive anaesthesia is in Scotland and Professor Sykes' Gillies Memorial Lecture was a fitting eponymous tribute and a most entertaining hour.

I have greatly enjoyed my presidency of the Society, particularly so because it has enabled me to pick up the threads of old and lasting friendships and to contribute, if nothing else, some time to Scottish anaesthetic affairs. I am immensely grateful to the Society for the opportunity to serve.

EDITORIAL

This has been an eventful year, in the world at large, in Britain and in Anaesthesia. Thanks to satellite communication people all round the world opened their hearts and their wallets to make the Live Aid concert a global charity gala. The disturbing events during the miners' strike were brought home daily to millions in Britain by television. In our own small way, in anaesthesia we have pushed forward the frontiers of communication too. The Faculty of Anaesthetists' venture to link up with the departments all over the country by computers and Prestel is a pioneering step in medical education. We should feel proud that Scottish anaesthetists have played such an important role in bringing this about. If the venture is successful then perhaps we should use the expertise to link departments in Scotland for educational, research and other purposes. Perhaps the day will come when registrars from all over Scotland, each group sitting in its own department, will take part in tutorials together through such a link. Different departments would be able to co-operate in research easily and the Newsletter may appear on a screen instead of on paper!

Communications between anaesthetists is not the only subject with which we should be concerned. As long ago as 1964 Egbert and colleagues showed that by encouraging and instructing patients pre-operatively it was possible to reduce post-operative pain and allow them to be discharged home sooner than controls. Some people see Anaesthesia as a scientific but rather impersonal specialty and our interest in equipment such as computers could be interpreted as evidence for this. It need not be so, however, and encouraging anaesthetists, particularly those in training, to learn about all aspects of communication must be a priority in years to come.

The editor of the Newsletter relies on others to write most of the articles in each issue and I am grateful to all those who contributed this year. I would also like to thank Drs Tony Wildsmith and Mike Telfer for providing photographs.

ANNUAL GENERAL MEETING PEEBLES HOTEL HYDRO, APRIL 26th-28th, 1985



This year's meeting followed the well established pattern of previous years. The first, and some would argue, the most important event of the meeting, was the golf competition and the first prize, a crystal decanter donated by Mr Andy Bisset, went to Dr Robin Allison. Dr Peter Wallace was the runner up and won a putter. The lady's prize, a vacuum flask, went to Dr Betty Bradford. This year saw the presentation of a new fishing trophy called the Grouse and Claret Trophy which was donated by Norther Hospital Supplies. Dr James Straton won this prize and also received a bottle of whisky.

The Annual General Meeting of the Society took place on Saturday morning with the Scientific part in the afternoon. The Presidential Address, Guest Lecture and Registrar's Prize Paper are, as usual printed in the Newsletter to allow those who were not present to see what they missed. In the evening, there was a party for the children and a dinner-dance for the adults. The Peebles Hotel Hydro provided excellent service which, together with the normal convivial atmosphere, contributed to a most successful meeting.

PRESIDENTIAL ADDRESS

THE CHALLENGE OF ANAESTHESIA

Prof. SIR GORDON ROBSON

It is a very great honour for me to be able to address this venerable society as its President. I have done so before as a member, as a guest and as the John Gillies lecturer but I had no thought that I might be elected to this high office. To be held worthy of it by my peers is extremely good for the shine on my ego. All my predecessors in office have been men of distinction and have set high targets to emulate.

This old Society went into relative hibernation during the two world wars which it has weathered. I was fortunate enough to be associated with its post-war revival in the late 1940s. One of its immediate achievements was then to unify the gathering band of anaesthetists who practised in Scotland, bringing the older members into social and professional contact with the up and coming young to our mutual benefit. The scientific content of this annual meeting was minimal in those years, I suppose it seemed to be more important to weld the members together once more into a society. It is my own view that it is still of overriding importance to anaesthesia in Scotland to bring together the members and their wives and families each year. This it does right well. The Society has invisible tentacles which pull Scots from very far places some of whom are here today. I suppose that the ties are partly those of the clannishness of the Scots but chiefly I think of the pleasures which come from meeting old friends. Where else can one find a united group of practically all the anaesthetists who serve a population of over 5 million people?

In other spheres I have been very conscious of this Society's unity which has exerted a stabilising effect on anaesthetic affairs in the United Kingdom as a whole. Problems which seem to be unsurpassable south of the border are frequently easily solved in Scotland principally, I think, because through this Society, people know each other and talk to each other and work out solutions which are exemplary for the rest of the country.

Over the forty years which come within my own span the position of anaesthetists and the standing of the specialty have changed very radically indeed. Sir Donald Douglas in his address to the Society in 1975 put it:

"We quickly learned (during the war) that the operation was an incident, and often a minor one, in a continuing therapeutic process which began with the stretcher bearers. The average anaesthetist started the war as a purveyor of sleep but ended as a skilled physician of trauma."

He went on to say that "the development of cardiac surgery completed the transition of the anaesthetist from analgesist to clinical physiologist." He was talking from a surgeon's viewpoint but it could equally be maintained that cardiac surgery would not have been

possible unless anaesthesia had already developed sufficiently to meet the needs.

I was privileged to start at the early stages of the development of modern anaesthesia from its empirical war time stage and be part of it to its present state of applied science. Over the years I have, as most of you also have, had to face many questions about anaesthesia. It seems that the intellectual challenges of a physician's practice and the practical immediacy of surgical diagnoses and decision are obvious to all comers, but in our specialty we are still frequently asked "What is interesting about giving anaesthetics? How can it pose any intellectual challenges?" Of course we also always have the question which comes from the side of the table when your friend the surgeon is totally bored by his routine operation and has nothing else to occupy his mind. "Do you think about anything when you are sitting there?" All of you will have your own answers but I propose today to give you a rather personal account of some of mine using the privilege conferred on me by office.

As for many of my generation I had of course, an empirical background which started when I was a student in 1941. Having done—I put "done" in inverted commas—physiology and anatomy, I went to the local hospital, a voluntary general hospital as it was in those days, with its staff at minimal levels because of the call of the forces. I was keen to get to grips with patients and that wish was early and amply, and in some ways quite totally, fulfilled. Being no use for clerking patients I was put to being an anaesthetist. By accepting me at that age patients obviously showed preternatural trust in the hospital system which they would be unlikely to have nowadays. War time anaesthesia was done by newly qualified house physicians and surgeons and by some local general practitioners drafted in for the duration. The techniques which were in use by then went right back to Snow, Clover and Simpson and I became accustomed to chloroform and ether on a Schimmelbusch mask, to ethyl chloride and ether with an Ogston mask and when I said coming to grips with patients, I had in mind the restraint of 16 stone hard drinking, hard smoking miners being induced with open chloroform. I was taught the use of ethyl chloride for children's tonsillectomy and I became practised with Clover's inhaler. One learned then the use of a wedge and gag to open jaws clenched in anoxic spasm, and tongue forceps which transfixed the tongue to help keep the airway free. There were Boyle's machines in the hospital but no one could use them and it was probably safer that way.

This was interesting if adventuresome and after a summer vacation of it I took myself off to Tony Pinkerton, Roy Sinclair, Andrew Tindal, Alex Forrester and others, to find out what proper anaesthetists did.

They opened up entirely new world of practical and intellectual challenge. They demonstrated endotracheal intubation, the use of open and closed circuits, cyclopropane, nitrous oxide, ether and trilene sequences, and intravenous induction with evipan and thiopentone.

With these brief exposures interest was aroused, and in succeeding student vacations I became reasonably expert in most of these modern methods.

One must remember then that without muscle relaxants, relaxation involved very toxic doses of anaesthetics with toxic depression of the heart, circulation and respiration with miserable recovery periods. Monitoring consisted of a finger on the pulse, general observation and observation of Guedel's signs. I have since, as an examiner, sometimes asked these signs of candidates and drawn a complete blank—in those days one practised by them.

Blood transfusion was available but only used in severe emergency. An intravenous drip was looked upon as a slight on the expertise of the surgeon. Surgery itself was very limited in scope and speed was important because quick surgery gave the best results. No one liked to do operations lasting more than an hour and with good reason. There was much art to anaesthesia then. For example, the production of good operating conditions for the patient was of prime importance. This was achieved preferably without any induction period for many surgeons did not believe in such wasted time. Then, as now, an anaesthetic difficulty was attributed to incompetence, a surgical difficulty was naturally a complication.

The first challenge in anaesthesia then lay in the understanding of the applications of the basic sciences of pharmacology, physiology and biochemistry to the anaesthetic state and the opening up of the vast field of its inter-relationship with pathological states. In earlier times the disciplines of physics and physical chemistry had held the prime interest of anaesthetists. Our efforts were dedicated to the reduction of anaesthetic toxicity which was not really achieved until the introduction of curare, but it could be considerably mitigated by sensible control of the depth of anaesthesia, the combination with local and regional techniques and by surgical co-operation. We learned the importance of fluid and electrolyte balance which did much to improve morbidity and mortality.

There was therefore the special challenge of acute pharmacology, the acquisition of good medical knowledge and understanding of the care of patients in what is one of the most hostile environments in which people ever find themselves.

These challenges were enough to hook me, as they say, in the early years before I qualified and they still present themselves as challenges.

In my own time mortality from anaesthetic causes has been reduced from 1 in 800 cases to about one in twenty thousand cases, this being very largely attribut-

able to the fact that anaesthesia became a specialty. It was easy in past times to ignore an anaesthetic death. There were many let-outs such as "I gave the usual dose of 'pentothal' but the patient died," which seemed to be a perfectly acceptable excuse for a non-specialist anaesthetist. Death from "status lymphaticus" was also acceptable and so on. There were many reasons for not giving an anaesthetic and this of itself must have caused much morbidity and many deaths. Now, of course, once the patient is brought to the best possible condition, however bad that is, we go ahead if surgery has anything to offer the patient.

Of the major advances in anaesthesia the greatest in the post-war years was undoubtedly due to the demobilisation from the forces of large numbers of keen, trained ex-service anaesthetists and surgeons. They had a huge impact on civilian life which had been relying for five years on students, housemen, and general practitioners for most of the anaesthetics given in the country. They rapidly magnified the voices of the few civilian specialists who had been practising with difficulty on their own and their efforts founded the Faculty in the Royal College of Surgeons in 1948. This of course was seminal in the setting of standards.

In due course we learned to control physiological variables such as blood pressure, respiration, temperature and muscle tone and adopted the use of curare with enthusiasm.

Dr Booth in 1982 in his Presidential address gave a splendid account of the use of curare which as you all know was first used clinically by Harold Griffith and Enid Johnson in 1942. This was a major milestone in our specialty and it made possible the rapid progress which we all know of.

Many lives, however, were put in jeopardy when curare was used by those who were not properly trained because some of them stood arrogantly upon many past years of experience and would not learn safe practices. I well remember being seconded out from the Western Infirmary, Glasgow, to do a morning list at a peripheral hospital. There I found that there had been two deaths on the previous day in the wards, certainly due to persistent curarisation following operation. Each had received a large dose of curare for short operations and no reversal drugs had been used because the patients were breathing. The Beecher and Todd report (1954) showed that out of nearly 600,000 anaesthetics the death rate in anaesthesia which did not include curare was 1:2100 whereas the death rate in those which did was 1:370. I recall that this was greeted with some disbelief but I am sure that even in Britain, where anaesthesia was generally better developed, it was true in the early years.

The explanation of deaths in the post-operative period came much later. We originally held the view that so long as the general stimulation of the patient was going on, the stimulus of extubation, suction of the pharynx, movement off the table was sufficient to keep the

afferent input to the central nervous system high enough to maintain respiration which so much depends upon nervous traffic in the brain stem. When the patient was "safely" in bed this nervous traffic declined and respiration failed. Once curarisation began to be investigated by estimation of neuromuscular conduction with electrical stimulation of nerves we found that while a twitch could be elicited in a partially curarised patient, a tetanus could not be sustained and muscle power would rapidly fade, this being a fatigue phenomenon. Obviously a tongue falling back in a still curarised patient causes respiratory obstruction which calls for sustained tetanic contraction of the respiratory muscles and quickly results in complete neuromuscular conduction failure. This, however, is still not the complete story because in more recent years a further explanation has been elucidated. Dr E. J. M. Campbell, John Norman and myself and others were curious about the sensation of breathlessness. It was our view that principally this sensation arises from length-tension inappropriateness of respiratory muscle. Certainly it had many times been shown that lung volume is a much more important determinant of the urge to breathe than is a rise of the arterial carbon dioxide tension. We set up a series of experiments in volunteers from the experimental team, giving d-tubocurarine in 3 mg increments until almost full curarisation was achieved. One arm was excluded from circulation by a sphygmomanometer cuff for a few minutes after each dose so that the subject remained able to give pre-arranged hand signals. Basically we were measuring breath-holding time at the resting respiratory level with an open glottis. Oxygen was given from a Boyle's machine throughout the experiment. In the control period the subjects were able to breathe hold for about 45 to 50 seconds. With almost complete curarisation in all subjects the breath holding time multiplied four or five fold. After 42 mg of curare in one subject breath holding time lengthened to 4.7 minutes without distress—the period being cut short by me on the basis of developing hypoxia. The experiments showed clearly that one became breathless because of frustrated response to developing tension in the respiratory muscles and joints. Curare prevents the development of that tension and removes the sensation of breathlessness. There thus was a further explanation to post-operative deaths following the use of curare. The patients were quite unlikely to feel the need to breathe until it was too late. There are therefore at least three excellent reasons for ensuring that there is no residual curarisation and good figures to show what happens if you don't.

Such deaths are now rare but they do still happen where recovery room practices are slack and where the anaesthetist—mostly through pressure of work, does not make sure that full muscle power and ability to sustain a tetanic contraction of muscle has returned.

It was fortunate indeed that I was able to work with such splendid mentors as Tony Pinkerton, E. A. Pask and

John Gillies, and to go to McGill University where I fell in with Harold Griffith and Wesley Bourne in anaesthesia and F. C. MacIntosh and B. D. Burns in Physiology.

McGill was in those days, as now, a bright active centre for anaesthesia with much co-operation between anaesthetists and basic scientists. It seemed to be so much easier to get things done, probably because I was relieved of the large routine work load which I had carried for years.

The campus was rather splendid with a lovely old medical building and I did most of my clinical work at the Royal Victoria Hospital which very closely resembles the Royal Infirmary, Edinburgh.

I thought today to continue in this rather reminiscent theme and to present to you, once more some work on the problem of amnesia and consciousness which so interested me in the 1960s. B. D. Burns of Physiology, Peter Welt who was one of my graduate students and I were interested in the mechanism of anaesthesia although not from the biochemical or electrical points of view. It seemed to us that research into a controllable process which interfered with memory and consciousness could very well reveal something about the mechanisms of these functions.

John Snow for most of his anaesthetics used the "second stage of narcotism," the stage of analgesia with amnesia. In his 1847 book "On the Inhalation of Ether for Surgical Operations" he described it as:

"commonly, however, the use of the knife when the narcotism had not proceeded further than this degree, occasions expressions indicative of pain, which are either not remembered or are recollected as having occurred in a dream."

He made the point that it is not usually necessary to maintain narcotism at a point beyond this during the greater part of the time in protracted operations.

When you give small concentrations of ether or nitrous oxide you can control the depth of narcotism pretty accurately. Brain equilibrium is achieved with nitrous oxide in about ten minutes and it can be given in steps of increasing concentration to achieve a staged effect.

Estimating the changes in the sensory thresholds of touch, superficial pain, hearing, brightness discrimination and proprioception showed that rises of threshold which occurred progressively with increasing concentrations of nitrous oxide correlated very well with the ability to remember events and with one's sense of the passage of time. One could define unconsciousness as that event which occurred when one's internal time clock stopped. It became serially slower with each stepped increase in nitrous oxide concentration. It was possible to deduce that one's sense of the passage of time is dependent upon the input to the central nervous system of significant sensory events and that the reduction in input caused by anaesthetics finally brings this process to a halt.

There is still much room for further investigation into the anaesthetic state. It remains a great challenge to all anaesthetists and is a challenge which is understood by non-anaesthetists both medical and lay.

I have today provided you with some of my personal answers to the challenge of anaesthesia. It has been a great pleasure to have such an attentive audience.

Reference: The Beecher & Todd Report. Ann. Surg., 1954. 140. 2-34.

GUEST LECTURE

Prof. BERNARD WOLFSON

ACUTE AND CHRONIC ALCOHOL ABUSE



Anaesthetic management in the patient requiring emergency surgery may be complicated by recent alcohol intake, chronic alcohol intake or the combination of both. The most common reason for surgery in the acutely intoxicated patient is trauma, often multiple.

Alcohol is distributed throughout body water and the level attained, therefore, is related not only to the amount ingested but also to body weight. For any given dose this level is higher in the female who has proportionately less body water than her male counterpart. Consumption of 35 grams (50 ml) of absolute alcohol in one hour will lead to blood levels of approximately 100 mg% in a 70 kg male and 130 mg% in a 60 kg female. Twelve ounces of beer contain about 15 grams of alcohol and the average cocktail (1½ ounces of 80 proof spirit) contains 13 grams. Thus three cocktails or three 12 ounce cans of beer may produce in excess of 100 mg% blood alcohol, a common definition of "drunk."

For practical purposes, the elimination of alcohol may be assumed to follow zero order kinetics. In the nontolerant individual elimination is at the rate of approximately 100 mg/kg/hr, 7 grams (10cc) of absolute alcohol (20cc of 100 proof spirits) per hour in the 70 kg patient. In terms of blood alcohol this means an approximate decline of 15 mg% per hour.

ACUTE INTOXICATION— WITHOUT CHRONIC USE

The problems here relate only to the acute affects of alcohol, which include:

A: Myocardial and respiratory depression:

In the untreated subject the LD-50 for alcohol is 400-500 mg% (A fatality has been reported with a level of 260 mg% and a survivor with a level of 780 mg%). Death is generally due to respiratory failure. Death due to cardiac failure, however, may occur even during adequate controlled ventilation. Although the patient commonly presents with hypertension and tachycardia, impaired myocardial contractility has been demonstrated with relatively low alcohol levels (less than 100 mg%). The following facts have been demonstrated experimentally:

- i. In intoxicating dosage, alcohol reduces the amount of halothane necessary to produce anaesthesia to a greater extent than it reduces the amount necessary to produce cardiovascular or respiratory failure. However, both latter values are also markedly reduced.
- ii. During concomitant alcohol intoxication the difference between the concentration of halothane producing respiratory failure and that producing cardiac failure is less than in the sober animal.
- iii. The ability of alcohol to reduce the anaesthetic requirements of isoflurane does not vary in proportion to the dose of alcohol; in the lower dose range alcohol may have very little anaesthetic effect.
- iv. The lethal dose of thiopentone is greatly reduced by intoxicating levels of alcohol.
- v. Alcohol is a potent respiratory depressant which may enhance similar narcotic induced depression.

B. Delayed gastric emptying and increased gastric acidity:

The gastric acidity is probably due to direct alcohol induced increase in antral gastrin secretion and the importance of these side effects is obvious.

C. Peripheral Vascular Effects:

Alcohol's peripheral effects may vary with dosage and with the vascular bed. Its vasodilator effect on skin vessels may increase heat loss, especially in air-conditioned operating rooms. Splanchnic dilation may contribute to relative hypovolaemia and hypotension. Such relative hypovolaemia will be intensified by the

diuresis associated with a rising blood alcohol concentration as well as by nausea and vomiting. The latter results from direct gastric irritation and central vomiting centre stimulation. The peripheral dilatation may also interfere with the vasoconstrictive response to blood loss or surgical stress.

D. Hypoglycemia:

Although more common in the chronic alcohol abuser this can be seen in the recovery period following an acute binge and may have serious consequences if unrecognised.

SUGGESTIONS FOR ANAESTHETIC MANAGEMENT

- 1 Treat all patients as having a full stomach with contents which are probably acid in nature. Regional anaesthesia is attractive but may be unsuitable in the uncooperative patient. When applicable, remember that any concomitant sedation will be additive to the depressant effects of alcohol. If major regional anaesthesia, e.g. spinal is used, be prepared for the additive effects of sympathetic blockade on pre-existent relative hypovolemia.
- 2 Exercise extreme care with rapidly acting intravenous agents such as thiopentone. Even the rambunctious patient should be considered to be partly anaesthetised and it must be remembered that rapidity of onset of thiopentone action applies equally to cardiac and anaesthetic effects; the effects of cerebral hypoxia may be intensified during alcoholic intoxication.
- 3 Avoid preconceived ideas; inhalation agents should be titrated carefully according to patient response, particularly cardiovascular response. Remember the reduced margin between cardiovascular and respiratory depression. When converting spontaneous to controlled ventilation the inhaled concentration should be reduced to compensate for a potentially catastrophic increase in anaesthetic uptake.
- 4 Narcotic supplementation of nitrous oxide may eliminate or reduce the need for potent inhalation agents but enhances the potential for respiratory depression in the postoperative period.
- 5 The use of muscle relaxants and controlled ventilation even where not indicated by the surgery may permit the anaesthetist to "buy time" for safer titration.
- 6 The possibility of aspiration of gastric contents before as well as during induction should be borne in mind and respiratory problems developing during surgery treated aggressively. Use blood gas analysis liberally to help with both diagnosis and treatment.

If the above guidelines are employed, moderate alcoholic intoxication should not in itself add to the risk of anaesthetic mortality or add to the problem associated with the condition requiring surgical intervention. An

important corollary is that problems without immediate apparent reasons should not be attributed to alcohol until other aetiologies, are ruled out.

CHRONIC ALCOHOL INTAKE

Anaesthetic management in the chronic alcohol user must take the following factors into account:

A. Tolerance:

It is commonly accepted that chronic drinkers develop tolerance to alcohol and cross-tolerance to both sedatives and general anaesthetic agents. The few studies available appear to offer some confirmation of this folklore. Increase in the MAC for halothane has been demonstrated in a small number of chronic alcoholics and a few studies have reported increased requirements for thiopentone, halothane and fentanyl, and increased likelihood of awareness and less than satisfactory anaesthesia. More important than the development of tolerance to the anaesthetic effect of alcohol and related drugs is the relationship between this tolerance and the tolerance, if any, to the respiratory and cardiovascular effect of these drugs.

In one animal study chronic alcohol intake was shown to produce partial tolerance to its own anaesthetic effects, complete tolerance to respiratory depressant and partial tolerance to cardiovascular depressant effects. The same study demonstrated cross-tolerance to the anaesthetic effects of halothane but *no such cross-tolerance to the respiratory or cardiovascular depressant effects of the anaesthetic agent*. It would be unwise to extrapolate these findings directly to man but assumption of the following broad guidelines will err on the side of safety.

- i. An intoxicated patient requires less anaesthesia than a sober patient. However, because of different degrees of tolerance and different levels of intoxication this relationship must be considered to have wide latitude.
- ii. Due to the cross-tolerance a sober chronic drinker will *probably* require more anaesthesia than his naive counterpart. However, the absence of similar cross-tolerance to the respiratory and cardiac depressant effect of inhalation agents may reduce their margin of safety.
- iii. An intoxicated chronic drinker will *probably* require more anaesthesia than his naive counterpart with a similar blood alcohol level. He will also *probably* be more tolerant to the respiratory and cardiovascular depressant effects of alcohol but will still be more sensitive to the cardiac depressant effects of inhalation agents than he would be if sober. Thus the margin of safety of these agents is once again reduced.

Where alcohol induced myocardial damage already exists, tolerance to further alcohol induced depression cannot be assumed and indeed in such patients increased

sensitivity may be seen. Finally, lethal levels of alcohol may not be modified by the development of tolerance.

The mechanism of tolerance is not known, It is presumably mainly a tissue level phenomenon but is probably also related to increased rate of elimination due to alcohol induced enzyme induction—non-specific P450 group for some drugs and MEOS (microsomal ethanol oxidising system) for alcohol itself.

B. Alcohol Induced Organ Damage

1. Cardiovascular System

Chronic alcohol abuse may produce both hypertension and/or myocardial damage. Two distinct types of cardiac failure occur. Beriberi, a nutritional disease induced by a thiamine deficiency is associated with high output failure. More commonly, direct alcohol induced myocardial damage produces low output failure. This extreme degree of myocardial impairment is rare following less than five to eight years of a daily intake of at least eight ounces of spirits although usually even longer and greater abuse is required. Smaller consumption may be associated with lesser degrees of damage which may be asymptomatic or produce such non-specific effects as palpitations, conduction defects and arrhythmias. Sympathetic neuropathy can interfere with cardiovascular responsiveness. Treatment in the emergency situation is symptomatic and may include the use of long and short acting inotropes and antiarrhythmics.

2. Respiratory Systems

Almost all heavy alcohol users are also heavy smokers with all the potential for pulmonary problems that this provides. Alcohol itself can produce mild obstructive disease, ventilation perfusion mismatching and impairment of diffusion. Interference with both ciliary action and phagocytosis may render the patient more susceptible to infection. Cirrhosis of the liver is associated with right to left shunting which in extreme cases may account for 30 per cent of the cardiac output.

3. Liver

Eighty-five to 90% of alcohol intake is metabolised in the liver. Fatty infiltration may be seen following one "good binge." However significant liver dysfunction usually requires years of abuse. Potential effects of interest to the anaesthetist include:

i. Alteration in drug effects.

The duration of effect of many drugs, especially sedatives, may be reduced due to alcohol produced enzyme induction. Clinically, this is most marked in the sober chronic alcohol user because it complements alcohol induced tolerance. In the presence of alcohol, however, enzyme activity may be inhibited. As liver damage progresses, especially in the presence of overt cirrhosis, drug metabolism may be impaired, thus prolonging

activity. Pancuronium which is in part broken down and eliminated via the liver has prolonged elimination half life in patients with cirrhosis. Paradoxically an increase in the volume of distribution for this drug in such patients can necessitate initially larger dosage. Reduced levels of plasma pseudocholinesterase could theoretically lead to prolongation of succinylcholine effect. Clinically this is unlikely to be of serious moment unless liver impairment is very severe or there is coincident atypical enzyme activity. Markedly reduced levels of serum albumin (less than 3.0 grams/ml) suggests serious liver dysfunction. Clinically, reduced protein binding leads to increased bioavailability of drugs such as thiopentone, a potentially serious hazard. D-tubocurarine, on the other hand, was thought to be bound mainly by serum globulins, which may be increased. This was proposed as a partial explanation for increased requirements of D-tubocurarine sometimes seen in cirrhotic patients although recent studies do not support this assumption.

ii. Coagulopathies

Liver disease, of whatever aetiology, may be associated with impairment of clotting mechanisms. Diagnosis of the exact mechanism of coagulopathy is complicated and beyond the scope of this lecture. However, it may be noted that an increased prothrombin time which does not respond to administration of vitamin K may indicate severe liver dysfunction.

iii. Impaired Gluconeogenesis

The metabolism of large quantities of alcohol in the liver alters the reduction-oxidation (redox) state in the liver. This in turn inhibits the ability of the liver to convert protein to glucose which may lead to hypoglycaemia especially in the undernourished glycogen depleted chronic alcoholic. The hypoglycaemia may manifest itself up to 30 hours after the period of acute intoxication. Insulin dependent diabetic patients are especially at risk.

iv. Portal Hypertension

Oesophageal varices and ascites, the latter enhanced by hypoproteinaemia are the most dramatic manifestations of this complication.

v. Alcohol Hepatitis

This is an acute and serious disease with a 10 to 50 percent mortality and a clinical picture similar to viral hepatitis.

vi. Hepatic Encephalopathy

This is associated with severe liver dysfunction and covers a wide spectrum of symptomatology from subtle decreases in intellectual performance through impaired consciousness to coma. There are often nonspecific increased blood ammonia levels and highly suggestive electroencephalogram changes. Of particular interest is its occasional precipitation in

previously alert cirrhotics by sedatives or tranquilisers and its similar precipitation by gastrointestinal bleeding possibly due to the resulting increase in blood ammonia levels.

C. Nutritional, Fluid and Electrolyte Anomalies.

Nutritional disorders are common, either due to improper diet or alcohol induced impaired absorption. Vitamin deficiencies, especially thiamine, are of particular importance. Because of the well known diuretic effect of alcohol the user is commonly thought to be dehydrated. This diuresis is associated only with rising blood alcohol levels and the chronic drinker is in fact often overhydrated. Electrolyte and fluid abnormalities may be induced by alcohol induced vomiting or by large fluid intake following cessation of alcohol. In addition, during acute withdrawal there is commonly marked hypokalemia and hypomagnesemia both with arrhythmic potential.

D. Withdrawal Syndrome

Consumers of large quantities of alcohol over long or on occasion even relatively short periods of time may develop withdrawal symptoms. In general the severity of the symptoms are related to the dose ingested but this is not always the case.

For convenience withdrawal symptomatology can be separated into four stages. However, these stages represent a progression and overlapping of time frames is common. Each stage does not necessarily occur in every patient.

Stage one usually commences within approximately six hours after reduction of intake and may occur in the presence of measurable blood alcohol levels. Symptoms include tremor, anxiety, tachycardia and mild hypertension. These symptoms may resolve or merge into the second stage which commonly begins within twenty-four hours after intake reduction. The hallmark of this stage is hallucinations, commonly auditory but often mixed. Autonomic hyperactivity may be greater than in stage one. Onset of this second stage is sometimes delayed for several days and may also last for several days if untreated. Stage three is characterised by convulsions (rum fits). Most of these occur within seven to forty-eight hours after cessation of alcohol intake and thus may overlap stage two. The seizures may be single or multiple. They are usually of short duration and cover a short span of time, less than six hours. Longer or more frequent seizures over a more prolonged period or status epilepticus should suggest some intracranial pathology or the concomitant use of drugs such as barbiturates. It has been theorised that rum fits are related to hyperventilation and hypomagnesemia. The fourth and most serious withdrawal syndrome is delirium tremens. For unknown reasons, even in the absence of treatment only a small minority of abusers progress to this final and still potentially fatal

stage of withdrawal. Onset is commonly three to five days after withdrawal but may be delayed even longer. There may be a lucid interval of between twelve hours and five days between stages three and four. Symptomatology consists of marked autonomic hyperactivity, extreme restlessness, global confusion and hallucinations. Further seizures are very rare in this stage and again should point to other aetiologies. Resolution usually takes place within three days but there is still an appreciable mortality rate. Once established DTs are not reversed by therapy, which at best may be considered a holding action until the condition plays itself out.

SUGGESTIONS FOR ANAESTHETIC MANAGEMENT

There is no consensus. The following is predicted on the past experience and personal biases of the author. The factors with the most common impact on management are acute alcohol intake and tolerance. The factors with the most potentially serious impact are cardiac damage, liver damage and withdrawal symptomatology. Helpful in the evaluation and management are; a) history of the extent of acute chronic alcohol intake (preferably from friends or relatives), b) blood alcohol level, c) PT and serum albumin as possible indicators of liver damage—enzyme studies are of little value in assessing chronic liver damage, although marked elevation may be present in alcohol hepatitis, d) ECG changes or a history of cardiac problems, especially in younger patients, e) electrolyte measurements.

Acute alcohol intake preempts other considerations. Exercise particular vigilance during the use of inhalation agents as the development of differential tolerances and cross-tolerances may reduce the margin of safety and patients with myocardial involvement may be especially susceptible to their depressant effects. Guard against hypoglycaemia, as this is the group most prone to this complication.

Monitoring

The apparently healthy chronic drinker needs only monitoring appropriate to the surgery. The chronic cirrhotic requires an arterial catheter and frequent blood gas monitoring because of a potentially precarious pulmonary status. Serious myocardial involvement warrants the use of a pulmonary artery catheter. A peripheral nerve stimulator is advisable.

Induction

In the absence of intoxication anticipate the possibility of increased induction requirements of thiopentone and be certain the patient is asleep before administering muscle relaxant. Because of the possibility of myocardial involvement, and/or reduced protein binding, titrate to this end point rather than use a precalculated bolus. Consider the empirical use of diazepam either prior to or in place of thiopentone.

Maintenance

Cardiomyopathy, when present, becomes the prime determinant of management and choice of agents may vary from minute to minute. There is no convincing evidence that any of the modern inhalation agents are hepatotoxic even in the presence of preexisting liver disease. Nevertheless current concepts of the aetiology of "Halothane Hepatitis" suggest a preference for the less metabolised, medicolegally unsullied, newer agents such as isoflurane. The judicious addition of modest doses of a short acting narcotic (fentanyl) reduces the requirements of inhalation agent and may increase the margin of safety of the latter. This type of combination anaesthesia may also serve to smooth out the "roller coaster" anaesthesia not uncommonly seen where more "purist" techniques (either narcotic or inhalation) are used. Although impaired liver function may delay metabolism and increase duration of effect of narcotic there is no clear evidence that the narcotic produces further liver damage. However, morphine has been implicated, as a precipitating factor of hepatic encephalopathy. Therefore, where severe liver disease is suspected or known to exist or where another precipitating factor such as gastrointestinal bleeding is present use narcotics and indeed all sedatives with caution.

Because of factors already described muscle relaxant effects are unpredictable. Use whatever relaxant thought necessary but monitor neuromuscular transmission with a nerve stimulator. Continue mechanical ventilation, should reversal of neuromuscular blockade prove unsatisfactory. Unless there are specific indications to the contrary, e.g. increased intracranial pressure, attempt to keep PO₂, PCO₂ and blood pressure in the normal range in an effort to maintain liver blood flow. All chronic alcohol abusers should receive multiple vitamin therapy including thiamine. The latter is particularly important in the severely undernourished alcoholic as the metabolism of carbohydrates utilises thiamine and the administration of glucose alone in such a patient may precipitate CNS complications.

The use of regional anaesthesia may avoid many of the unpredictable problems seen with general anaesthetic techniques in this group of patients and may be particularly useful for peripheral surgery. The presence of peripheral neuropathy does not necessarily contraindicate such techniques but when present should be well documented prior to institution of regional anaesthesia.

Alcohol abusers are not immune to any of the complications seen in other patients. When these have been eliminated more specific alcohol related factors should be investigated, e.g.

- a. Hypomagnesaemia in addition to other electrolyte abnormalities as a cause of arrhythmias,

- b. Sympathetic neuropathy as a cause of hypotension,
- c. Liver dysfunction induced coagulopathies as a cause of bleeding,
- d. Alcohol withdrawal as a cause of autonomic hyperactivity and pyrexia.

It cannot be overstressed that these are secondary diagnoses. Therapy for these problems consist of

- a. I.V. magnesium sulphate (200 mg. bolus, 2G/6 hours),
- b. Fluid administration and possibly sympathetic agonists.
- c. Fresh frozen plasma, vitamin K and platelet administration.
- d. I.V. diazepam (2.5-5 mg. increments at 5 minute intervals). If diazepam is unsuccessful then consider the use of 5% alcohol in 5% dextrose (200 ml/hour).

Withdrawal

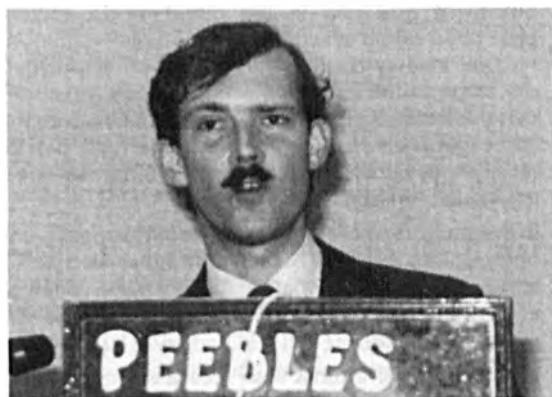
The anaesthetist is unlikely to be the primary physician in the treatment of alcohol withdrawal. However, in the emergency situation he may be implicated acutely, before or during surgery or more probably in the recovery room. The symptomatology has already been described. The main aim of initial therapy is to alleviate early symptoms (tremor, anxiety, disorientation, tachycardia etc.) and avoid progression to convulsions or delirium tremens. It is essential that other causes of similar symptomatology, especially hypoxia and drug effects be eliminated during establishment of the diagnosis. The main-stays of therapy are sedation and good nonjudgemental nursing care. The most common drugs used in the United States are the benzodiazepines, diazepam and chlordiazepoxide. Most anaesthetists are familiar with the former. The use of I.V. alcohol is controversial. Pragmatically the anaesthetist may elect to use it as described above as an acute short term measure early in the withdrawal stage or prophylactically in the chronic drinker who is not severely ill and has no intentions of withdrawing from his habit. It is probably of no value once the stage of DT's has been reached. Propranolol (Inderal) may be of value to reduce tremor and alleviate tachycardia. However, it will not stop the progression of withdrawal symptomatology and if used should only be a part of a broader scheme of sedative therapy and should not be permitted to induce a false sense of security. Convulsions are best treated with diazepam in 2.5-5 mg. increments. The possibility of diazepam induced apnea should be remembered. For reasons already described fluid and electrolytes must be carefully monitored and imbalance corrected.

REGISTRAR'S PRIZE

EFFECT OF POSTOPERATIVE ANALGESIA WITH EPIDURAL BLOCKADE OR INTRAVENOUS DIAMORPHINE ON CALF BLOOD FLOW

Assessment using strain gauge venous occlusion plethysmography

Dr GEOFFREY BOWLER



Patients undergoing gynaecological surgery, especially those with malignancy, form a high-risk group for the development of deep venous thrombosis (D.V.T.) and pulmonary embolus (P.E.). The aim of this study was to provide a within patient comparison to assess the changes in calf blood flow and vein capacity following epidural blockade (E.D.B.) in a pain-free state and when given on the day after lower abdominal surgery for analgesia, and following optimal analgesia with intravenous diamorphine.

METHOD

Patients

Seven female patients scheduled on a morning operating list for elective total abdominal hysterectomy or uterine myomectomy for benign disease were studied after approval for the study had been given by the anaesthetic ethical committee, and verbal informed consent had been obtained from each patient. Their mean age was 36.7 years, range 28-43 years, mean weight 64.4 kg, range 43.2-89.1 kg and mean height 163 cm, range 156-173 cm.

Anaesthetic technique

Premedication was an intramuscular injection of diamorphine 5 mg and atropine 0.6 mg, given one hour before transfer to the anaesthetic room. A catheter was passed into the epidural space at the T11/12 interspace. Ten ml of 0.5% bupivacaine was injected over 60 s. At the completion of venous occlusion plethysmography (V.O.P.) of the calves general anaesthesia was induced with thiopentone and maintained by nitrous oxide and halothane 0.5% delivered through a face mask with spontaneous ventilation. Incremental doses of 0.5% bupivacaine were administered as necessary.

Postoperative analgesia was provided by a continuous infusion of 0.1%-0.125% bupivacaine delivered at 15-20 ml/hour until 8.30 a.m. on the first postoperative morning. Intramuscular diamorphine 5 mg PRN was also prescribed. The last doses administered was at 6 a.m. on the first postoperative morning and the mean dosage was 1.7 injections, range 0-4.

When pain was experienced, an epidural injection of 10 ml of 0.5% bupivacaine over 60s, which resulted in good analgesia, was given, accompanied by VOP. On return of pain later that morning, complete analgesia was achieved using intravenous diamorphine: an initial dose of 5 mg was given, followed by 1 mg every 2 minutes until the patient stated to direct questioning that she felt no pain. The mean dose requirement was 8.6 mg, range 6-10 mg. VOP also accompanied this injection.

Venous occlusion plethysmography

Strain gauge venous occlusion plethysmography of the calves (Whitney, 1953) was performed on each patient on four occasions, recording arterial inflow. Series of measurements were made before and 10, 20 and 30 minutes after the start of injection. The four series were:

- i—Pre-operative epidural. In the anaesthetic room immediately before and for 30 minutes after injection of bupivacaine.

- ii—Postoperative analgesic epidural. Immediately before and for 30 minutes after the epidural injection of bupivacaine.

- iii—Diamorphine. Immediately before and for 30 minutes after the intravenous injection of diamorphine.

- iv—Control. The timings were identical to the other series, though no injection was made.

A Medimatic SP2 machine was used, with automatic cuff inflation and deflation by a Flowmatic device (medimatic, Hellerup, Denmark). The mean arterial pressure in the right brachial artery was measured at 5 minute intervals using a Critikon Dinamap 845 machine. The room temperature was recorded at the beginning and end of each run from an alcohol-filled liquid expansion thermometer.

On the first application, the position of the strain gauges was marked and the method of application standardised so that their position in the coronal plane and the position of the overlap of the ends was identical in subsequent measurement periods.

The flow and volume measurements were made from the chart recordings by a second observer blind to the

treatments. Mean values were compared to the control value at the corresponding time by paired t-tests with a Bonferroni correction.

RESULTS

Calf arterial flow

The values described are the mean of the values for the left and right legs. The value of arterial flow for each leg was the mean of 3-5 slopes.

The raw values obtained are given in table 1. Figure 1 shows the percentage changes, where the mean value at the start of the control run ("first control" value) is 100%. The "first control" value was 3.4 ml/100 ml/min, range 1.8-5.9 ml/100 ml/min.

After the pre-operative epidural injection of bupivacaine, arterial flow increased from a value of 160% of "first control" to 283% 30 min after the injection. The differences between the values at 10, 20 and 30 minutes were highly significant when compared to the control values at the corresponding time.

Postoperatively, the mean arterial flow increased from 123% to 191% of "first control" with epidural analgesia. Compared to the control values, the flow was significantly higher 20 and 30 minutes after injection.

With intravenous diamorphine, the flow did not change significantly from 120% of "first control."

Heart rate and mean arterial pressure

The mean percentage changes of MAP, heart rate and calf arterial flow are shown in figure 1.

DISCUSSION

The use of spinal or epidural blockade (EDB) reduces the incidence of DVT and PE in patients after elective and emergency hip surgery compared to the incidence after an anaesthetic technique employing controlled ventilation followed by parenteral opioids "as required" for postoperative analgesia (Davis, Quince and Laurenson, 1980; Modig, et al., 1980, 1981, 1983; Thorburn, Loudon and Vallance, 1980). Of the three aetiological factors in the formation of thrombus described by Virchow in 1856, blood flow and blood coagulability may be affected by EDB.

EDB increases deep venous flow velocity (Poikolainen and Hendolin, 1983). By increasing volume flow rate (Cousins and Wright, 1971; Modig, 1980) into the legs, flow through the common pathway of the proximal deep veins, namely the popliteal, femoral and external iliac veins, is increased. It is the presence of DVTs proximal to the calf that gives rise to a serious risk of PE. Blood coagulability may be reduced, fibrinolysis increased and leucocyte invasion of damaged venous endothelium decreased by local anaesthetic drugs (Modig et al., 1983). Indirect effects of EDB involved in the reduction of the incidence of DVT formation may include a reduced requirement for blood transfusion (Moir, 1968; Gray and Mackie, 1983; Modig et al., 1983).

Previous studies have investigated leg blood flow in patients undergoing hip surgery, a high risk group for DVT and PE. No studies in leg blood flow appear to have been undertaken in patients undergoing gynaecological surgery. Furthermore, the postoperative measurements of blood flow were made only three hours after surgery, and no comment was made of the quality of analgesia in the opioid group. Patients prescribed opioid analgesia "as required" commonly receive inadequate dosage. As reflex sympathetic discharge to the lower limbs and adrenal catecholamine secretion may result from painful afferent input into central nervous system, central interruption of the reflex arc by opioids may have been sub-optimal due to inadequate dosage.

In this study, diamorphine was given intravenously until optimal analgesia was obtained and the effect on leg blood flow was compared to that seen after an analgesic dose of 0.5% bupivacaine, on the day following surgery.

The increase of arterial flow seen after institution of EDB pre-operatively is similar to that in Modig's study (1980), as is the lack of change seen in venous capacity and MVO. The calf arterial flow following the pain-relieving postoperative EDB was less than that achieved by the pre-operative EDB, although the changes in MAP were similar. Thus reduction in overall sympathetic efferent activity, as reflected by MAP, may have been similar but the predilection for the lower limb sympathetic efferents was relatively less. Tachyphylaxis may account for this.

While diamorphine provided excellent analgesia with a small decrease in MAP probably reflecting decreased sympathetic activity and a direct vasodilatory effect, there was no increase in the lower limb blood flow.

A recent editorial (Salzman, 1983) has highlighted the lack of success and adverse effects of treatments such as mini-heparin, warfarin, dextran and aspirin in preventing deep venous thrombosis in patients in high risk groups including pelvic surgery for malignant disease. In these patients, the incidence of DVT is around 40% and of fatal PE 1-5% (Salzman, 1983) where DVT is sought using venography or 125I-fibrinogen scanning. Remarkably, no mention was made in Salzman's editorial of the potential role of anaesthetic technique in prophylaxis against DVT and PE.

While the rate of the rise in mortality from venous thrombosis and pulmonary embolism following general surgery appears to be decreasing in Scotland (Ruckley and Thurston, 1982) and England and Wales (Butler et al., 1983), it has been estimated that potentially preventable thrombo-embolism may result in 5,000 to 10,000 deaths per year in England and Wales (Morris and Mitchell, 1978). The choice of an appropriate anaesthetic technique may contribute to a

further decline in this mortality in patients with a high risk of PE. The EDB-induced increase in leg blood flow seen after gynaecological surgery and demonstrated in this study may have an important role in DVT prophylaxis. A prospective controlled study is required to assess whether EDB used for operation and post-operative analgesia reduces the incidence of DVT and PE following gynaecological cancer surgery compared to other anaesthetic techniques.

ACKNOWLEDGEMENT

I wish to thank Mr Michael Lamont, B.Sc., for performing the measurements on the chart recordings, and Miss Denise Fagan, B.Sc., for help with the computer data storage and programming for SPSS.

REFERENCES

Butler C.M., Cotton L.T., Roberts, V.C. (1983). Mortality trends from venous thrombosis and embolism in England and Wales. *Lancet*, 2, 1314.

Cousins, M.J., Wright, C.J. (1971). Graft, Muscle, skin blood flow after epidural block in vascular surgical procedures. *Surgery, Gynaecology & Obstetrics*, 133, 59-64.

Davis, F.M., Quince, M. Laurensen, V.G. (1980). Deep vein thrombosis and anaesthetic technique in emergency hip surgery. *British Medical Journal*, 281, 1528-1529.

Modig, J. Malmberg, P., Karlstrom, G. (1980). Effect of epidural versus general anaesthesia on calf blood flow. *Acta Anaesthesiologica Scandinavica*, 24, 305-309.

Modig, J., Hjelmstedt, A. Sahlstedt, B., Maripuu, E. (1981). Comparative influences of epidural and general

anaesthesia on deep venous thrombosis and pulmonary embolism after total hip replacement. *Acta Chirurgica Scandinavica*, 147, 125-130.

Modig, J., Borg, T., Bagge, L., Saldeen, T. (1983). Role of extradural and of general anaesthesia in fibrinolysis and coagulation after total hip replacement. *British Journal of Anaesthesia*, 55, 625-629.

Moir, D.D. (1968). Blood loss during major vaginal surgery. *British Journal of Anaesthesia*, 40, 233-240.

Morris, G.K., Mitchell, J.R.A. (1978). Clinical management of venous thromboembolism. *British Medical Bulletin*, 34, 169-175.

Poikolainen, E., Hendolin, H. (1983). Effects of lumbar epidural analgesia and general anaesthesia on flow velocity in the femoral vein and postoperative deep vein thrombosis. *Acta Chirurgica Scandinavica*, 149, 361-364.

Ruckley, C.V., Thurston, C. (1982). Pulmonary embolism in surgical patients: 1959-79. *British Medical Journal*, 284, 1100-1102.

Salzman, E.W. (1983). Progress in preventing venous thromboembolism. *New England Journal of Medicine*, 309, 980-982.

Thorburn, J., Loudon, J. R., Vallance, R. (1980). Spinal and general anaesthesia in total hip replacement: frequency of deep vein thrombosis. *British Journal of Anaesthesia*, 52, 1117-1121.

Whitney, R. J. (1953). The measurement of volume changes in human limbs. *Journal of Physiology*, 121, 1-27.

	Before Injection	After injection		
		10 min	20 min	30 min
Control (no injection)	3.4 (0.58)	3.1 (0.55)	3.0 (0.56)	3.0 (0.72)
Pre-operative EDB	4.6 (0.50)	7.4** (0.65)	8.2** (0.58)	8.3** (0.53)
Postoperative EDB	3.6 (0.40)	4.6 (0.37)	5.2* (0.36)	5.4* (0.34)
IV Diamorphine	4.0 (0.80)	3.9 (0.69)	3.9 (0.65)	3.7 (0.66)

mean (s.e.m.)
(ml/100 ml/min)

Table 1. Calf arterial flow with EDB or IV diamorphine. Comparisons using student's paired t-test with Bonferroni correction are made with the control value. **P<0.01 and *P<0.05.

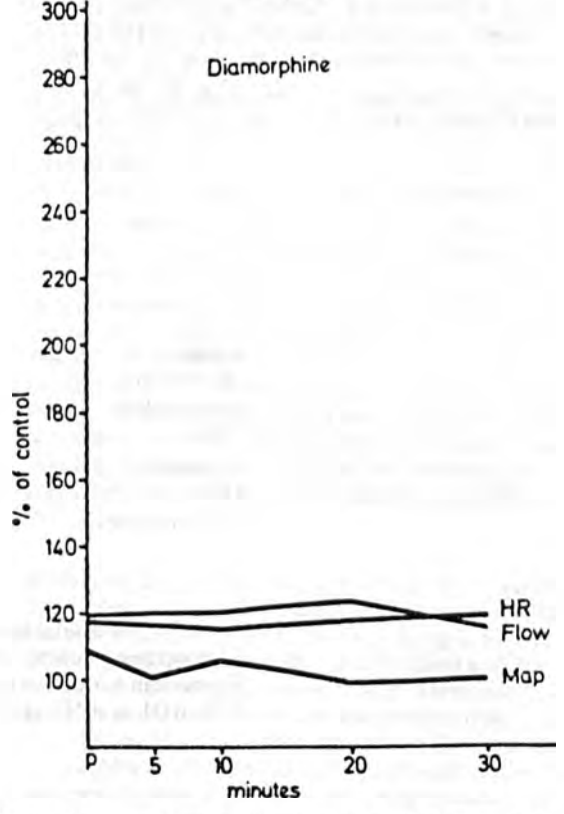
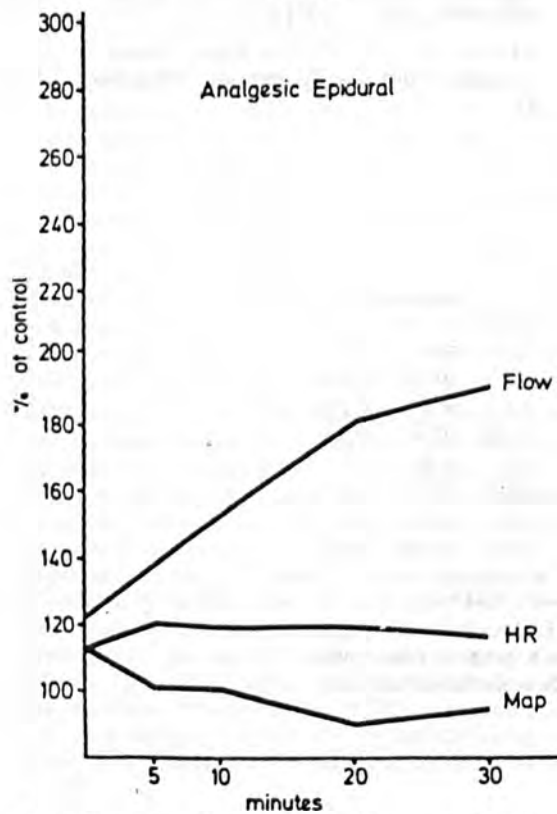
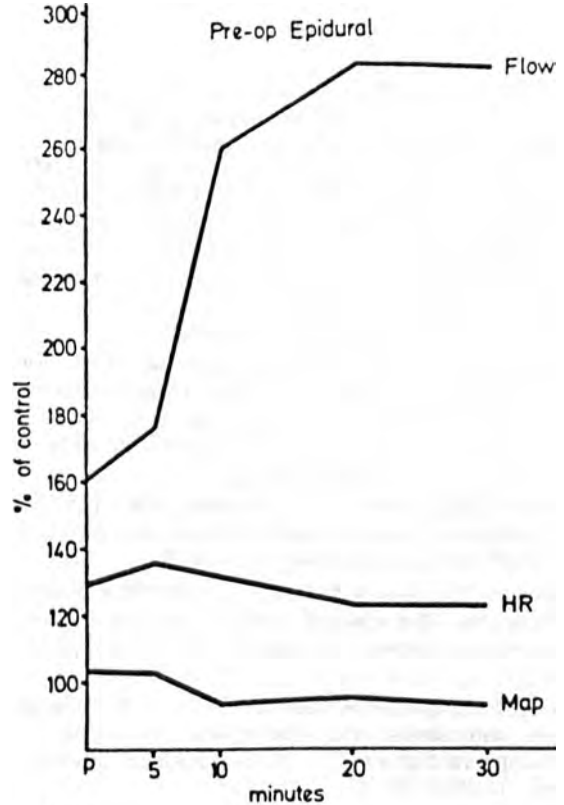
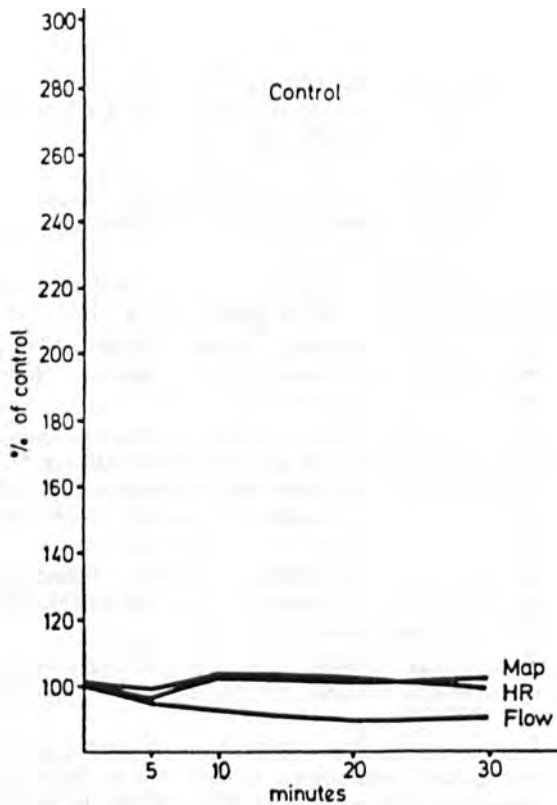


Fig. 1. Percentage values of calf arterial flow, mean arterial pressure (Map) and heart rate (HR). The first control value is 100%. p = before injection value.

REGISTRAR'S MEETING

ROYAL INFIRMARY, GLASGOW, JUNE 7th, 1985

This year's meeting was held in the Teaching Suite in Phase 1 of the new Royal Infirmary. The facilities allowed the whole meeting to take place in one area, at the same time combining compactness with sufficient space for a relaxed atmosphere. Sixty three registrars from all over Scotland enjoyed a full day of lectures and demonstrations. For the first time abstracts of the lectures are printed in the Newsletter and I would like to thank Dr A. B. M. Telfer for making this possible by

encouraging the lecturers to provide abstracts, and for providing photographs of the meeting.

The demonstration showed a continuous positive airway pressure system, a mobile cardiac arrest trolley, equipment for patient controlled analgesia and a trolley for transferring intensive care patients.

Dr J. P. Vance and his colleagues at the Royal Infirmary are to be congratulated on a most successful meeting.

KETAMINE—A RATIONAL APPROACH

Dr ROBERT M. REEKIE

Ketamine was developed as an intravenous anaesthetic agent in 1962, and was first tested in humans in 1964. Clinical evaluation (1) showed that it provided good surgical anaesthesia, with relative maintenance of pharyngeal and laryngeal reflexes. However, psychotomimetic effects or emergence reactions are common.

Shortly after its introduction into clinical practice, analgesia was reported to persist into recovery from Ketamine anaesthesia (2), and interest has been shown in the use of ketamine as a post-operative analgesic. This analgesic activity has been variously attributed to blockade of spinoreticular tracts, suppression of certain spinal cord laminae, and specific binding to opiate receptors. Ketamine has been utilised, by infusion, for post-operative analgesia, but with limited success (3) (4). Infusion rates were determined empirically and, although satisfactory analgesia was obtained, 50-80% of subjects experienced severe dreaming, and increases in systolic blood pressure. Heavy sedation was also noted.

Clements and Nimmo (5) showed that Ketamine behaves according to a two compartment open model, with a relatively short distribution half-life ($T_{1/2\alpha}$) of 17 minutes, and a longer elimination half-life ($T_{1/2\beta}$) of 186 minutes. Pharmacokinetic parameters were defined, and a threshold for analgesia noted at a plasma concentration of 100 ng/ml of Ketamine. At higher plasma concentrations of 640 to 1120 ng/ml, sedation and side-effects occur. Therefore, in order to achieve analgesia without serious side-effects, a constant plasma concentration of 150 ng/ml would be ideal. From the pharmacokinetic data, the required loading dose and infusion rate, for Ketamine, are 1 mg/Kg and 2.85 ug/Kg/min, respectively. In the previous studies, infusion rates 6 to 9 times this calculated value were used. This resulted in accumulation of Ketamine, due to the relatively slow elimination of the drug, with plasma concentration rising towards that at which sedation and side-effects occur.

A study is currently in progress at Glasgow Royal Infirmary, to assess the analgesic potential of low dose Ketamine by infusion. Following upper abdominal surgery, patients receive either Ketamine or Morphine, by loading dose and infusion, as previously calculated.

Additional analgesic requirements are met by means of morphine bolus doses from a patient-controlled analgesia system. This then acts as a means of assessing the analgesia obtained from the infusions.

Initial results suggest that, in order to achieve steady-state plasma Ketamine concentrations of 150 ng/ml, infusion rate 4 ug Kg/ml/min is required, and that the analgesic activity of such an infusion is at least equivalent to that of morphine infused at a rate of 2 mg/hr.

This work is still in progress, and the pharmacokinetics have yet to be fully defined. Nevertheless, this approach to the use of Ketamine is more rational than those infusion regimes used previously.

REFERENCES

1. DOMINO, E. F., CHODOFF, P., CORSEN, G. *Clinical Pharmacology and Therapeutics* (1969); 6: 279-291.
2. BOVILL, J. G., DUNDEE, J. W. *British Journal of Anaesthesia* (1971); 43: 496-499.
3. ITO, Y., ICHIYANAGI, K. *Anaesthesia* (1974); 29: 222-229.
4. PANDIT, S. K., KOTHARY, S. P., KUMAR, S. M. *Anaesthesia* (1980); 35: 669-675.
5. CLEMENTS, J. A., NIMMO, W. S. *British Journal of Anaesthesia* (1981); 53: 27-30.

ALTERNATIVES TO OPIOIDS FOR POSTOPERATIVE PAIN RELIEF

Dr HARRY OWEN

After nearly 150 years of painless surgery, patients can still expect much pain after surgery. Whilst much effort has been directed towards new analgesic drugs, little regard has been paid to the better use of drugs (and

techniques) already on the shelf. Three of the four papers that follow address this deficiency, and the fourth paper considers the natural history of a novel compound.

MONITORING NEUROMUSCULAR BLOCKADE

Dr JAMES E. CALDWELL

In routine practice, clinical evaluation and calculated guesswork have guided the use of non-depolarising neuromuscular blocking agents (muscle relaxants). There is evidence that this is unsatisfactory as patients may not have adequate neuromuscular function post-operatively despite the administration of anti-cholinesterase agents. (1) Factors which account for this are the wide individual variation in response to muscle relaxants and the relationship between the effectiveness of anti-cholinesterase agents and the level of neuromuscular blockade which exists when they are given. In particular it is not possible to rapidly antagonise complete blockade. What is required is a monitoring system which permits close control of the level of blockade and which is feasible for routine use. The aim is to provide adequate muscle relaxation for any surgical procedure yet ensure suitable conditions for rapid reliable antagonism at the end of the operation.

The main component of such a system is a simple peripheral nerve stimulator. It should generate constant current impulses of up to 60 mA in a train-of-four (T.O.F.) pattern. The stimuli are most conveniently applied via surface electrodes to the ulnar nerve at the wrist. This causes contraction of the adductor pollicis

brevis muscle and the resultant twitch is best detected by the anaesthetist's finger pulling gently on the thumb. Simply counting the number of twitch responses evoked by a supramaximal T.O.F. sequence permits acceptably objective assessment of the level of neuromuscular blockade. Muscle relaxation is adequate for surgery when there are 1 or 2 responses and conditions for reversal are suitable when there are 3 or 4. A deficiency of the system is that accurate clinical assessment of the T.O.F. ratio is possible. Systems being developed, based on the technique of electromyography and incorporating a response analyser will overcome this problem.

The technique described is safe and simple, properly used it gives useful and reliable clinical information and the equipment is in relative terms inexpensive. It therefore merits routine clinical use.

REFERENCE

1. VIBY-MOGENSEN, J., CHRAEMMER-JORGENSEN, B., ORDING, H. Residual curarisation in the recovery room. *Anaesthesiology* 1979; 50: 539-41.

STIMULATION PRODUCED ANALGESIA

Dr DONALD MACLEAN

Transcutaneous electrical nerve stimulation is a historically ancient technique dating back to the year 300 B.C. Today, more than 200 companies in the U.S.A. manufacture the battery powered stimulators we now use, each with different settings for the frequency, amplitude, pulse width and pulse trains.

Hymes in 1974 was the first to report beneficial effect of T.E.N.S. for post-operative analgesia and this has subsequently been confirmed by several authors.

Although the "gate control theory" of Melzak and Wall may explain the mechanism of T.E.N.S., the stimulation of endorphins has also been postulated.

At the Glasgow Royal Infirmary, a study of 24 males undergoing inguinal herniorrhaphy has been carried out (8 controls). A standardised anaesthetic was given

and T.E.N.S. (80 Hz, 170 μ s pulse width) applied continuously postoperatively for 24 hours.

Analysis of results showed no difference between the T.E.N.S. and control groups for morphine consumption, peak expiratory flow rates, and analogue pain scores measured at 24 hours, i.e. no beneficial effect of T.E.N.S. was noted.

In addition no difference was noted between the two groups for the plasma B-endorphin levels measured pre-operatively and 24 hours post-operatively.

Further research is required into the mechanism of T.E.N.S. and to delineate both the optimal electrical characteristics for stimulation and the patients who will benefit the greatest from this method.

CLINICAL TRIALS OF A NEW ANALGESIC

Dr GRAHAM GILLIES

The initial pre-clinical investigation of analgesic effect of a prospective new drug involves empirical screening tests in animals. These are performed in a variety of pain models and include tests designed to determine the mode of action of the analgesic. Most drugs are rejected at this stage because of lack of efficacy or toxicity. Those that show promise undergo toxicity tests in animals and concurrent studies of pharmacokinetics and metabolism.

When the pre-clinical studies are completed, a research panel decides if the drug should proceed to phase I clinical trials. Clinical trials of new drugs are classified into four main phases. Phase I clinical trials are designed to investigate drug safety rather than efficacy and are therefore performed on healthy human volunteers. These trials should establish an acceptable single drug dosage free from serious side effects.

The next step, phase II, involves clinical trials in patients. This requires a clinical trial certificate or letter of exemption from the Committee on Safety of Medicine (CSM). The protocol for a prospective clinical trial must also be passed by the local ethics committee. Phase II trials comprise the initial clinical investigation for therapeutic effect and involve relatively small patient numbers. Their main objectives are to assess efficacy and safety.

When phase II studies are completed, the data must go back to the CSM for approval before phase III may be undertaken. Phase III trials are short and long-term studies intended to assess the effectiveness of the recommended dosage schedule. They involve substantial numbers of patients from several centres with pain of varied aetiology. They should lead to a judgement as to the clinical usefulness and acceptability of the drug as an analgesic. If it appears from phase III that the drug has a definite place, a product license must be obtained from the CSM before it can be marketed.

Phase IV refers to post marketing trials and monitoring. These include long-term morbidity and mortality studies with large patient numbers. A drug is under phase IV surveillance until such times as it is withdrawn.

REFERENCES

- Pocock, S.J. *Clinical Trials—A Practical Approach*. Chichester: John Wiley & Sons, 1983.
- Food and Drug Administration, *Guidelines for the Clinical Evaluation of Analgesic Drugs*. HEW (FDA) 80-3039. November, 1979.

GLASGOW ROYAL INFIRMARY CARDIAC ARREST SURVEY, 1984

Dr W. A. L. MITCHELL

A survey of cardiac arrests to which the duty anaesthetists respond as part of the hospital cardiac arrest team, was undertaken during 1984. The opening of the new phase I building in 1983 necessitated reassessment of the cardiac arrest facilities and this led to a desire for further information on the numbers, location and outcome of cardiac arrest calls.

The survey was based on a proforma which was completed by the duty anaesthetist after each telephone switchboard initiated call and the results stored and analysed with the aid of an Apple II computer. It is emphasised that the survey may not cover every arrest in the hospital where patients are treated by their own medical staff but only those arrests in which the duty anaesthetist is involved as part of the arrest team.

Two-hundred-and-thirty cardiac arrests were analysed which includes 22 false alarms. Overall 37% of patients were resuscitated after their arrest and 34 patients (15%) were alive after 28 days. Half of all arrests occurred in the medical wards with a further third in the casualty department. The survival of patients in the casualty department (23%) was better than average and this probably reflects the lack of chronic illness in this group.

Patients over 60 years of age accounted for 55% of all arrests but their survival at 17% was better than average. In the 40-60 year age group only 3 of 4 patients survived (7%).

Analysing the results with respect to the time of day at which the arrests occurred shows that 44% of all working hour arrests were resuscitated and 17% survived. For after-hours and night-time arrests 31% of patients were resuscitated and 13% survived. The higher resuscitation rate for daytime arrests is significant ($P < 0.05$).

Although many patients were resuscitated or recovered spontaneously before the arrival of the cardiac arrest team, 166 patients (72%) required full arrest team treatment of intubation, ventilation and cardiac massage. Of this deeply arrested group 17 patients (10%) were alive after 28 days and represents those who owe their continued life to the existence and prompt action of the cardiac arrest team service.

THE ROLE OF NON-STEROIDAL ANTI-INFLAMMATORY DRUGS IN POST-OPERATIVE PAIN RELIEF

Dr R. J. GLAVIN

Anti-inflammatory drugs are not only amongst the most commonly used (6,000 million tablets consumed in the U.K. each year) but also the oldest. Only recently has their mode of action been elucidated; this is due to inhibition of the enzyme cyclo-oxygenase which converts arachidonic acid into prostaglandins. In addition to their inflammatory role prostaglandins also modify pain perception in both a central and peripheral manner by reducing threshold sensitivity. N.S.A.I.D.'s would seem to have potential opiate sparing effects when used in the management of post-operative pain, thus possibly reducing the morbidity associated with opiate analgesics. Although N.S.A.I.D.'s have been used successfully for pain relief following minor surgery, further clinical studies are necessary to establish the

value of these drugs in the management of pain following major surgery, such a study is being undertaken in Glasgow Royal Infirmary. Animal work has shown that certain N.S.A.I.D.'s have the potential for reducing some features of post-operative surgical morbidity (Kantor, 1984). If further clinical studies show that these drugs do indeed have a role in reducing both anaesthetic and surgical morbidity then will become a very valuable part of the anaesthetist's armamentarium.

REFERENCE

KANTOR, Thomas G. 1984. American Journal of Medicine, July Supplement. Summary.
Ibuprofen—Past, Present and Future, p 121-125.

POSSIBILITIES IN THE PAIN CLINIC

There are many hurdles to be overcome when setting up a pain relief clinic such as clinical time, facilities and funding. The audit of patient population, treatment, outcome and costs are important.

Among matters to be considered are patient care, education and the role of the anaesthetist. Problems encountered include over-referral, under-investigation of patients and the lack of locum during clinician's absences. Problem sharing, clinical discussion and

Dr A. A. KUTARSKI

research at a local level may be difficult in a small but growing subspecialty, due to the small number of patients. National associations and local interest groups, such as the North British Pain Association may help to overcome some of the difficulties. There is a need for a unified multidisciplinary approach to clinical and academic work and formalised training for those seeking to provide a pain relief service, either *de novo* or within an established clinic.

DIAGNOSIS OF SMOKE INHALATION

Dr A. POLLOCK

Since the advent of topical antibiotic therapy to control burn wound sepsis in the late 50's, respiratory complications have emerged as the dominant killer of individuals with major thermal injury. The components of smoke may be divided up into systemic poisons such as carbon monoxide and cyanide and pulmonary irritants/corrosives capable of initiating an intense chemical tracheobronchitis. Smoke inhalation injury can involve any part of the respiratory tree and should not be confused with thermal injury which is confined to above the cords with a different clinical picture and time course.

The diagnosis requires a relevant history with information regarding whether or not the patient was found in an enclosed space, some estimation as to the duration of exposure but most importantly whether or not the patient was found unconscious requiring resuscitation. A strong correlation has been found between eventual pulmonary failure and the history of a closed space injury in a patient stuporose or unconscious.

The examination should concentrate on respiratory tract signs, there being no one sign pathognomonic of inhalation injury and there may be very little to alert the clinician to the possibility of an inhalation injury.

Investigations such as chest x-ray and arterial gases are insensitive early indicators of a significant inhalation

injury. It has been demonstrated that with the aid of a nomogram the carboxyhaemoglobin value extrapolated back to the time of exposure, correlates very strongly with bronchoscopic evidence of a significant inhalation injury (Clark, 1981). They have also been able to demonstrate a correlation between this corrected value and blood cyanide level (hydrogen cyanide being the product of incomplete combustion of nitrogen containing polymers) but the clinical significance of these sub-lethal levels are as yet unknown.

A sub-group was identified who demonstrated facial burns, an elevated corrected carboxyhaemoglobin value and the severest of bronchoscopic findings. All these patients developed pulmonary failure requiring ventilation. Perhaps by identifying such cases on admission, initiating artificial ventilation early, prior to the onset of pulmonary failure we may be able to improve both mortality and morbidity.

Therefore in the absence of facilities for direct visualisation of the bronchial tree, the combination of an extended history, appropriate examination and corrected carboxyhaemoglobin value can provide the necessary information required for the clinician to predict confidently the presence or absence of a significant inhalation injury.

CLARK C.J., CAMPBELL D., REID, W.H., Lancet 1981; i: 1332-1335.

SCIENTIFIC MEETING

WESTERN GENERAL HOSPITAL, EDINBURGH, NOVEMBER 15th, 1985

This year's meeting took place in the Scottish Health Services Centre at the Western General Hospital in Edinburgh. There were two sessions, the morning one chaired by Dr J. Wilson and the afternoon session chaired by the President, Professor Sir Gordon Robson. The Gillies Memorial Lecture was given by Professor M. K. Sykes and as usual his lecture is printed in the newsletter together with summaries of the other presentations.

The meeting was so well attended that those who arrived without having registered had to find their own lunch because the dining room was already full to capacity. Dr Sandy Buchan is to be congratulated for organising such a successful meeting.

CONTINUOUS INTRAVENOUS OPIATES

G. B. DRUMMOND

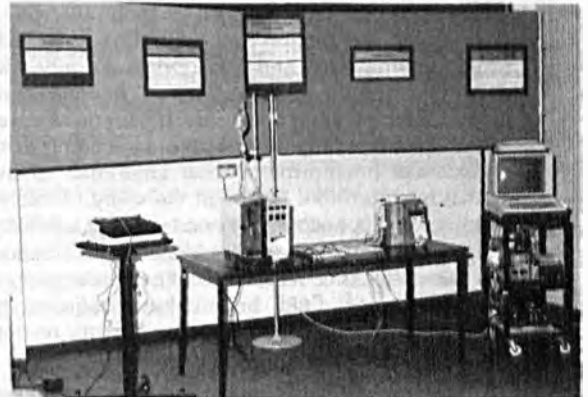
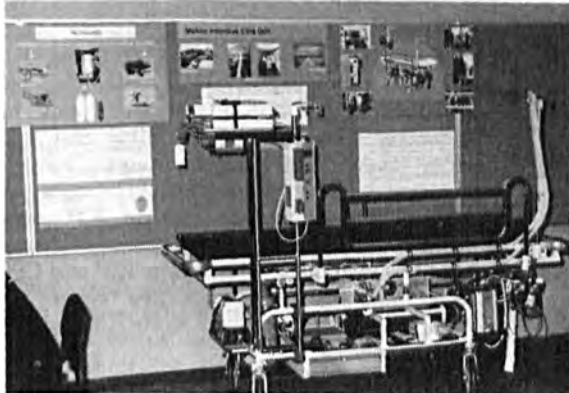
After an intramuscular injection of morphine, pain relief declines so that after four hours, less than 30% of young patients still have pain relief. Analgesic administration to patients after operation is often woefully inadequate, because of ignorance, bad habits, poor staffing, awkward regulations, and probably most of all because of simple disregard of the problem. To overcome some of the problems of intermittent administration, continuous systems have been developed. We have developed a simple continuous system that is very cheap and can be adapted easily to current regulations for drug administration.

In patients undergoing abdominal surgery, morphine is given during and immediately after the operation to provide analgesia. Administration starts with very small iv doses during and after operation to obtain pain relief. At the same time, we start an infusion of about 1 mg/kg of morphine (reduced by 10 mg in those over 60 years, and 20 mg in those with renal impairment). This is given over 24 hours, from a clockwork syringe driver,

through a separate intravenous cannula. If the patient has pain the nurses give intramuscular doses of morphine as prescribed (5 or 10 mg according to physical status). The respiratory rate is measured at hourly intervals, and the infusion is stopped if the rate becomes less than 8 breaths/min.

In 100 patients studied consecutively after elective upper abdominal surgery, the mean total quantity of morphine given was about 100 mg. The infusion was stopped for some time in the first 24 hours in 20 of the patients. These doses are much greater than in other reported studies, and have been achieved without complications. No formal assessment of analgesia has been done, but clinically this has been excellent.

In association with such studies, we have developed a thoracic impedance technique to measure respirations over prolonged periods, with later automatic analysis. The respiratory rates show variations with a non-sinusoidal cycle and as the respiratory rate slows, the variation in the breath-to-breath interval increases.



Some of the demonstrations from the Registrars' Meeting

POST OPERATIVE ABDOMINAL WOUND PERFUSION A comparison of bupivacaine with saline

Dr IAIN LEVACK

Wound perfusion for post operative analgesia was first described in 1935 (1). There have been subsequent reports of an associated reduction in narcotic requirements and the technique has been recommended for patients with abnormal respiratory function. A more recent study (2) has reported that irrigation with isotonic saline is equally effective as bupivacaine in reducing opioid requirements.

The present study was designed to compare saline and bupivacaine as wound irrigants, assessed by visual analogue scores (VAS), spirometry and opioid requirements in 50 patients following subcostal incisions performed for cholecystectomy or splenectomy. A standard anaesthetic technique was used and, before closure of the wound, a perforated Porto-Vac 2.4 mm drainage tube was positioned between peritoneal and muscle layers and led through a separate stab skin incision. 10 ml of solution was instilled twice daily on days 1, 2 and 3 after operation and measurements were made on each occasion beforehand and 30 minutes afterward. Intramuscular methadone was available at intervals of not less than 4 hours although none was administered within a 4 hour period prior to perfusion.

Total mean methadone requirements over the 78 hours were 61 mg (SEM5) in the bupivacaine group

and 84 mg (SEM10) in the saline group. There was a statistically significant decrease in VAS in both groups after perfusion but no significant difference in the magnitude of the change between the two groups using a Wilcoxon test. In the bupivacaine group FVC was improved after perfusion by the order of 100 ml. In the saline group, changes in FVC did not achieve statistical significance. Improvements in FVC following bupivacaine were not sustained indicating that the intervals between perfusion were too long. An increased frequency of top-ups or a continuous infusion would be a logical improvement. It remains to be established whether saline related analgesia reflected by VAS scores is a placebo effect or a pharmacological action on the origin of pain in the tissues.

1 Capelle W. (1935) Die Bedeutung des Wundschmerzes und seiner Ausschaltung für den Ablauf der Atmung bei Laparotomierten. Deutsche Ztschr.F.Chir. 246, 466.

2 Thomas DFM, Lambert WG and Williams KL. (1983). The direct perfusion of surgical wounds with local anaesthetic. Ann. Roy. Col. Surg. Eng., 65, 226.

HEAD INJURY MANAGEMENT

Dr N. M. DEARDEN

Severe head injury accounts for 90 deaths per million population per year in Britain with 70% of victims less than 30 years old.

After severe head injury initial management must ensure cerebral oxygenation by maintenance of a clear airway, ventilation and circulation, followed by urgent examination and appropriate surgery. Many patients exhibit a characteristic haemodynamic response consequent upon catecholamine release. In some cases this may be maladaptive leading to sub-endocardial haemorrhage, fatal arrhythmias or intracranial hypertension. Although the value of intensive therapy to reduce secondary brain damage is debatable subsequent management should avoid exacerbation of this haemodynamic response and include appropriate adjustments to fluid and calorie requirements. Therapeutic abolition of the haemodynamic response has been advocated but is unproven.

Fifty per cent of severely head injured patients develop intracranial hypertension (intracranial pressure (ICP) above 20 mmHg) during the first week after trauma.

This may be attributed to cerebrovascular engorgement, cerebral swelling, haematoma or hydrocephalus. Mortality rate increases with high ICP and/or low cerebral perfusion pressure (CPP), (mean blood pressure—mean ICP). Scarcity of reports that ICP reduction improves outcome may be due to inaccurate monitoring, and inadequate attention to the effects of therapy on both ICP and CPP. Furthermore different methods of therapy appear superior at reducing ICP, maintaining CPP above 50 MMHg and avoiding cerebral ischaemia, in different groups of head injury, while injudicious use of therapy may provoke cerebral ischaemia. Hopefully, advances in ICP waveform analysis and monitoring of the effects of therapy on cerebral oxygen delivery as well as ICP and CPP, will lead to more specific and effective regimes, and to identification of patients in whom ICP reduction is inappropriate.

VENTILATION OF 500 NEONATES WITHOUT SUBGLOTTIC STENOSIS

Dr ROBERT HUME

Mechanical ventilation is an integral part of neonatal intensive care. This paper documents the experience of 500 consecutive ventilated infants using the same type of oro-tracheal tube and method of fixation. Of the 500 infants 213 died without being extubated. Of the 287 infants initially extubated 32 required further ventilation and four of those infants died. The total number of extubations was therefore 315. The majority of infants were preterm (401) and a high proportion less than 30 weeks gestation.

On 68 occasions endotracheal tubes were replaced. The commonest reason was blockage with bronchial secretions (33) or with blood (7). On nine occasions the tube was considered blocked on clinical features but was patent on removal. The frequency of tube replacement secondary to blockage has decreased from 1 per 46 ventilated days in 1978 to 1 per 577 in 1984.

On 13 occasions the tube became accidentally displaced with a frequency of 1/256 ventilated days.

Twenty four infants successfully extubated required a further period of ventilatory support for the conditions: pneumonia (7), milk aspiration (4), convulsions (4), septicaemia (4), cardiac failure (2), meningitis (1), recurrent apnoea (1) and necrotising enterocolitis (1).

Forty four infants developed post extubation stridor and in the majority of infants (32) this resolved spontaneously. In two infants infection was thought contributory. In three infants post extubation stridor persisted and laryngoscopy/bronchoscopy was performed (2 laryngomalacia, 1 normal). Six infants with severe stridor developed acute respiratory failure secondary to laryngeal oedema and required re-intubation.

No surviving infant developed clinical subglottic stenosis nor was this identified at post mortem (post mortem rate 90%). One infant was ventilated from admission to day 123 when a tracheostomy was performed during which it was observed that apart from oedema of the vocal cords the upper airway was normal.

ANTITHROMBIN III—A RELIABLE INDICATOR OF PROGRESS AND SURVIVAL IN SEPTIC PATIENTS

Dr MARGERY MACNAB

Antithrombin III is an alpha-2 globulin with a molecular weight of 58,000. It is the major physiological inhibitor of blood coagulation acting mainly against thrombin and factor X combining with them and inactivating them. A previous study by Buller and colleagues* in Amsterdam reported that after major surgery plasma antithrombin III levels fall, rising again after the 3rd post-operative day. Where sepsis complicated recovery these levels remained depressed or fell further. A prospective study was therefore undertaken on 20 consecutive patients admitted to the intensive care unit following anaesthesia for major surgery or trauma to determine whether plasma Antithrombin III levels and/or their trend would serve as a reliable indicator of sepsis and its progress. Sepsis was determined on clinical grounds and by the presence of purulent material confirmed by bacteriological examination.

Patients with pre-operative sepsis had significantly lower plasma antithrombin III levels pre-operatively than those who showed no evidence of pre-operative sepsis. All of the patients who demonstrated no evidence of pre-operative sepsis had pre-operative plasma antithrombin III levels of greater than 80% of

normal value. All showed the post-operative fall previously described. Where sepsis intervened post-operatively plasma antithrombin III levels remained depressed.

Patients with pre-operative sepsis all had low pre-operative levels of plasma antithrombin III (less than 80% of normal value). Of these patients those not demonstrating post-operative sepsis all demonstrated a rising trend in plasma antithrombin III levels whereas all patients who remained septic post-operatively showed a fall in plasma antithrombin III levels.

In conclusion, our study showed that the trend in plasma antithrombin III levels is a useful indicator of sepsis in the post-operative period.

*Buller, H R, Bolwerk C, ten Cate J, Roos J, Kahle LH, ten Cate J W. Post-operative haemostatic profile in relation to gram negative septicaemia. *Critical Care Medicine* 1982; 10:311-15.

TEACHING OF CARDIOPULMONARY RESUSCITATION BY MEDICAL STUDENTS

Dr ALEXANDER MOWBRAY

Scotland has a high incidence of ischaemic heart disease and therefore sudden death from cardiac arrest. Research in the U.S.A. especially, has shown that early and efficient cardiopulmonary resuscitation (C.P.R.) can save lives and that many of the survivors return to a normal lifestyle. We, on this side of the Atlantic, have been very slow to pursue the philosophy of widespread C.P.R. teaching. If it is implemented in the future it would require many more C.P.R. instructors than are at present available. This study was set up to observe C.P.R. teaching by medical students. Ten first year medical students were taught basic C.P.R. according to the guidelines laid down by the American Heart Association. This involved 7½ hours of lectures, video films and practical instruction on resuscitation mannikins. The mannikins contained recording devices which allowed an objective assessment of efficiency of ventilation and chest compression. At the end of this course of instruction the students were assessed by independent members of the

department and all were found to be competent at basic C.P.R. The medical students then taught four groups of ten school pupils, with each group attending for 2½ hours. Instruction consisted again of lectures, video films and practice on resuscitation mannikins. When assessed by members of the Anaesthetic Department all of the pupils could satisfactorily perform basic C.P.R. However, 17 of the pupils were retested 6 months later and only 8 could ventilate and perform chest compression correctly on a mannikin. This study illustrates that even junior medical students can teach C.P.R. effectively, but the training must be repeated to improve the retention of skills.

THE LOW-FLOW ADMINISTRATION OF ISOFLURANE

Dr DAVID WEATHERILL

The work presented is a continuation of studies of the use of low-flow systems initiated by Dr H. Y. Wishart in the Western Infirmary, Glasgow, and described in his Presidential Address to the Society eighteen months ago. These investigations were undertaken to assess the validity of predictions from two mathematical models of low-flow systems, firstly of Holmes and Spears (1977) of the use of premixed 50% N₂O in O₂ (Entonox) as fresh gas at a flowrate of 1 litre min⁻¹ to provide safe and useful inspired concentrations of O₂ and N₂O, and secondly of Mapleson (1960) of inspired concentrations of volatile agents within low-flow systems, vaporiser-outside-circuit (VOC).

In the present investigation twenty-eight adult patients undergoing elective surgery breathed spontaneously from a circle system after tracheal intubation. Fresh gas flow of Entonox was maintained at 4 litre min⁻¹ for 10 min and thereafter 1 litre min⁻¹; isoflurane was administered VOC as required. O₂ concentration within the expiratory limb decreased with time but always remained above 37% after up to 90 min anaesthesia. At the end of a 27 min (mean; range 10-80) period during which the delivery of isoflurane was maintained constant the inspired isoflurane concentration averaged 70% of that in fresh gas and remained relatively constant within individuals over this time. These observations suggest that the low-flow technique affords a basis for the safe and economical administration of N₂O/O₂/isoflurane anaesthesia.

GILLIES MEMORIAL LECTURE—Prof. M. K. SYKES SAFETY IN ANAESTHESIA—SIMPLICITY VERSUS SURVEILLANCE



John Gillies died in Edinburgh on 18th July, 1976, at the age of eighty-one. He was born and educated in Edinburgh, and had just gone up to University when the first world war broke out. He immediately volunteered for service in the British Expeditionary Force and was later commissioned in the Highland Light Infantry. He was awarded the Military Cross, became a prisoner of war and then returned to Edinburgh to continue his medical education. After qualification, he joined a general practice in the West Riding of Yorkshire, where my grandmother was one of his patients. She had to undergo the ordeal of mastectomy on the kitchen table and spoke frequently of his kindness and care during that period.

After eight years in general practice, Gillies decided to specialise in anaesthesia and so moved to London where he worked with the late John Hunter and Ivan Magill. He returned to Edinburgh in 1932, and shortly afterwards was appointed anaesthetist to the Royal Infirmary.

Gillies was an extremely modest man and seldom referred to his contributions to the development of the speciality. He was elected Vice-President of the Association of Anaesthetists in 1946, when Dr Marston was president, and became President in 1947. He was, therefore, President when the Association formally requested the Council of the Royal College of Surgeons to set up a Faculty of Anaesthetists and he led the Association side of the Joint Committee which led to the formation of the Board of Faculty in 1948. The Faculty immediately decided on a two-part D.A. and Gillies was heavily involved with the introduction of the

new Primary Examination. Meanwhile, he had been developing anaesthesia in Edinburgh and in 1948 published with Griffiths the classical paper outlining the use of controlled hypotension by spinal anaesthesia for thoracolumbar sympathectomy. He elaborated on this theme in the Clover Lecture in 1950, and developed the concept of "physiological trespass" in anaesthesia in his Presidential Address to the Section of Anaesthetics of the Royal Society of Medicine in 1951. He had an immense influence on the development of a physiological approach to anaesthesia and was particularly concerned with safety. It is, therefore, perhaps appropriate that I should concentrate on this topic today.

It is unfortunate that we still have no firm figures on mortality and morbidity associated with anaesthesia. However, if we use the figures from the Association of Anaesthetists' study (Lunn & Mushin, 1982), we find that whereas one out of 166 patients (0.6%) die within six days of a surgical operation, only one out of 10,000 (0.01%) die totally as a result of anaesthesia. In the United Kingdom, the actual number of deaths is thus approximately 300 per year. However, anaesthesia might have been contributory in 0.06% of deaths. The assessors' opinions reveal that 70.4% of 125 avoidable deaths could be ascribed to an error of judgement, 7.2% to a lack of equipment, and 4.8% to equipment failure. Craig and Wilson (1981) have tried to tackle the problem more directly by looking at the frequency of "critical incidents". They define a "critical incident" as "a major or minor mishap, harmful or potentially harmful to the patient, and associated with human error or

equipment failure". In a study period of six months in a D.G.H., covering 8,312 anaesthetics, of which 1,765 were emergency procedures, they found 81 critical incidents, 36 of which were associated with the machine, ventilator or breathing system, 21 with the tracheal tube, 12 with drug administration, and 12 with patient care. Cooper et al (1984) also studied the distribution of critical incidents and found that out of 616 incidents, 430 were due to human error, 69 to equipment failure, 80 to disconnection, and 37 to other causes. In this study, 23% of all equipment failures were associated with the breathing systems, 19% with monitoring devices, 15% with the ventilator, 14% with the anaesthesia machine, 12% with the airway device, 10% with the laryngoscope, and 8% with other items of equipment. The picture which emerges is that although equipment failure is seldom directly responsible for a death during anaesthesia, it not infrequently results in a critical incident. However, we all know how irritating most of our equipment can be, and how frequently we have to correct minor faults, such as sticking controls and disconnections.

We are all familiar with the major deficiencies in current anaesthetic apparatus. For example, if we consider the gas mixing and flow controls, we find that there is no positive identification of the source gases, that we have to calculate total flow and O₂ percentage from the rotameter readings, that there are many sources of rotameter errors, and that leaks in the rotameter block are frequently a problem. When we consider vaporisation, there are problems in identifying the volatile agent, there are variations in delivered concentration in response to changes in gas composition, flow, temperature, and back pressure, and the controls frequently stick. Breathing systems are a frequent source of trouble, for the components may be incorrectly assembled, disconnection of components occurs frequently, and there may be valve failure, inadequate fresh gas supply or the development of high airway pressures. There are also many deficiencies in ventilators in common use. However, the major problem with most current anaesthesia equipment, is that machines tend to be built in modular form, so that purchasers can add on their own vaporisers, ventilators, or breathing system. This may result in a mis-match between components which can lead to a system malfunction.

The current move is to add monitoring devices to the standard anaesthetic machine. However, this can lead to a false sense of security. For example, it is a common practice to place an oxygen analyser at the common gas outlet. Oxygen analysers are in themselves subject to calibration errors, interference by nitrous oxide or halothane, battery failure, or other problems. However, if the analyser is connected to the outlet of an anaesthetic machine fitted with an N₂O cut-off or proportional controller without an audible pressure failure warning device, a failure in the oxygen supply will result in a corresponding cut-off in the nitrous oxide supply, so that the oxygen concentration under the

analytical cell remains constant. If the fresh gases are being led into a Bain system with a mechanical ventilator, the lungs may continue to be ventilated, but the patient may become hypoxic because there is no fresh gas supply. Thus, the presence of an oxygen analyser may give a false sense of security and may increase the risk of damage to the patient rather than adding to the safety of the equipment. Many similar examples of the inappropriate use of monitors could be quoted.

We have, therefore, joined with Penlon Ltd. at Abingdon, to design a versatile anaesthetic apparatus with facilities for spontaneous, manual controlled or mechanical ventilation which is (a) safe for the patient, (b) easy to control, (c) incorporates the monitoring of all machine functions, and (d) can provide the basis of a comprehensive record system. The machine uses microprocessor control which increases flexibility and enables a degree of "intelligence" to be built into the machine. Mixing of oxygen and nitrous oxide, or oxygen and air, is achieved by varying the frequency of opening of solenoid valves in each gas line and the addition of vapour is controlled by pulses of gas which are bypassed through one of the three copper kettle-style vaporising chambers. The volume of gas diverted to the vaporising chamber is controlled by the microprocessor which reads the temperature of the liquid in the vaporising chamber and calculates the gas flow required to produce a given vapour concentration by reference to the known vapour pressure curve of the liquid. All the breathing systems are contained within the anaesthetic machine and are selected by the movement of valves which are controlled by the microprocessor in response to movement of a selector knob on the control panel. This enables the operator to select the common gas outlet alone or the Mapleson A, D, or circle system utilising the two delivery hoses attached to the common-gas outlet and return port on the breathing system module. The ventilator is a constant flow time-cycled device which is controlled by the microprocessor so that alterations in fresh gas flow rate do not affect delivered tidal volume. The ventilator can be used with all breathing systems except the Mapleson A, though manual ventilation is possible with all breathing systems.

All the machine functions are monitored by the microprocessor and displayed on the control panel. Thus, the identity of the gases delivered by the piped gas supplies is checked when the machine is switched on and performs a self-check procedure. The oxygen concentration, and total flow of fresh gases is monitored continuously and displayed digitally opposite the control knobs, and there are separate analysers for inspired oxygen and CO₂ concentration situated within the breathing system with digital displays on the monitor panel. The airway pressure and CO₂ trace can also be displayed in analogue form on an LCD panel, whilst airway leak is continuously checked by comparison of inspired and expired volumes. Thus, all machine

functions are continuously monitored and the important variables (inspired oxygen concentration, high airway pressure, airway leak) are linked to audible alarms.

Other manufacturers are now following the lead given by the Boston Bioengineering group (Cooper et al, 1978), but the question which has now to be answered is whether the increased complexity of machines, such as that described, will lead to less reliability and, therefore, to rejection by the practising anaesthetist. I suspect that the early models of these new-generation machines will prove relatively unreliable when compared with the simple Boyle's machine, and that it will be several years before the teething troubles are ironed out. However, I have no doubt that future development will parallel developments in aviation, and that the complex monitoring displays will gradually give way to simple and reliable technology with a minimum of machine-user interaction. Much as many of us enjoy "flying by the seat of our pants," the demands for higher standards of safety will overtake us. We therefore

need to be concerned with the development of anaesthetic machines which use current technology and not that developed by our forefathers over fifty years ago.

REFERENCES:

- 1 Cooper, J. B., Newbower, R.S., Moore, J.W., Trautman, E.D.
A new anaesthesia delivery system.
Aesthesiology, 1978, 49, 310-318.
- 2 Cooper, J.B., Newbower, R.S., Kitz, R.J.
An analysis of major errors and equipment failures in anaesthesia management: considerations for prevention and detection.
Anaesthesiology, 1984, 60, 34-42.
- 3 Craig, J. Wilson, M.E.
A survey of anaesthetic mis-adventures.
Anaesthesia, 1981, 36, 933-936.
- 4 Lunn, J.N., Mushin, W.W.
Mortality associated with anaesthesia; Nuffield Provincial Hospital Trust, London.



Peebles'85

A PAST DEAN'S REFLECTIONS IN TRANQUILITY

Professor DONALD CAMPBELL

When invited by the Editor to contribute to this issue of the Newsletter something of my experience as Dean, the immediate reaction was to refer the members of the Society to the series of Dean's Newsletters issued from the Faculty during my term of office. It became clear that was unlikely to suffice on two counts. Firstly, as every Dean is well aware, these occasional publications are probably read only by a few and then with little enjoyment and varying degrees of understanding. Secondly, they present only the barest facts of various political and educational issues important at the time, and preclude any embellishment of human interest which might qualify them as memorable contributions to literature. This represents, therefore, an attempt to put some flesh on the bones of bygone events.

Straight away one is faced with difficulty since it is clear that everyone's memory and therefore reporting of such events will be different, and many matters of greatest interest must quite rightly be regarded as confidential. Some general statements, however, can be made. Every Dean comes to office, after an initial period of shock at his or her fate, determined to alter the course of events even in a modest way and departs much chastened, ruefully contemplating the demise of some pet project and musing on the apparent obduracy of colleagues on the Board. The learning curve certainly is long, the period available for accomplishment short and the results probably ephemeral. Nevertheless, one should be allowed the conceit of believing that certain accomplishments are likely to prove of lasting importance. In my own Deanship I would consider that the most significant of these, in no particular order, are likely to be the continuing evolution towards a new independent relationship within the College as a whole, the new examination structure, the establishment of various new intercollegiate/Faculty liaison groups such as the one dealing with training in the field of Intensive Therapy and the educational experiments including the use of Meditel for distance learning and dissemination of Faculty information to assist tutors remote from main teaching centres. All these activities underline the Faculty's continuing search to evaluate what has been done and constantly to seek to improve its performance on behalf of the Fellowship.

It perhaps is not generally appreciated how much of the Board members' valuable time is devoted to the interests of the Fellows and the specialty, particularly nowadays at a time of great change and potential threat to the profession of medicine at large. This necessitates the establishment of various working parties within the Board in addition to the already great number of regular committees, Boards in Committee, formal Board and Council meetings. On these domestic and intercollegiate professional matters the time spent is most willingly given by all but there is no doubt that an inordinate amount of time seems to be spent on

external matters, mostly at the urgent behest of the DHSS and SHHD, with frequently little to show for it. This breeds a measure of frustration and indeed resentment but attendance is essential always remembering the music-hall imperative "no show, no dough!" The Faculty's position as a United Kingdom educational body ensures that its view is co-ordinated and sharply focussed which is not always the case where specialties are represented by a number of independent and not always co-ordinated Colleges. Partly as a result of this the Faculty's influence within the family of medicine has steadily grown stronger and along with the political arm of the specialty, the Association of Anaesthetists of Great Britain and Ireland, it has brought about many changes of benefit to the whole profession. Overseas the Faculty too is influential, partly through its overseas examinations and assistance to developing countries to establish their own indigenous qualifications and also through membership of the international organisation of English-speaking Colleges and Faculties and American Boards.

Closer to home, I feel that members of the Society should be aware of the important role of the Faculty's Scottish Standing Committee at whose birth it assisted. This Committee of Faculty continually safeguards the interests of Fellows practising in Scotland and ensures that the Board does not lose sight of the Scottish dimension in its affairs. It has been able to take initiatives which, because of the scale of the Scottish model, have been easier to get off the ground here and have not infrequently served as a useful template for wider application in the United Kingdom as a whole. This state of affairs is admirable but should not lead to complacency since it depends on a continuing critical interest in the affairs of the Standing Committee being maintained by all, in particular active participation in its elections.

The three years spent in office have not been without their lighter moments but, in the absence of a "fifty-year" rule, it is probably better to draw a discreet veil over them to preserve the dignity of office! I can say, however, that I will miss the rather informal gatherings which tended to take place on the night-sleeper homewards when problems that had defied solution earlier in the day miraculously resolved. Unfortunately, in the cold, calm, clear light of dawn at Central Station these solutions strangely seemed to evaporate like Wills-o'-the-Wisp and defied recall.

Whether at the end of the day, a Deanship has been worthwhile is largely for the electorate to judge but, from my own point of view, it has been a rewarding experience though at times leading to chronic brain-fatigue and travel weariness. I am, of course, plainly forever in the debt of those colleagues in my own

department who closed ranks and helped to sustain the inevitable effort posed by the problem of distance from the centre. Their understanding and support and the tolerance of my family were a constant inspiration. To

paraphrase Goethe "If you took away all that I owe to others there would be little left." I do hope that in due course colleagues from Scotland will also experience such honour and opportunity to serve the specialty.

BUSINESS FROM THE ANNUAL GENERAL MEETING

The first matter discussed at the Annual General Meeting was the long standing problem of assistance for the anaesthetist. Dr L. V. H. Martin reported to the Society members that there was no progress regarding the establishment of a training school for anaesthetic nurses in Scotland. It seems that there is reluctance on the part of the Royal College of Nursing to set up training schools, but it may be possible for registered general nurses to have a post basic training course in anaesthesia, post-operative care and intensive care. It seems that if these changes occur, they will take some time and at present it was important for anaesthetists to exercise their responsibilities at a local level to improve existing arrangements.

In his financial statement, the treasurer, Dr Iain Gray, reported an extremely healthy state of affairs, and it was felt that it was important to give careful consideration to the best use of the Society's funds. It was agreed to make a donation of a Trafalgar style leather chair and a Caithness glass decanter engraved with the Society's motif to the Association of Anaesthetists' Appeal for the refurbishment of 9 Bedford Square. A proposal from the Council to set up a travelling scholarship was discussed. The Council will re-consider the matter and take the subject back to the next A.G.M.

The editor of the Newsletter spoke about the special edition which was produced to commemorate the 25th Newsletter. Costs had been held down despite a large increase in the price of paper. A search for old copies of the newsletter continues in the hope of being able to present complete editions of all the newsletters to the major Scottish centres.

There were four reports from committees. Professor A. A. Spence reported on the Standing Committee, Scotland, Faculty of Anaesthetists. He stated that the review of hospital medical staffing establishments with respect to anaesthesia had almost been completed. His personal feeling was that the main aim should be to rationalise the emergency services to reduce the demand on junior staff. Careful deliberation would be required before any implementation of suggestions. He suggested that a reduction by ten of the registrars in Scotland would improve manpower prospects. He was concerned, however, lest a reduction of registrars in Scotland would permit registrar expansion in the rest of the United Kingdom. He announced that the Faculty was embarking on an exercise in distance learning using Prestel so that individual centres could communicate with the Faculty. Finally, he announced that Professor Donald Campbell had been succeeded by Dr A. Adams as Dean of the Faculty.

Dr J. I. M. Lawson gave a report from the Anaesthetic Sub Committee of the National Medical Consultative Committee. He intimated that Dr G. McNab had now succeeded him as Chairman of the Committee and that Dr G. M. R. Bowler was the new junior staff representative. The main items discussed at the Sub Committee's meetings were mortality associated with anaesthesia, current practice in obstetric anaesthesia and pain therapy. The Sub Committee felt that the impetus of the Association of Anaesthetists mortality study could best be maintained by a combined exercise with the Specialty Sub Committee for Surgery. The parent body responded by suggesting that the most appropriate forum through which this could be done was the Scottish Conference of Royal Colleges and Faculties, and the matter had now been taken up by these bodies. The report of the Working Group on Obstetric Anaesthesia had been submitted to the Planning Council and was ready for publication but had been held up by the S.H.H.D. because of financial and staffing implications. The Sub Committee suggested the chairmen of Health Boards and divisional chairmen should be included in the distribution list but the distribution may be more restricted than this. On the subject of pain clinics, while supporting the establishment of such clinics, the parent body did not see it as part of its function to publicise their value. Their development should rather be through contacts at local level between the profession and employing authority.

Dr W. F. D. Hamilton reported on the Scottish Committee for Hospital Medical Services. The S.H.H.D. had at last issued a circular on the organisation and management of pathology services and Fife Health Board had now acted on the instructions contained in the circular. The B.M.A. had therefore agreed to withdraw from the dispute procedure with the Fife Health Board. With respect to the Griffiths Report in Scotland, a consultative paper on the general management function in the N.H.S. in Scotland was issued in June 1984 with a request for comments. The joint paper from all the B.M.A. craft committees, including S.C.H.M.S. was then submitted to the S.H.H.D. The comments were necessarily of a preliminary nature and it was expected that a further round of consultation would take place once basic elements such as the composition of Griffiths units had been determined. It was expected that all general managers would have been appointed before the end of 1985 and that the appointment of unit managers would come later. The S.C.H.M.S. welcomed the outcome of the negotiations between the profession and the D.H.S.S. on the remuneration of

medical representatives and clinical general managers. Management budgeting is an integral part of the Griffiths proposal and two hospitals, Inverclyde and Bangour had been selected for a trial of a management budgeting system. A leading firm of management consultants have been selected to provide the necessary specialist advice. The proposal from the Minister of Health and Social Work to limit the range of drugs available for prescription on the N.H.S had been considered. The Minister had been informed that the medical profession in Scotland was totally opposed to the imposition of a limited list by regulation but that they would welcome the opportunity to take part in fresh discussions to examine the effective and economical prescribing of all drugs.

Lastly, Dr A. I. Davidson reported on the Anaesthetic Sub Committee to the C.C.H.M.S. The Sub Committee had been monitoring the problem of consultants in some hospitals having to work without supporting junior

staff. Its recommendations had been passed on to the Council of the Association of Anaesthetists of Great Britain and Ireland which had subsequently published a document on the subject. The payment of domiciliary fees to anaesthetists providing E.C.T. services inside hospital had been discussed and passed on to the negotiating sub committee. The sub committee was concerned about the payments to anaesthetists from the provident associations. The anaesthetic fee was not mentioned as being separate from the surgical fee and there was no fee for intensive care. The sub committee had again been pursuing the case for adequate remuneration for dental anaesthesia and to this end had made representations to the negotiating sub committee to separate payments for dental anaesthesia from the dental pool. It was not, however, optimistic of a successful outcome.

GOLF OUTING

This year's golf outing took place on Tuesday, 11th June at Bruntsfield Links Golf Club, Edinburgh. The weather was cool with sunny periods and a few light showers, but these did not deter the 17 golfers from the Society together with the Vice President, Alistair McKenzie who recorded the day for posterity on a video film. In the morning an individual Stapleford competition was held and the winner was Sandy Buchan from Edinburgh with 39 points. Second was Iain Gray from Dundee with 34 points. Third, Farquhar Hamilton from Dundee with 33 points and fourth, John Murray from Falkirk with 32 points. In the afternoon there was a friendly two-ball foursome.

Bruce Scott is to be congratulated, not only on initiating the idea of a golf outing, but also for helping to organise this year's event. It seems that the outing will now become a popular item in the Society's calendar and it was agreed by the golfers present at this year's event that the venue for the outing should rotate annually between the east and west of Scotland. The individual course would be decided by the Secretary and other members of the Council who play golf, in consultation with the golfing members of the Society.



News from the Regions

TAYSIDE

The year now ended has been one of relative stability in the Dundee and Stracathro departments but in October it was the turn of Perth to experience change with the retirement of Dr Norman McLeod. After 24 years as consultant anaesthetist at bridge of Earn Hospital and Perth Royal Infirmary Dr McLeod will be greatly missed and we extend our best wishes for a long, active and happy retirement. In his place we warmly welcome Dr Andrew Kutarski from Glasgow.

With the enlargement of the senior registrar establishment from four to five it has been possible this year to arrange attachments to other centres more readily than in the past. Both Margery MacNab and Neil Morton obtained clinical fellowships in Canada, the latter in Montreal and the former on London, Ontario.

Equally valuable experience was gained by Dr Neil McKenzie at the Regional Plastic Maxillo Facial Unit in East Grinstead and at the Alder Hey Children's Hospital. Dr John Martin was also attached to the Alder Hey and to the Regional Pain Centre, Walton Hospital, Liverpool.

Joining the department as registrars during the year were Dr Barbara Reay from Perth, Dr Mary Elphinstone from Northwick Park and Dr Eddie Wilson from Glasgow. Appointed as new senior house officers were Dr Sarah Crawley, Dr Gerry Keenen, Dr David McCallum and most recently, from Newcastle, Dr Cathy Davies. To all those new to the department and to the specialty we extend a warm welcome and give our best wishes for a bright future.

Congratulations are due for examination successes to Drs Hood, Oates, Serpill, Smith, Nik and Amin who passed Part 1 of the FFA and to Drs Rae Webster, Grant Hutchison and Mary Elphinstone who passed the final FFA and have ably acted up for the absent senior registrars. The teaching programmes of the department were this year expertly organised and co-ordinated by Dr Sandy Forrest, Dr Mel Thomson, Dr Houston and Dr Peter Taylor and the tutorials were enhanced by the regular attendance of the Perth junior staff.

The department's computer has now completed its first year in office and, firmly under the control of Mrs Morrison, makes a valuable contribution to efficiency. Further developments include connection to Prestel giving access to the Faculty's Meditel Teaching Programme.

Finally, congratulations are due to Dr Isobel Smith on the occasion of her marriage to Dr Peter Illingworth, to Drs Bill Macrae and Charlie Allison who each had a daughter and, in a different field, to Dr Peter Taylor who was a member of each of the teams which won all of the Central District "Teams of Four" Bridge Trophies.

WESTERN REGION

The Royal Infirmary, Glasgow University Department

Dr R. P. Alston has been appointed to the post of lecturer.

Dr H. Owen has resigned to take up a post in Australia.

N.H.S Department

Dr A. K. Brown retired, November 1985.

Dr W. T. Frame was appointed Consultant in the Royal Infirmary from November 1985.

Dr J. Orr was appointed Consultant in the Royal Alexandra Infirmary, Paisley, from August 1985.

Dr A. A. Kutarski was appointed Consultant in Perth from December 1985.

The following have been appointed Senior Registrars at the Royal Infirmary:

Dr T. A. Goudie—March 1985; Dr J. K. Moore—December 1985.

The Western Infirmary, Glasgow

Retirals: Dr I. Levy—June 1985; Dr H. Y. Wishart—March 1986.

Dr G. C. Cummings was appointed Consultant in the Western Infirmary from September 1985.

Dr Joyce Reid has been appointed Senior Registrar in the Western Infirmary.

The Victoria Infirmary

Dr Gavin Gordon was appointed Consultant at the Victoria Infirmary from October 1985.

Dr M. McCulloch resigned as Senior Registrar to take up a temporary post as Consultant Anaesthetist at the R.A.F. Hospital at Wendover.

Dr Graham Gillies has been appointed to succeed Dr McCulloch as Senior Registrar.

Stobhill Hospital

Dr Ann Blyth has been appointed Senior Registrar at Stobhill.

Royal Hospital for Sick Children

Dr David Hallworth was appointed Consultant at Yorkhill from June 1985.

Social

The main social event of the year (apart from Peebles) has been the 40th Anniversary celebrations of the Glasgow and West of Scotland Society of Anaesthetists. A dinner was held on January 24th, 1986, in the Royal College of Physicians and Surgeons in Glasgow. The president of the society, Dr Graham McNab, was in the chair. The toast, "The Specialty of Anaesthesia" was proposed by Professor David Carter, St Mungo Professor of Surgery at Glasgow Royal Infirmary and Professor Sir Gordon Robson replied. Dr Aileen Adams, Dean of the Faculty of Anaesthetists, then proposed the toast to the Glasgow and West of Scotland Society of Anaesthetists and the response to this was given by Professor Alistair Spence.

HIGHLAND REGION

This has been "a vintage year" for the Highland Region. The highlight of our year has been the opening of the new Raigmore Hospital. Opened by Her Majesty The Queen on Thursday, 15th August, 1985, the Hospital begins a new era of health care in the Highlands. This new impetus is being maintained by the construction of our new maternity unit which is now well under way. In addition comes the welcome news that the new hospital in Wick is due for completion by the Summer of 1986.

The move to our new accommodation has been remarkably smooth and is due in no small part to a new sense of co-operation which exists between members of staff and different departments—long may it continue! The "dream" of having adequate departmental accommodation in close proximity to the intensive care unit and operating theatres has now been realised. It has been worth the effort.

We are pleased to welcome a new member to our division. Dr W. Antonious has been appointed to a new consultant post in the Northern Unit and will be based initially at Dunbar Hospital, Thurso, prior to the completion of the new hospital in Wick.

Congratulations are in order for two of our junior staff. Dr Thomas, our part-time registrar has recently passed the final fellowship examination. Wedding bells have rung for one of our registrars, Dr Alistair MacNeil. We should like to take this opportunity to wish Alistair and Dianne health and happiness for the future.

EDINBURGH AND SOUTH EAST REGION

In the Royal Infirmary the "new department" was officially opened by Dr Aileen Adams and has now run its first full year with members enjoying office and lab space unthinkable a few years ago. Professor Spence has also "enjoyed" his first year in office and his academic department blossoms with Dr Weatherill as Senior Lecturer and Drs Levack, Logan and more recently Duggan, as Lecturers.

In the N.H.S. department we were sad to learn of the retiral in December 1985 of Dr D. B. Scott, Administrative Head of the Department, a past President of the S.S.A. and many other organisations as well. His contribution to the department in the last twenty years has been enormous and will be sorely missed although he will no doubt continue his involvement with anaesthetics and his hectic pace of life through the Faculty of Anaesthetists, E.S.R.A., many international trips and the pharmaceutical industry.

Dr Alistair Masson has been appointed as the new administrative Head of the N.H.S. Department.

Also, unfortunately due to ill health Dr Jack Burgoyne has recently retired from P.M.R., and Dick Burtles has decided to retire from the Sick Children's Hospital for sunnier climates. With the opening of a new theatre in the P.M.R., the three aforementioned retirals and the

closure of the Deaconess as a surgical unit, considerable changes are imminent in the consultant sessions in the southern side of town, a fact which has not gone unnoticed by our Senior Registrar establishment.

Two of our S.R.s are abroad, namely Bill McCulloch in Muscat, Oman, and Dermot McKeown in Adelaide. Both are due to return in the spring. Dr Sonny Mowbray leaves at the very end of the year for a year in Hong Kong. Dr Donald McLean from Glasgow and Dr Alan Conn have been appointed to S.R. posts.

Two new research assistants are at work in the R.I.E.; Dr Gordon Pugh in studies on post-operative pain and respiratory function and Dr Alistair Lee in regional analgesia.

Congratulations are due to Dr Geoff Bowler who won the S.S.A. Registrar Prize in this past year.

In the north of Edinburgh, Dr J. E. Norman and Dr K. W. Dodd retired in December 1985. Teddy Norman was consultant for 22 years at both Leith Hospital and the Eastern General Hospital. His successor, Dr Tim Winning, will take up post in January, 1986. Keith Dodd was consultant in the old Southern Group of hospitals before he moved to the Eastern General Hospital where he spent the last 10 years. Dr Janet Jenkins has taken up appointment as his successor. Congratulations to all four on their respective achievements.

The future of Leith Hospital is in the balance as discussions proceed to rationalise acute hospital services. It seems likely that these will be relocated at the Western General and Eastern General Hospitals. The new phase two building nears completion at the Western, creating an intensive therapy unit. There are plans afoot to build a new maternity hospital on site at the Western, "to be opened by 1990." This would replace the three small maternity units at the Elsie Inglis, Eastern General and Western General Hospitals.

GRAMPIAN REGION

Dr John Latham has decided to retire and will leave in the spring. He intends to live in Devon and we hope that he will enjoy a long and happy retirement there.

Dr Fiona McLennan was appointed to a consultant post in June having resigned her fellowship during which she had been researching N.M.R.

Dr John Ross returned from Northwick Park and the Middlesex Hospital to be Senior Lecturer in the Department of Occupational and Environmental Medicine and is continuing his interest in anaesthesia.

Dr John Muir returned from Nova Scotia and Dr Abdul Sheikh has been appointed to a consultant post in Kirkcaldy.

Dr Pradeep Ramayya has decided to resign from his registrar post to pursue his interest in computing for a time.

Dr Bill Morrison rejoined as a S.H.O. and Drs Susan Geddes, Elizabeth Smith and Michael Brokeway took up S.H.O. appointments in August.

**NORTH EAST OF SCOTLAND
SOCIETY OF ANAESTHETISTS**

Meetings are held at 7.30 p.m. for 8.00 in Aberdeen Royal Infirmary, Ninewells Hospital, Dundee and in Stracathro Hospital, Brechin, unless otherwise notified

1985

Thursday, 26th September, Dundee
Dr R. Eltringham, Gloucester
"I.C.U. Etiquette"

Thursday, 31st October, Stracathro
Dr G. Kenny, Glasgow
"Computers in Anaesthesia and Intensive Care"

1986

Thursday, 20th February, Stracathro
Registrars Papers

Thursday, 3rd April, Aberdeen
Dr P. Lee, Preston
"Making Dextrans Safe"

Thursday, 8th May, Stracathro
Annual General Meeting and Presidential Address

**GLASGOW AND WEST OF SCOTLAND
SOCIETY OF ANAESTHETISTS**

1985

Friday, October 25th
Combined meeting with Edinburgh and East of Scotland Society of Anaesthetists in Glasgow.
Professor W. B. Jennett, Dean of Faculty of Medicine, University of Glasgow.
"Surgery and Intensive Care—when are they worthwhile?"

Thursday, November 28th
Dr W. R. MacRae, Consultant Anaesthetist, Edinburgh Royal Infirmary.
"Myths in Hypotension."

1986

Friday, January 24th
40th Anniversary Dinner

Wednesday, February 26th
Members' Night. Hosts Division of Anaesthesia, Royal Alexandra Infirmary, Paisley.

Wednesday, March 26th
Presidential Address. Dr G. W. McNab.

Tuesday, April 22nd
Annual General Meeting

Unless otherwise stated meetings will be held in the Royal College of Physicians and Surgeons of Glasgow, 242 St Vincent Street, Glasgow.

**EDINBURGH AND EAST OF SCOTLAND
SOCIETY OF ANAESTHETISTS**

1985

Tuesday, October 15th
The 40th Anniversary Meeting of the Edinburgh and East of Scotland Society of Anaesthetists, including a Symposium on "The History and Future of Edinburgh Anaesthesia." Buffet Supper in the Symposium Hall of the Royal College of Surgeons, Hill Square, Edinburgh.

Friday, October 25th
A joint meeting of the Edinburgh and East of Scotland and the Glasgow and West of Scotland Society of Anaesthetists.
The Royal College of Physicians and Surgeons, St Vincent Street, Glasgow.
Speaker: Professor Brian Jennett, Dean of the Faculty of Medicine, Glasgow University.
"Surgery and Intensive Care."

Tuesday, November 12th
Dr Peter Baskett, Bristol.
"Resuscitation."

Tuesday, December 3rd
Professor Graham Smith, University of Leicester.
"Regurgitation."

1986

Tuesday, January 7
Mr Roger Catto,
Scottish Home and Health Department.
"Hospital Budget Management."

Tuesday, February 4th
Dr James Wilson.
The Presidential Address.

Tuesday, March 4th
Members' Night

Saturday, March 22nd
Dinner. To be held in the Students' Union, Teviot Row House, Bristo Square, Edinburgh

Tuesday, May 6th
Annual General Meeting.
Reception Room of the Royal College of Surgeons, Nicolson Street, Edinburgh.

Unless otherwise stated these meetings will be held at 7.30 p.m. for 8 p.m in the Main Hall of the Royal College of Surgeons, Nicolson Street, Edinburgh.
Further details of meetings etc from Dr D. G. Littlewood, Anaesthetic Department, Royal Infirmary, Edinburgh, telephone 031-229 2477, ext. 2061.

Registrar's Prize

The Society annually awards a prize of £100 for the best original paper or essay submitted by an anaesthetist in Scotland, holding the grade of Senior Registrar or under. A second prize of £75 or a third of £50 may be awarded for other papers of particular merit at the discretion of the assessors. It is not necessary that the Registrar be a member of the Society.

The conditions attaching to the award are as follows:—

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

digest of the paper at the Annual General Meeting of the Society towards the end of April. His/her expenses for the meeting will be met by the Society.

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

The prize for 1985 was won by Dr Geoffrey Bowler of the Royal Infirmary, Edinburgh, for his paper entitled "Effects of post-operative analgesia with epidural blockade or intravenous diamorphine on calf blood flow."

COPYRIGHT

Items included in this Newsletter are copyright of the Scottish Society of Anaesthetists. Requests to republish any part should be addressed to the Hon. Secretary.