BULLETIN 17

THE ROYAL COLLEGE OF ANAESTHETISTS

January 2003

Inside this issue

Sevoflurane Prescribing Information.
Presentation: Amber bottle containing 250ml sevoflurane. **Indications:** For induction and maintenance of general anaesthesia in adult and paediatric patients for inpatient and outpatient surgery. **Dose:** MAC values decrease with age and the addition of nitrous oxide (see Summary of Product Characteristics). *Induction*: In adults up to 5% sevoflurane usually produces surgical anaesthesia in less than 2 minutes; in children up to 7% sevoflurane usually produces surgical anaesthesia in less than 2 minutes. Up to 8% sevoflurane can be used for induction in unpremedicated patients. Maintenance concentrations range from 0.5–3%. *Elderly*: lesser concentrations normally required. **Administration:** Deliver via a vaporiser specifically calibrated for use with sevoflurane. Induction can be achieved and maintenance sustained in oxygen or oxygen-nitrous oxide mixtures. **Contra-indications:** Sensitivity to sevoflurane. Known or suspected genetic susceptibility to malignant hyperthermia. **Precautions:** For use only by trained anaesthetists. Hypotension and respiratory depression increase as anaesthesia is deepened. Malignant hyperthermia. Experience with repeat exposure is very limited. Until further data are obtained, sevoflurane should be used with caution in patients with renal insufficiency. Levels of Compound A (produced by direct contact with CO_2 absorbents) increase with: increase in canister temperature; increase in anaesthetic concentration; decrease in gas flow rate and increase more with the use of Baralyme rather than soda lime. **Interactions:** Potentiation of non-depolarising muscle relaxants. Similar to isoflurane in the sensitisation of the myocardium to the arrhythmogenic effect of adrenaline. Lesser concentrations may be required following use of an IV anaesthetic. Sevoflurane metabolism may be induced by CYP2E1 inducers, but not by barbiturates. **Side-Effects:** Dose-dependent cardio-respiratory depression. The type, severity and frequency of adverse events are comparable to those seen with other inhalation anaesthetics. Most adverse events are mild to moderate and transient: nausea, vomiting, increased cough, hypotension, agitation and bradycardia. Hepatitis has been reported rarely. Convulsions may occur extremely rarely, particularly in children. There have been very rare reports of pulmonary oedema. As with other anaesthetics, twitching and jerking movements, with spontaneous resolution have been reported in children during induction. Patients should not be allowed to drive for a suitable period after sevoflurane anaesthesia. **Use in Pregnancy and Lactation:** Use during pregnancy only if clearly needed. It is not known whether sevoflurane is excreted in human milk – caution in nursing women. **Overdose:** Stop sevoflurane administration, establish a clear airway and initiate assisted or controlled ventilation with pure oxygen and maintain adequate cardiovascular function. **Special Storage Conditions:** Do not store above 25°C. Do not refrigerate. Keep cap tightly closed. **Legal Category:** POM **Marketing Authorisation Number:** PL 0037/0258. **Basic NHS Price:** 250ml bottle £123.00. Further information is available on request from Abbott Laboratories Ltd., Abbott House, Norden Road, Maidenhead, Berkshire SL6 4XE. **Ref.** PI/12/009.
Date of preparation: October 2002.
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ABBOTT ANAESTHETICS
operating with care

ALL AGES

ALL S

STAGES

Sevoflurane

FROM INDUCTION TO MAINTENANCE

THE ROYAL COLLEGE OF ANAESTHETISTS

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Inside Bulletin 17

The views and opinions expressed in the Bulletin are solely those of the individual authors, and do not necessarily represent the view of The Royal College of Anaesthetists

The Royal College of Anaesthetists is grateful for the contribution to the production of this publication by:

Fellows, Members and trainees are asked to send notification of their changes of address direct to: Miss Karen Slater, Membership Officer, at The Royal College of Anaesthetists **tel** 020 7813 1900 **fax** 020 7580 6325 **email** subs@rcoa.ac.uk.

Articles for submission, together with any declaration of interest, should be sent via email (preferred option) to: **bulletin@rcoa.ac.uk**, or by post (accompanied by an electronic version on a floppy PC disk, preferably written in any version of Microsoft Word), to: Mrs Mandie Kelly, Editorial Officer, The Royal College of Anaesthetists. All contributions will receive an acknowledgement. The Editor reserves the right to edit articles for reasons of space or clarity.

President's Statement

I hope that you all had a good Christmas and New Year. If it hadn't been for an Act of Parliament introduced by Lord Chesterfield in 1751, the New Year would still start on 25 March (which was the feast of the Annunciation). In the same Act, the days between 2 September and 14 September 1752 were omitted to bring us into line with the Gregorian calendar that had been adopted by the majority of European countries. During the conversation period in 1752, there were inevitably a number of mediaeval 'metric martyrs' who refused to change, thereby creating chaos with two calendar systems running simultaneously. Can we find here the origins of the process that has culminated in the modern EU with all its internal stresses and strains?

The difficulty of harmonizing the calendars in the eighteenth century has close parallels with the relationship between the UK and mainland European systems of postgraduate medical training and the hassles over the requirements for a CCST. We are currently in danger of the rest of Europe dominating our thinking on educational developments in the UK. However, is it just England having these worries and trying to accommodate the anomalies or will the devolved Celtic administrations declare UDI and do what suits them best? At the moment, there is so much professional uncertainty around that it is difficult to be anything other than anxious. When, from time to time, some small elements of optimism do appear, before allowing my mood to rise I quickly remind myself that every silver lining has a big black cloud around it and slump back into reality.

Professionalism, managers and medical staff

Writing in 1844 in his poem about November, Thomas Hood said:

No warmth, no cheerfulness, no healthful ease,
No comfortable feel in any member –

After the results of the ballot on the proposed consultants' contract these lines appear to sum up the mood of not only the doctors but also the managers. The 'yes' vote in Scotland is another step in the break-up of a UK wide NHS: the 'no' vote in England and Wales allows the introduction of individual pay bargaining with the option of separating pensionable and non-pensionable service. I do hope that the government has not been taught a lesson the profession will come to regret. The consequences of a worthless victory carved a niche in history for Pyrrhus, the king of Epirus when he defeated the Romans with unsustainable losses in 279BC. I fear that we also might soon experience the fruits of a pyrric victory. It may be that a satisfactory settlement will be reached quickly, but I doubt it.

As I write in the middle of November, the Queen's Speech is being broadcast, Foundation Trusts with their extended powers are being given the go-ahead, doctors are wondering what will happen and the BMA is on the ropes. The drive to more locally determined services has been launched as the European Working Time Directive (EWTD) gets ever closer, final-salary pension schemes are under threat and top-up fees for university education are being considered. Every reason therefore for doctors to be feeling a little challenged, but recently I was at a meeting where the managers appeared to be not dissimilar in outlook. The question is why, when they may be about to get a considerable extension of their powers?

The reason is the adverse publicity they received when the media started to report that doctors had turned away higher salaries because they cared about clinical standards and mis-trusted managers who were driven by centrally determined, numerically-based, performance targets. Nobody likes to be branded as uncaring. In addition, a poll of over 400 NHS senior managers[1] showed that 51% felt unable to raise concerns about the service, or their organisation, for fear of recrimination.

So now everybody is fed up and the politicians are bad tempered – terrific!

Changing behaviour for the benefit of patients

When sticking up for standards at a recent meeting an irritated 'health expert' said to me 'What you need, Professor, is a good dose of behaviourism'. I didn't know what that was so I looked it up. Behaviourism (says the OED) is the theory that behaviour can be explained in terms of conditioning, and that psychological disorders are best treated by altering behaviour patterns. WH Auden, writing in 'A Certain World' in 1970 gave it short shrift. He said:

'Of course, behaviourism 'works'. So does torture. Give me a no-nonsense, down-to-earth behaviourist, a few drugs, and simple electrical appliances, and in six months I will have him reciting the Athanasian Creed[2] in public.'

Well, with little encouragement for behavioural change, I think that in different ways both doctors and managers have, over the last few years been subject to slow torture: the doctors because of the unethical erosion of control over clinical standards and the managers because of impossible performance targets. Now, I am pleased to say there may be a resolution.

Our College and the Academy have been pressing on quietly but persistently trying to improve the interaction between managers and clinicians. Two documents have now been issued by the Department of Health (DOH) which will be very important in the

1 British Medical Journal 2002; 325:792.
2 In context, this implies a sudden change of strongly held beliefs.

future. The first is a *Code of Conduct for NHS Managers*[3] which puts as its first commandment that:

'As an NHS manager, I will … make the care and safety of patients my first concern and act to protect them from risk'

The second is a statement of principles on skill-mix within a paper entitled *'Developing the roles of health professionals'*. It includes the following bullet points related to the introduction of skill-mix:

- *It should be clear to patients and professionals where responsibility for any role or task lies, and there should be appropriate processes for the delegation and referral of patients.*
- *Role developments must not compromise patient safety or the quality of care or outcomes, and*
- *Changes in roles should be supported by appropriate investment in education and training.*

Now, based on quality of patient care, there is a clear way in which we can link positively with management. Obviously, we need to get stuck in and become involved in decisions on patient services or we will have little effect. If, however, we do, there are now agreed DOH guidelines that put the clinical care for patients first and allow a bond to be formed between clinicians and management based on quality rather than on throughput targets.

Do the sums add up?

I am not an economist but remain concerned about the new investment in the NHS and just what we can expect to get from it. In trying to research this, I have discovered worrying data from two sources. Health data from the countries in the Organisation for Economic Co-operation and Development[4] demonstrate just how much catching up Britain has to do. All the so called 'whining and grumbling' the Colleges have been doing over the past ten years to try to maintain high standards of clinical care and training can now be seen to have been an accurate reflection on what was happening. There are currently 1.8 practising doctors per 1000 people in the UK compared with a European average of 3.1 per 1000: France has 8.4 in-patient beds per 1000 population compared with 4.1 in the UK. Superficially, the huge increases planned in UK health spending will do much to redress the balance. But will they?

Public sector spending and inflation within it are notoriously difficult to define and predict. Because of this the boffins at the Office for National Statistics[5] use an index called the public sector deflator. Basically it measures the extra cash you need each year to stand still and as such is an indirect measure of public sector inflation: it is now running at 4%. So, with a figure of 7.4% per annum increase committed to health spending in the last budget, Mr Brown has to spend 4% of it every year just to stand still and, furthermore, obtain it from an economy growing at half this rate. Consequently, as Sir George Alberti is trying to acquire more trolleys with well-oiled wheels to reduce waiting times in A&E departments, the wheels on Mr Brown's trolley appear increasingly wobbly. No wonder he and Mr Milburn disagree on mortgaging the future.[6] However, I'm not an economist, so I may have got it all wrong.

The truth, the whole truth and nothing but the truth

At the end of October I had to chair a press conference to launch the latest set of outcome figures for cardiac surgery prepared by the Society of Cardiothoracic Surgeons of Great Britain and Ireland.[7] This year, for the first time results have been presented on a unit-specific basis. The data demonstrated that the UK compared well internationally and that there was little significant variation between hospitals. As usual, the persons of the press divided into those who were genuinely interested and those who wanted headlines and soundbites. In future, the government would like to see outcomes correlated with individual surgeons and anaesthetists. The question is, is this in the public interest?

The pros and cons were discussed recently in some detail by Stephen Westerby, a cardiac surgeon from Oxford.[8] He argued cogently that clinician specific league tables transfer the clinician's attention from patient care to self-preservation. This has been amply demonstrated in the US. In Pennsylvania, 63% of surgeons are now less willing to accept severely ill patients because of public reporting. 59% of cardiologists reported increased difficulty in finding surgeons to operate on high-risk cases and those who do so automatically fall to the bottom of the 'performance' league table. The drive for truth appears to be overwhelming the clinicians' ability to cope not only with the stress of constant adverse vigilance, but also the time commitment and 'hassle' needed to deal with all the enquiries. Once patients realize the consequences of absolute truth, we may move back to a more fruitful policy of continuous, audit–led improvement. We are in discussions with the DOH over this matter.

NCEPOD continues to serve us well

The National Confidential Enquiry into Perioperative Deaths (NCEPOD) needs congratulating on three counts. Firstly they produced an excellent annual report which was highly relevant to anaesthesia and critical care:[9] secondly, they have had the sense to appoint our Vice-President, Peter Simpson to be their next Chairman: and thirdly they have decided to revisit the timing of

3 Available at www.doh.gov.uk/codeofconductfornhsmanagers
4 Available at www.oecd.org.uk
5 Available at www.ons.gov.uk
6 British Medical Journal 2002;325:856.
7 The Society of Cardiothoracic Surgeons of Great Britain and Ireland; National Adult Cardiac Surgical Database Report 2000–2001; Dendrite Clinical Systems, 2002.
8 Westerby S. League tables, risk assessment and an opportunity to improve standards. British Journal of Cardiology (Acute Interv Cardiol) 2002;9:5–10.
9 Available at www.ncepod.org.uk

surgery in next year's edition. The latter will provide vital data to underpin further rationalization of urgent and emergency operating – a key component of the actions necessary if we are to prevent NHS meltdown in August 2004.

In particular, the report draws attention to the shortage of consultant CCU sessions, the need for monitoring and the functionality of the overall clinical team. There was also a strong recommendation made that if a trainee was undertaking a major case, the name of the supervising consultant should be recorded. This responsibility to trainees, i.e. that there must always be a named person available for support, is clearly stated in the College training documents. This does not mean that they necessarily have to be immediately available: we all know that part of learning is being on one's own. It does however mean that the decision as to where the consultant is should have been taken deliberately and sensibly and not left to chance.

The EWTD (again)

Last October the College sent out a letter to all Chief Executives, Regional Advisers, Programme Directors, Postgraduate Deans and College Tutors concerning the EWTD. It pointed out the problems that our specialty has which are, in fact, worse than any other hospital group. It exhorted people to talk together and to put quality of care and training to the fore. The College will do everything it can to help those trying against the odds to find solutions. Centrally, through the Academy a cross-College group is talking to the DOH and NHS management has now begun to grasp the nettle.

Could I please emphasise again that innumerable appointments to suspect, non-standard posts are not the answer; neither is a registrar's working week that consists of one day of anaesthesia and two nights on call, (especially if the latter are spent only on the obstetric unit and the ICU). Please, please adopt a sensible approach and use the College to help you. Now, everybody who matters in the DOH and Government is aware of the consequences of the EWTD legislation and the punitive on-call rates that cut in sequentially over the coming months. The reduction in workforce hours available put the aspirations of the NHS Plan in great jeopardy. This is a problem for everybody and quick fixes are to be avoided.

The PMETB

The Postgraduate Medical Education Training Board (PMETB) will replace the Specialist Training Authority later this year. The Statutory Instrument (SI) to take it through Parliament was published in early November with a consultation period of 12 weeks which ends later this month. As suspected, the SI does not closely follow the really positive 'Statement of Policy' on postgraduate medical training agreed between the DOH and the Colleges in September. It is currently causing me catecholamine secretion and sleep deprivation. Taken at its worst, the SI allows the Secretary of State to appoint everybody on the PMETB and, when appointed, for them to take no notice of the agreed 'Statement of Policy'.

Naturally, we have been given verbal assurances that this will not occur and I even have a letter from Mr Milburn to that effect. However, the Colleges are now in the same boat as the consultant body voting for the contract: there is such a history of disaffection from both sides that nobody trusts anybody else, especially when the new Board will control the regulations for the award of a CCST. The government thinks the Colleges are reactionary bastions obstructing progress; we think they care only about numbers and little about quality. Neither statement is of course true but emotion underlines our thinking. The outcome may be decided simply because they have a parliamentary majority of over 160 but in the meantime we will be pressing on with the Academy to get better representation in the new legislation for the Colleges who, after all, are the only bodies with Charters to protect the public.

Scotland the brave

Our RCA Board in Scotland is doing well and is currently contributing to a major advance in anaesthesia safety. For some months, the Board has been collaborating with the Clinical Standards Board for Scotland to produce minimum standards for the safe provision of anaesthesia, wherever it is carried out in the country. This initiative began under the previous Chairman, Tony Wildsmith, and is being continued by the new Chairman, Gavin Kenny. The public is being fully involved and there have been open meetings in Glasgow and Aberdeen to allow a wide input of opinion. The draft documents look excellent and when the exercise is completed, no longer will individual anaesthetists have to fight unsupported to maintain proper standards: they will simply have to be met as a basic expectation of hospital activity. Once accepted north of the border, why not in the rest of the UK? This is undoubtedly a development to keep an eye on.

Back to basics

Criticising what others do is easy and usually a rather cheap form of point scoring, but earlier in the year I was irritated by an article in a leading journal on blood conservation during surgery that was accompanied by an expert 'Science Commentary' entitled 'Why is it important to reduce the need for blood transfusion, and how can it be done?'. There were comments on erythropoetin, autologous transfusion, perioperative dilution and cell salvage. Basic measures such as stopping the bleeding, preventing hypercapnia, the use of tourniquets and subcutaneous vasoconstrictors were never mentioned. There is, I feel, still a lot to be said for down to earth, straightforward clinical training. This can only be learned through hours of contact as an apprentice in the workplace: books are no substitute for real experience under pressure. That things can be learnt from books and questions answered in written examinations must never be allowed to be given as a reason for reducing clinical training time or doing workplace assessments. If the clinical contact hours for trainees are to be reduced yet further, they must be spent wholly with patients and not allocated to sleeping or reading.

Nil carborundum illegitimi and keep smiling.

Peter Hutton

Guest Editorial

Selecting the best anaesthetists

To whom is selection of the best anaesthetists crucial? Clearly it is important to patients, to whom we have a duty to provide the highest possible standard of care. It is also important for trusts, departments of anaesthesia, to potential colleagues, to the doctors themselves and also to their families. Departments of anaesthesia are the sum of their individual parts. The individual strengths and personalities of its anaesthetists define a department's character and effectiveness as much as their clinical abilities. As established consultants we may work with new consultant colleagues for the rest of our professional lives. Trainees, on the other hand, come and go, but our working relationship with them is often closer on a day to day basis. We have an equal duty to the applicants themselves. Making the wrong choice for a post leads to unhappy doctors. They work poorly and make mistakes, which reinforces our duty to patients. They can also be like a stone creating a ripple in a pond, having effects within their workplace, their families and beyond.

General principles

The principles of good appointments are well known. They should be appropriate, legal, fair and defensible. Legal issues are covered by three main pieces of legislation. These are the Race Relations Act (1976), the Sex Discrimination Act (revised in 1986), and the Disability Discrimination Act (amended 2000). Most trusts and deaneries now require those sitting on appointment panels to have received formal training in appointment procedures. Discrimination may be either direct, such as excluding people of a particular ethnic background or sex, or indirect, when conditions of appointment are applied equally to all applicants, but one group is less able to comply than another. This is much more insidious than direct discrimination, and may occur inadvertently in some cases. An example of such practice might be a requirement for all candidates for SpR posts to be qualified for less than four years. This would be unrelated to the post being offered, and overseas candidates coming to the UK after a postgraduate period in their own countries would be less likely to meet the criteria. If in doubt, the question an interviewer must ask themselves should be 'why would this affect the candidates ability to do the job?' If there is a clear answer, and the question is applied to all candidates, then it can be used.

The need for fairness covers the whole appointment process, from equality of access to all potential candidates at the initial stage of hearing about the post, throughout the actual appointment and to the offer of a job. Defensibility against appeal necessitates the keeping of accurate and clear records about all stages of the decision making process. Unless the final result is also appropriate, however, this is all worthless. This is the hard part.

The evidence

What evidence is there as to how appointments should be made? Work from overseas, mainly the United States,[1,2] has looked at different components of the appointment process, and given them a reliability coefficient. Biodata (or curriculum vitae) has a low reliability, as do references. This is not surprising, if one considers that the curriculum vitae is the candidate selecting and editing, on their own terms, the information that they wish the panel to be aware of. This can be partially addressed by the use of application forms. References, in particular unstructured references, are third party judgements, and will not only reflect the referee's personal values and motives rather than necessarily those of the committee, but also will reflect, by the manner in which they are written, the personality and style of the referee.

Available research suggests the single most discriminatory process is the structured interview. The difference between this and an unstructured interview is that the areas covered are standard to all candidates and designed to satisfy the requirements as set out in the person specification. Individual questions may differ, as suggested by information already obtained from the curriculum vitae, or a single stem may lead in different directions for each candidate. A stem question should start in an open manner, when the candidate is encouraged to impart information to the panel, and then focus down to the stage when a candidate may be asked to make a choice between two possible positions. It is suggested that questions should be based on behavioural or situational scenarios, where the candidate is given a hypothetical situation relevant to the post and asked to respond. How useful this is in practice can be determined by the previous experience of the candidate, so it is more useful for SpR or consultant appointments in anaesthesia than for the novice SHO.

Structured interviews can be improved further by a defined scoring system for the candidates response. However, this can be very difficult to implement in practice.

Other attributes of the candidate which appear to have good predictive capacity are cognitive ability and conscientiousness. Together with intelligence these make up a concept called Effectiveness Quotient (EQ). It is like an applied Intelligence Quotient (IQ). All potential anaesthetists have succeeded at medical school, and so there is little doubt that they have a high level of basic intelligence. This does not mean, necessarily, that they will be able to apply this effectively in the workplace, which is why cognitive ability and conscientiousness are important factors. Together, EQ and structured interview are the best dual approach. Other selectors can be used, but medical appointments are almost always constrained by resources and time, so tests such as personality profiling, used widely in some industries, but not widely validated within medicine, are impractical for use in current UK anaesthetic practice.

The process

All potential posts go through several basic stages: construction of a job description and person specification, the advertisement, application, short listing, and the 'peri-interview' period.

In reality, the whole process is driven by the person specification. Although many institutions use a generic specification, with minor modifications for a speciality, if proper thought is given to the requirements needed for the post, these can prove a very useful tool. If it is combined with a clear indication of when different attributes will be explored (such as used by the London Deanery in the document 'Consultant 2000'),[3] then the person specification can be used to identify not only the objective qualifications of the ideal candidate, but also to form the basis of a relevant and probing structured interview, looking in depth at subjective qualities. You need to decide what these should be, however! A department appointing a consultant colleague may need a team player, a diplomat, or a mover and shaker at different times, and they should ensure that they are able to make the right appointment. This can be enshrined in a carefully worded person specification.

Appointments to different grades within anaesthesia are governed by differing sets of rules, laid down by trusts, deaneries, or the Department of Health.[4] All operate to ensure the same basic principles are followed, essentially that all the relevant 'stake holders' have input into the process, and that expertise is available to the panel to make the appropriate choice.

Current practice in the UK normally features two main selection components, short listing, and an unstructured or semi-structured interview. Short listing is often contentious, especially if several 'stakeholders' are involved. The ideal situation would be for short listing to be an exclusion process, whereby only unsuitable candidates are weeded out. This is often impractical, especially for the training grades, so the result can be that arbitrary, but easily measurable, criteria are selected to get down to a manageable number. The panel must agree to a set of criteria to be used, and critically evaluate these to decide why they should be used as predictors of success.

In the London Deanery, in order to try and avoid problems with agreeing short listing criteria, we have tried to go back to the original purpose of short listing as an exclusion process. This led us to the problem of how we could adequately interview, in a single day, as many candidates as we would wish. Interviewing over several days was both impractical and difficult to defend in terms of fairness, so we devised an approach not unlike an OSCE examination. Candidates rotate around several tables, manned by three committee members. They have a specific brief, which they have more time to explore than would be possible in a conventional interview. Candidates are not facing a large panel, so can talk in a more informal way, and better information should be obtained. Structuring the interview is easier, and documentation is more comprehensive, gained in the same way as in the FRCA examination, being scribed by one of the panel. It also fulfils the need for the whole panel to see each candidate, and allows panel members to develop areas of expertise. By collecting data from sequential interview processes, we can explore which are the most discriminatory aspects of the interview.

We need as doctors to ensure that selection receives the status that it deserves, it is so important for all concerned. At the moment there is comparatively little evidence as to the most effective methods to employ, and we are often driven more by practical issues than good appointment practice. Nevertheless, solutions to some problem areas can be found, with willingness to explore innovative methods.

Dr Jane Pateman
Regional Adviser, South Thames (East)

References

1 Bobko P, Roth Pl and Potosky D (1999). Derivations and implications of a meta-analysis matrix incorporating cognitive ability, alternative predictors and job performance. Personnel Psychology;52:561–589.

2 Hunter JE, Hunter RF (1984) Validity and Utility of Alternative Predictors of Job Performance. Psychological Bulletin;96:72–98.

3 Consultant 2000. www.londondeanery.ac.uk/publications

4 NHSE (1998) A Guide to Specialist Registrar Training, DOH.

Non-consultant career grades

Dr C J Rowlands, NCCG Committee

Competency Assessment and Career Progression

Andy Lim and I recently attended a meeting at the BMA which looked at the possibility of using competency-based assessment as a tool for career progression. This work is currently in its very early stages and as yet has no clear aims or definitions. For example, what is career progression? Ideas which come to mind include recognition through wider clinical responsibility, optional salary points, progression to Associate Specialist status for Staff Grades and Trust Doctors, or perhaps ultimately progression to the Consultant grade. On the other side of the coin, who would define the required competencies for the desired outcome and who would assess them? Where would the resources (time, people and money and expertise) come from?

Recent developments abound and confuse the issue. The recent report on the SHO grade, 'Unfinished Business', promises a wide ranging review of the Non-Consultant Career Grades before reforming the SHO grade. The NCCG review appears to be happening behind closed doors though at the College we are very keen to have some influence, if we are given the chance. Recent proposals to replace the Specialist Training Authority and its Certificate of Completion of Specialist Training with a new Postgraduate Medical Education Training Board and as yet undefined Certificate of Completion of Specialist Training move the goalposts for progress to the Consultant grade. With so much up in the air, my own view is that the best short term aim for the majority would be career progression/improvement within grade, through the development of new areas of practice and responsibility. Perhaps competency based assessment will have a bright future if the Consultant grade is redefined by the PMETB, though I can't see it having a major impact before then – the criteria for the award of a CCST require far more than a demonstration of competence! Andy and I have our own views but we need yours if we are to fully represent you – please email me (crowlands@doctors.org.uk) or write to me at the College.

Appraisal

Appraisal is upon us. The Department of Health has finally issued Advance Letter (MD) 05/02 to employers with instructions for appraisal for NCCGs, making NCCG appraisal compulsory. The appraisal process will for the first time look at where each individual is, where he/she needs to be going and the resources needed to get there. Importantly, the annual review will look at how effective the previous year's plan has been. Appraisal will be a flexible and powerful tool in the quest for job satisfaction and career progression and I hope that in the future we will be able to use it to enhance our role and responsibility in the delivery of services. All this is some way off, but in the short term I believe that appraisal will be a more realistic and useful tool than competency based assessment.

Publications

The Department of Health Advance Letter (MD) 05/02 and the documents 'Unfinished Business' and 'The General Medical Practice and Specialist Medical Education, Training and Qualifications Order 2003' can be found at http://www.doh.gov.uk/publications/coinh.html.

Please send articles for submission, together with any declaration of interest, to the Editor of Trainees' Topics, Dr Mark Garfield, via email (preferred option) to: mark.garfield@ipsh-tr.anglox.nhs.uk, or by post (accompanied by an electronic version on a floppy PC disk, preferably written in any version of Microsoft Word), to: Department of Anaesthetics, The Ipswich Hospital, Heath Road, Ipswich, Suffolk IP4 5PD.

The Editor reserves the right to edit articles for reasons of space or clarity.

The finance function of the College and how it affects trainees

Mr K Storey, College Secretary and Finance Director

The finance function of the College separates into two broad areas: firstly, Membership, who maintain contact details for the delivery of journals, publications etc. and the collection of registration fees and secondly, Finance, who manage the cash and account for spending the College's money.

Membership

The Membership department consists of two full-time staff: Karen Slater and Alison Clark. Together they maintain the details of 11,500 Fellows, Members and trainees on the College database. Each year they handle 3,000 address changes alone, predominately trainees. Keeping on top of all changes is absolutely paramount to providing a good service. Their normal working day consists of a mixture of data input, selling College ties over the telephone and answering general queries received via letters, telephone calls, or emails. These can include creating an address at Aunt Bessie's for a period of three weeks that coincides with sitting an examination to having all mail sent to a parent's home for 12 months whilst the trainee serves as a doctor to an expedition to the Antarctic. It is not sufficient having our database up-to-date, the information has to be relayed to the Oxford University Press who print and distribute your journals. Two years ago Membership staff had to print out each address manually, but now, through improvements in the College's IT systems they exchange information electronically.

All Fellows, Members and trainees pay their subscription or trainee registration fee on 1 April or 1 October depending upon when they started their association with the College. This is a busy time as approximately 5,000 direct debit letters and invoices have to be printed and dispatched every six months. The astute amongst you will have calculated that approximately 1,500 do not pay a fee; these are trainees in their first year and some retired folk. The Membership department workload also includes letters chasing up late payers, although these are getting fewer each year. I am particularly proud that last year the College received 99.1% of all subscription income requested. No other medical Royal College can match that. I believe that the reason for this impressively high figure is the increased confidence that anaesthetists at the sharp end have in the College and its Council. I appreciate that trainees have no option but to pay their fee if they wish to go on to the Specialist Register, but trainees account for only 5% of subscription income.

The Membership department also maintain a small supply of journals etc. that they send to trainees who suddenly realise that examination time is looming and that they are not in possession of a copy of that vital issue. The reasons for non-possession can range from the subscription renewal having fallen down the back of the settee, to the next door neighbour unilaterally redirecting the mail in retaliation for that noisy party.

Finance

The greatest part of expenditure incurred on trainees is that of running the examinations. It is sometimes thought that Colleges charge too high a fee to trainees. Here at the Royal College of Anaesthetists this is incorrect, for at least the past three years the total income from examinations has been just less than the total cost of supporting the whole examination process. Trainees are not therefore seen as a source of income. I will not go into detail about paying the bills etc., but suffice it to say that a lot of work goes into ensuring that papers are ready to sit and that desks and chairs are available to sit on.

I hope that you will note from the tone of this article that we try to stay in touch with reality and attempt to help trainees whenever possible. You are, after all, tomorrow's consultants and potential Council members.

‘I have never tried it because I don’t like it’

Dr A R Wali and Dr C Busby, Specialist Registrars, The Royal Glamorgan Hospital, Mid Glamorgan

‘Why is the induction of general anaesthesia performed in a separate room and then an unconscious and unmonitored patient transferred into theatre?’ was the first question I asked myself when I started working in the UK. My previous anaesthetic experience had been in Pakistan where we routinely anaesthetised all cases in the theatre itself.

Following a critical incident with one of my patients, who had become severely hypotensive after induction and during transfer, I became especially interested in the multiple dimensions of the problems of these seemingly short transfers. The patient in this case was a middle aged, moderately obese lady, who showed signs of systemic sepsis. As I felt her pulse becoming thready while entering the theatre, I realised that my ephedrine was still in the induction room, and that the crystalloid infusion was not running. My priorities at this stage were to correct what I thought clinically was severe hypotension. At that point, when I was physically close to two sources of oxygen and two sets of monitoring, but connected to neither, I began to question the logic of separate anaesthetic rooms. The rest of the staff, in the absence of any alarms or politically incorrect numbers on a screen, did not seem to share my sense of urgency to get everything connected and running.

Listing what has to be done made me realise the risk we all take. It includes: getting the patient near to the anaesthetic machine and usually transferring from trolley to table (increasingly time-consuming as patients seem to get heavier and correct manual handling procedures are followed); connecting the breathing circuit; turning oxygen to a high flow and starting positive pressure ventilation; reconnecting the pulse oximeter, ECG and blood pressure cuff and taking a set of readings; hanging and restarting the fluid. In my patient’s case, the ephedrine had to be collected, when all the while, the theatre staff ignored my concerns and busied themselves with positioning, exposure, diathermy pads etc. I believe that even though she did not come to any permanent harm, this was poor risk management by me, and the single most important factor in this case was the use of two different locations to administer one anaesthetic for one operation for one patient.

I thereafter conducted a survey of 30 routine peri-induction events in a UK District General Hospital setting, and found that the mean time spent disconnected from a breathing circuit was 35 seconds, but that it was much longer in some cases. The time spent disconnected from full monitoring ranged from 90 seconds to three minutes. At this time of crucial haemodynamic instability, the anaesthetist has to perform multiple tasks and is distracted by them from close patient observation. I also noted that in two cases, blood pressure had fallen sufficiently far during transfer to require urgent attention and intervention. There was a significant fall in oxygen saturation in two cases. Presumably these changes would have been detected sooner had there been no interruption in monitoring. In four cases, blood pressure was not checked after induction until the patient had been transferred into theatre. In one case the airway monitoring was not used in the theatre in spite of being available.

A survey conducted 12 years ago showed that the majority of anaesthetists would prefer to keep the induction rooms, mainly because of ‘anaesthetic independence’.[1] There have been two editorials published in Anaesthesia in the last decade, both pointing to the fact that ‘just because I like them’ may not be a good enough reason to retain the current use of anaesthetic rooms and identifying the need for evidence to justify the practice, which has even been described as ‘clumsy and ill conceived’ by D Brahams, Barrister-at-law, in a commentary on an accidental anaesthetic death.[2]

There are numerous other issues besides interruption in monitoring and ventilation. Unrecognised oesophageal intubation is a potential disaster, and displacement of laryngeal mask airways, endotracheal tubes and intravenous cannulae during transfer are not unusual occurrences. More subtle issues of repositioning an unconscious patient and the potential for awareness have also been raised. We have to alter the depth of anaesthesia unnecessarily to accommodate the journey; vaporisers and nitrous oxide are often left open only to be noted later after polluting the atmosphere. Staff requirement is naturally high for this logistic venture. Duplication of equipment has major cost implications. For these and a few more reasons, many have reported a change in practice among UK anaesthetists. Traditional arguments against routinely inducing in theatre are reduction in patient anxiety, reduction of case turn over time, storage of anaesthetic equipment, regional anaesthetic procedures, avoidance of intrusion (peace and quiet),

time available for the surgical team to prepare instruments, paediatric patients being able to be accompanied by the parents and the lack of any critical incident reports to indicate a problem.

The Ipswich experience

One UK hospital decided to analyse the matter systematically, following Witting and Wilkinson's editorial 'A safe haven or dangerous place – should we keep the anaesthetic room?'[3] A trial of 'theatre inductions' was carried out at Ipswich Hospital, nearly ten years ago to assess the possibility of a change in practice. The results showed that there was much scepticism and need for re-education of staff to implement the change. There was no significant delay to the lists with in-theatre inductions. Patients found it perfectly acceptable. Nursing staff could lay up instruments without a problem. Parents could be accommodated in theatre with children. Uninterrupted monitoring at the time of most haemodynamic instability was possible. There was opportunity for better training of juniors as focus stayed on one case at a time. A continuing minor problem was ensuring a quiet environment, but education and retraining of staff effectively rectified this problem. Anaesthetic rooms were still used for preparation prior to theatre in a different role.

In view of these results reorganization was implemented, and induction rooms, although physically not removed, were used in a modified way, e.g. venous access was established and BP cuff and ECG electrodes applied. In the new set up, routine inductions now take place inside the theatre and only one mobile machine with full monitoring is required as back-up for each theatre suite.

Significant cost reductions, improved results and satisfaction are claimed as a result. It is claimed that additional resources are thus made available for other facilities such as the High Dependency Unit.

Is it simply a matter of tradition and convention, like the left handed Boyle's machine, or is there a compelling need to retain induction rooms? Long before anaesthetists in this country had a separate Royal College, they had their own room for the induction of general anaesthesia. The anaesthetic agents in those days were much slower and monitoring requirements much simpler. The theatres could be more frightening and the nature of surgery was different. Could a prized asset of the past be a liability in the future? I propose that a change in their function could help us keep anaesthetic rooms in the future, when every aspect of medical care will need fiscal and risk management justification for its existence.

We as anaesthetists should realise that induction rooms somehow create a sense that an anaesthetist is in charge only in the induction room, and rest of the time he works for the surgeon in his theatre. In my view the operating theatre should be equally equipped and designed to be used for both anaesthetic and surgical use. This shift in function will also emphasize that, while the surgeon takes care of the anatomy, the patient's physiology is not left behind in a little side room, and that comprehensive care of the patient involves both of these aspects. I strongly believe, in terms of risk management, that we are better off focusing the anaesthetic at one location, with one set of equipment, to which the patient remains connected at all times.

If anaesthetising in the theatre is the safest option for the most critical of cases like a leaking aortic aneurysm, surely it must be the safest option for every one.

Acknowledgement

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The Diary of Recovery Nurse Bridget Jones

Sister Elaine Johnston, Recovery Team Leader, Royal Hospital for Sick Children, Glasgow

At the start of summer, 30-something Staff Nurse Bridget Jones, whose daily successes and failures are measured by counts of sickness and absence levels, decides to take control of her Recovery Room and starts keeping a diary. Despite her efforts to get her act together, she finds herself dangerously caught between her nursing and medical colleagues. This snap shot of her diary presents the reader with a dazzling satire of modern recovery room occurrences, where her thoughts and feelings are jotted down for the purpose of identifying the perfect anaesthetist.

Monday, 7 June

Three critical incidents (post airway list); two cardiac arrests; six late running lists; one parent fainted; one drug error; one throat pack left insitu.

0620 hrs Alarm clock does not go off. Busy day ahead. Must find out what makes the perfect anaesthetist. Can't think! Should I look at qualitative or quantitative data or use the in-house statistician? I don't know how I can define the perfect anaesthetist. Feeling totally overwhelmed. Must remember to appear keen in front of staff – keep morale high. Must make a mental note to ask staff what makes the perfect anaesthetist.

1630hrs Dissension in the camp! Staff can't agree on what makes the perfect anaesthetist. Interestingly, read a paper that stated the nursing profession has a tendency for internecine warfare, a line from that famous Pogo Paper: 'We have met the enemy and he is us'.[1] Regretfully true. Digressing again … Had vowed never to audit, research any papers, benchmark or do anything that involved extra work. Panicking now!

1800hrs Still don't have a clue as to what makes the perfect anaesthetist.

2330hrs Chablis, peanuts, statistics and more bloody homework!

Tuesday, 8 June

Four hours of CME; 11 pounds lost (excellent!). One successful resuscitation (not bad considering the anaesthetist); six blocked cannulae; one child fell off trolley.

0900hrs Reading the Good Practice Guide by The Royal College of Anaesthetists certainly does not match Harper's and Queens, Hello or OK magazine. Phew, sigh of relief, most of the guidelines can be plagiarised – more importantly they are not subject to copyright law (pretty decent of the authors). Absolutely freaking out, nothing particularly tangible to go on. Must look at the behaviour of anaesthetists. Yes, that's it, I will look at certain parameters. I'll look at the quality of the handover; how the anaesthetists leave the patient. I will check to see if the anaesthetist waits to see the first recording of the saturation, heart rate and BP. I am on a roll now. I will audit if clear instructions about the recovery care are given and note down if the anaesthetist returns to review their patients. Of course not forgetting the most important part, noting if the recovery nurse is happy with the quality of the handover.

Must make a mental note to self: 'continuation of care demands a good quality handover'.

Thursday, 9 June

Recovery room running smoothly; seven staff, three moved to other areas; lunchtime pandemonium; only two nurses able to recover adequately; doctors recovering patients. Frantic now.

0440hrs Can't sleep, feel that I have created a monster, watching every anaesthetist that moves in recovery. I wonder if they realise that they are subject to a point scoring system 'three arrests and you are out'. Notice that there are plenty of Dr Do-Littles, Dr Whos, but thankfully no Shipmanesque characters. Hopefully I'll find my Dr Darcy the perfect anaesthetist.

So stressed out that I can't even think about making another journal entry!

Friday, 10 June

One near miss; alcohol units 10; 1000 calories lost (must be shopping frenzy) or time spent getting anaesthetic charts written up (bad psychologically but very good exercise running back and forward to theatres).

1400hrs Now that I have had my ten units of alcohol, I have a vision of the perfect anaesthetist. Someone who can intubate the most difficult airway and cannulate the trickiest vein (Seldinger not humdinger technique). The perfect anaesthetist answers any queries raised by the recovery staff politely! Ever the pragmatist he offers solutions regarding the patient's care. He lets you know about any apnoea, bleed or any untoward events that may occur perioperatively. The perfect anaesthetist has soporific patients not handovers.

The perfect anaesthetist, like that well known insurance company, 'does not make a drama out of a crisis' ... or is it a crisis out of a drama!?!?

1805hrs I have just woken up. I realise that I have been dreaming about the perfect anaesthetist. Fortunately every anaesthetist looks like Dr Doug Ross (alias George Clooney) and to ensure that my

older nursing colleagues don't think that I am ageist I will mention Dr Quincy MD. Yes … should keep everyone in recovery happy.

In a panic again ... how do I know what makes a perfect anaesthetist? The safest anaesthetist probably never even touches a patient, just as the safest surgeon never operates and the most economical hospital is one with no patients (I think there was a TV programme about that hospital). Digressing yet again! (Digressing means to deviate from the subject). Wasted more time at 1810hrs looking up a thesaurus.

2200hrs I have to get my head round what makes the perfect anaesthetist. I know, I will start with the basics ABC. Airway Breathing and Circulation. All right, lets look at A. A = Airway, the perfect anaesthetist can manage any airway, difficult or otherwise. He is dexterous with a laryngeal mask, endotracheal tube or tracheal wand light. Pierre-Robin and Treacher-Collins syndrome pose no problem and if all else fails, he can perform a tracheostomy with a medicut cannula. B = Breathing, after every successful anaesthetic the patient still breathes assisted or otherwise. C = Circulation, after surgery the patient has a heart beat and blood that is circulating, preferably still in the vessels. Oh God! Feel like Professor Higgins in Pygmalion. By Jove I've got it! ABC. So the perfect anaesthetist knows his ABC. The recovery nurse can use this as a guide to assess what makes the perfect anaesthetist:

A = Affable, if the anaesthetist is affable he generally gets on well in recovery and any minor error or omission is overlooked. Recovery staff tend to help him and are keen to look after his patients post-operatively.

B = Beautiful, if the anaesthetist is beautiful and generally pleasing to the eye, again he tends to do better than his unsightly counterparts.

C = Confident, if the anaesthetist is confident he tends to have the recovery staff's trust and will be viewed favourably.

Digressing again – what does perfect mean! (Definition required – dictionary this time) complete; unspoiled; correct; precise; excellent – (vt) improve, make skillful. Hopefully, anaesthetists perfect their skills which in turn leads to improvement which yes, yes, yes, yes (oops sorry wrong film) in time could lead to perfection Harry, (and of course Sally).

I feel the anaesthetists are a much maligned breed, much like recovery staff – some of the public actually believe that anaesthetists are not doctors, (feel a common bond – feel like Archimedes, shouting eureka!) the perfect anaesthetist has many similarities with the recovery nurse. So the perfect anaesthetist is like a good recovery nurse. Now there's a thought …

2300hrs Hopeless situation, I thought this would be an easy task. What makes the perfect anaesthetist? I believe he has maturity, is skilled, has good communication skills and likes people. No, no, no, sounds like the dialogue from a Miss World pageant only she invariably loves animals too. The perfect anaesthetist can intubate, cannulate and transfuse a patient in the time that it takes for the ice to melt in a large gin and tonic. The older anaesthetist, sorry, the more mature anaesthetist, likes the finer things in life, nice wine, fine dining, hunting, shooting, and fishing. Obviously drinking and target practice feature highly. Oh gosh … stereotyping again – the younger anaesthetist tends to like sun, sea and suxamethonium. Really, must stop stereotyping. Some female anaesthetists have a penchant for Labradors. Must remember there are always exceptions in life. Hmm … target practice – wonder if there is a correlation between that and cannulating. Ah well, must be good hand/eye co-ordination or something. Well, this attempt to get some background information hasn't moved my thoughts on any further. Must get this finished.

Aarrgghh!!

2400hrs Getting just a little fed up with this now. Anyway this should be the final stretch. I know, I'll get rid of any scientific data (ooh, I could write for a nursing journal at this rate) regarding what makes the perfect anaesthetist (there is hardly any literature available anyway) and state spurious, anecdotal prose. Must always remember that a bit of poetic licence goes a long way. I might as well go the whole hog and define the first definitive test of what makes the perfect anaesthetist. The test will be: 'Would you be happy to be anaesthetised by this doctor?'

On a serious note, technological advancement in anaesthesia has reduced morbidity and mortality considerably. The importance of effective and skilled recovery was highlighted as early as 1846.[2] The concept of an integral recovery unit has been reinforced continually ever since. It has been suggested that it is the development of recovery units that have proven most effective in reducing deaths from anaesthesia in the last 150 years.[3] It has been suggested that the recovery units should be used as a benchmark for assessing a hospital's suitability for training of junior anaesthetists.[4]

This article is written entirely without prejudice to the author's whole rights and pleas in the matter and may not be founded upon in any subsequent court action.

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Tumescent anaesthesia

*Dr P D W Fettes and Professor J A W Wildsmith, Ninewells Hospital and Medical School, Dundee

'A surgical colleague has asked me to provide 'sedative cover' for a procedure during which he proposes to inject 55 mg.kg^{-1} of lidocaine subcutaneously. Can you provide me with some help or advice please?'

Such is the essence of one of the more unusual requests for advice received at Russell Square in the recent past. Unusual the request may be, but preliminary enquiry revealed that it is a serious issue, information on which might usefully be disseminated widely. The proposal may be met with a degree of incredulity, perhaps even a scathing comment about the position of the decimal point in the drug dosage, but this is no joke. There is a practice, commonly employed on the other side of the Atlantic, which involves the injection of lidocaine 35 mg.kg^{-1} (or more) in a technique known as tumescent anaesthesia. What follows is intended more in the way of a warning than guidance!

Definition

The term 'tumescent' is derived from the Latin tumescere, meaning 'to become swollen'. The technique involves the subcutaneous infiltration of very large volumes of dilute local anaesthetic solution (usually containing epinephrine) until the tissues become tense and swollen, hence the name. The aim is to provide particular conditions for certain types of surgery, primarily liposuction, but also a variety of other superficial and plastic surgical procedures. These operations may be undertaken with the patients completely awake, sedated, or anaesthetised. The derivation of the method is best understood by reviewing its history.

Historical development

Suction-assisted lipectomy, generally known as liposuction, was first performed without the use of subcutaneous fluid and by the simple insertion of suction catheters into the subcutaneous fat under general anaesthesia.[1] This 'dry' technique was developed into a 'wet' one by Illouz in France in 1982.[2] He injected relatively small volumes (200–300 ml) of hypotonic saline into the operative site on the premise that it would cause the lipocytes to swell and rupture, and so aid fat removal. Although it is questionable whether such cell lysis does occur,[2] the injection of fluid appeared to aid the surgery, and generated interest in subcutaneous fluid infiltration with the development of other solutions. In the 'superwet' technique, developed in 1986 by Fodor,[1] a volume of fluid equal to that of the proposed aspirate is used. The solution used is isotonic, contains a low concentration of epinephrine (1:1,000,000 – 1:2,000,000), but generally no local anaesthetic, and the surgery is performed under general anaesthesia.

Tumescent anaesthesia was first described by Klein in 1987.[3] Large volumes of isotonic fluid (usually either 0.9% saline or Hartmann's solution) containing similarly low concentrations of both epinephrine, but also a local anaesthetic (usually lidocaine 0.5 – 1.0 mg.ml^{-1}) are infused into the subcutaneous tissues to the point of tissue turgor. Addition of local anaesthetic means that the fluid can be used as the primary mode of anaesthesia, although it has also been used with sedation or general anaesthesia. The primary reason for the use of epinephrine was to reduce intra and post-operative blood loss, although the vasoconstriction that results may also be beneficial in reducing the risk of local anaesthetic toxicity. The volume infused is usually larger than that aspirated, meaning that much of the drug injected must remain in the patient. Although the concentration of local anaesthetic used is low, the total dose given is large, so a significant amount must remain to be metabolized and excreted by the patient. At least 20 litres of fluid, and 4 g of lidocaine have been used.[2] Other substances which have been added to the infusate are sodium bicarbonate, steroids, and antibiotics.[4] Sodium bicarbonate was used initially to reduce the burning sensation that can accompany infusion, but increasing the pH may also lead to faster onset of local anaesthesia by increasing the proportion of local anaesthetic drug which is in the non-ionised form. Steroids such as triamcinolone have been added in an attempt to reduce inflammation, and antibiotics as prophylaxis against infection.

The final technical development relates to the need for intravenous fluids. Liposuction can result in large fluid shifts and has been associated with fluid loss that is proportional to the volume of aspirate removed from the patient. Thus intravenous fluid is normally administered at the time of surgery, with blood transfusion frequently being required for larger aspirates. In contrast, Klein has stated

*Declaration of interest – The authors would note that they are in receipt of research funding from AstraZeneca.

that intravenous fluids are contraindicated in tumescent liposuction,[5] claiming that the vasoconstriction produced by the epinephrine administration is so complete that there is virtually no blood loss during liposuction.[6]

Claimed indications and benefits

As outlined above, tumescent anaesthesia evolved as part of the surgical technique of liposuction, and this remains the most popular application, but it has also been adopted for a number of other superficial procedures mainly, but not exclusively, in plastic surgery. It may be used in single or multiple sites, including the face and scalp as well as the more common sites such as legs, buttocks, abdomen and flanks.[4] Most recently it has also been applied to the treatment of pain due to herpes zoster.[7]

It is said to be quick and relatively easy to perform, and the surgeons are quick to extol the virtues of 'hydrodissection'. This not only facilitates surgery by separating connective tissue planes, but also improves 'contouring', the term applied to the desired post-operative 'aesthetic' appearance. Although it has been challenged,[8] the epinephrine induced vasoconstriction is said to reduce blood loss and the incidence of haematoma formation. Indeed, Klein and others have claimed that the reduced blood loss has totally removed the need for blood transfusion.[4,6] He has also claimed that the local anaesthetic effect persists for up to 18 hours "obviating the need for post-operative anaesthesia" (sic).[6] However, a more rigorous trial of analgesic efficacy after reduction mammoplasty found improved analgesia compared to control for only 3.5 hours after surgery, and reduced morphine consumption for only 4.5 hours after surgery.[9] These results prompted the suggestion that the addition of the lidocaine is hardly worth the effort.[10]

Where is it used?

The technique is mainly used in the USA where it has become increasingly popular over the last decade, particularly with 'office' based practitioners, presumably often working without the assistance of an anaesthetist. The technique is partly responsible for making liposuction the most popular aesthetic surgical procedure performed in the USA, with over 200,000 operations performed by board certified surgeons there in 1998.[11] Tumescent anaesthesia is also becoming more popular in parts of Europe, notably Germany. Use is minimal in the UK, perhaps because of the limited amount of 'office' practice here, but this College has now had several enquiries from anxious anaesthetists who have been asked to provide sedation or anaesthesia for tumescent techniques.

The primary stimulus for the development of the technique was growing pressure on surgical dermatologists in the USA to restrict their activities to outpatient surgery, and to procedures that could be performed under local anaesthesia. However, concerns have been raised[2] about safety standards in office-based practice, which is poorly regulated and financially driven. Many physicians, from a range of specialties, have been keen to adopt the procedure because of the high demand and significant financial reward. Worryingly, offices frequently have no monitoring equipment, or resuscitation facilities, and patients tend to be discharged quickly, probably before peak local anaesthetic concentrations have been reached.

Local anaesthetic doses

The mere thought of using lidocaine in doses of 35 $mg.kg^{-1}$, let alone greater, makes most anaesthetists shudder, this figure being five times the maximum dose recommended for use with epinephrine. However, there has been justified criticism of adherence to a single maximum dose which does not take into account the site of administration.[12] Local anaesthetic toxicity is related to the plasma concentrations which develop after injection. Dose is but one factor involved in this, the others being the rate of absorption (very dependent on the site of injection), the pattern of distribution to other tissues, and the rates of both metabolism and excretion. Local anaesthetics are absorbed fairly slowly from most subcutaneous tissues because their vascularity is low and because much of the drug is absorbed initially into the fat. The vasoconstriction produced by the epinephrine will further slow the process. In addition, a proportion (up to 35%) of the lidocaine administered for liposuction is removed in the aspirate.[13] That still leaves a large (potentially lethal) amount in the patient, but even that would not matter if absorption is slower than the rate of metabolism/excretion. There have been some studies[6,14–16] of plasma lidocaine concentrations with this technique, and the results have been used to make claims for safety. However, concentrations may continue to rise for 16, or even 23 hours,[16] long after the patient has left medical supervision. In addition, the sampling intervals were often wide, so that peak concentrations may have been missed, with regression analyses, rather than actual observations, being used to extrapolate results and to 'prove' the safety of doses as high as 35 $mg.kg^{-1}$,[6] and 55 $mg.kg^{-1}$.[15] Some have even claimed that 70–90 $mg.kg^{-1}$ is safe, but the number of patients involved was very small.[17] The evidence is, at best, incomplete.

Complications of tumescent anaesthesia

Proponents of tumescent anaesthesia claim that it is very safe. An internet search on the term will reveal plenty of sites offering ambulatory liposuction procedures, and attest-

ing to the remarkable safety of the technique. Such marketing material quotes some impressive statistics from the literature. One frequently quoted survey of 15,336 patients undergoing 'tumescent liposuction' reported no fatalities, blood transfusions or hospital admissions for treatment of complications.[18] However, this study has significant flaws. The authors wrote to 1,778 Fellows of the American Society for Dermatologic Surgery, but only 66 provided data. A response rate of less than 4% must cast considerable doubt over the validity of the results. In addition such self-reporting by surgeons with a vested interest in the perceived safety of the technique is almost bound to underestimate the actual incidence of morbidity and mortality. A recent critical review[19] of reported complications and patient outcome studies in lipoplasty procedures concluded that plastic surgeons do not often voluntarily report complications, and that surveys do not include complications occurring in the hands of trainee staff. These authors stated that the mortality from lipoplasty procedures may be as high as 0.1%.

Others also have questioned the safety of tumescent anaesthesia. In 1997, Grazer warned of its potential pitfalls, noting (as guest editor of a plastic surgical journal) that he had received several reports of complications and deaths associated with the technique. These reports included pulmonary oedema, cardiac depression, and death due to both lidocaine toxicity and high volume aspiration. He was concerned that "the current death rate is a culmination of physician one-upmanship" with competitive increases in lidocaine dosage and liposuction volume pursued in apparent disregard to patient safety.[2] In 1999 the New England Journal of Medicine published an article which reported five deaths after tumescent anaesthesia in New York between 1993 and 1998.[20] This was the first time that deaths associated with the technique had been described formally rather than just alluded to. The authors linked two deaths to lidocaine toxicity, one to fluid overload (this does not exclude drug toxicity), and another to thrombo-embolic complications. The fifth death was not fully discussed because of inability to obtain consent. Since then several other deaths have been reported in medical journals,[21,22] and several articles have appeared in the lay press[23–26] expressing concerns over the safety of liposuction and tumescent anaesthesia.

In 2000 Grazer and de Jong presented a large, questionnaire-based survey of certified plastic surgeons on the subject of death after liposuction in the period 1994-98.[27] This survey had a good response rate (917 out of 1200) and they found the mortality rate to be 19.1 in 10,000, which as they pointed out, was higher than the quoted rate for motor vehicle accidents (16.4 per 10,000) and showed that: "liposuction is not an altogether benign procedure." Pulmonary thrombo-embolism was listed as the most common cause of death (23.1%), with others including organ perforation (14.6%), anaesthesia or sedation (10%), fat embolism (8.5%), cardiorespiratory failure (7%), massive infection (7%) and haemorrhage (6%). Lidocaine toxicity was mentioned as a possible cause of death although it was eliminated from the analysis because of a lack of specific toxicological information. The authors noted that many of the deaths occurred during the first night, after "hasty discharge" home, leading to their recommendation that patients should be recovered adequately after surgery. The authors concluded that: "the time has come to stop, look and listen: the physicians pledge of 'primum non nocere' may have been compromised."

The role of anaesthetists

A thorough review of the anaesthetic literature revealed remarkably little about tumescent anaesthesia. The North American, Anesthesia Patient Safety Foundation, has published newsletters,[28–30] but in the indexed literature we found only two book reviews, both of which were somewhat sceptical of the safety claims,[31,32] and one original study. This study was published by Rosaeg and colleagues in Regional Anesthesia and Pain Medicine in 1999[8] and showed a mild, early benefit on postoperative analgesia. The remarkable sparsity of anaesthetic studies is of concern given the vast number of general anaesthetics which must be given for this procedure every year by our colleagues in other countries. Rosaeg and her colleagues quoted two studies[6,15] which had measured plasma lidocaine concentrations, and therefore they were content not to measure these themselves. However, they frankly misquoted one study by stating that peak concentrations were reached at four to eight hours, when it was actually at 12–14 hours,[6] some time after their own patients had been assessed as fit for discharge from hospital!

Conclusion

Whether the subcutaneous infiltration of large amounts of fluid produces good conditions for certain types of surgery is for our surgical colleagues to decide. However, it seems to us that most of these benefits can be obtained by the use of solutions which do not contain potentially lethal amounts of local anaesthetic, although general anaesthesia is obviously necessary. Whether there is further benefit to be gained from the addition of dilute local anaesthetic is questionable, given the present evidence, especially if an anaesthetist is going to be involved anyway. That said, it is an intriguing technique which may have a place, but it requires definitive study of the resultant systemic local anaesthetic

concentrations and of other potential causes of complications. Such studies would have to be performed in a setting where the patients could be monitored closely for at least 24 hours post-operatively, and with resuscitation services readily available throughout that time. What should be emphasized is that the problems are far more wide-ranging than the one which catches the anaesthetist's eye, the dose of lidocaine involved. Fluid overload and haemorrhage are the ones which seem to be of most 'anaesthetic' concern, but there is a range of surgical problems as well.

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The Association of Paediatric Anaesthetists

Interdepartmental Peer Review Scheme

Dr P Crean, Royal Hospital for Sick Children, Belfast

Since 1998 the Association of Paediatric Anaesthetists of Great Britain and Ireland (APA) has been developing a voluntary process of interdepartmental peer review of paediatric anaesthetic departments in the UK. The scheme is based on a paediatric modification of the Joint Committee on Good Practice's 'Departmental Portfolio'. The aim is to encourage and stimulate improvements in standards of clinical practice within paediatric anaesthetic departments and to identify and disseminate examples of good practice. It is hoped that there will be benefits, not only to the department being visited, but also to the visitors.

The process

This involves the collection of evidence of sound departmental structure, organisation and management which allows for the provision of high standards of patient care, as outlined in 'Good Practice, A Guide for Departments of Anaesthesia'.[1] Advice is given on where improvements are needed and the implementation of recommendations audited. The focus is on the department as a whole and not on the individual. However, the process should be able to ensure that any identified dysfunctional aspects of the performance of departments or individuals are dealt with appropriately.

Audit

The APA established a committee to initiate the process and to undertake the initial modifications of the departmental portfolio to enable it to be applied to paediatric anaesthetic practice. The structure of the portfolio has subsequently evolved as a result of experience gained at each visit and wider consultation. A subcommittee has since been formed to audit and oversee the visits, disseminate good practice and monitor the implementation of any recommendations for improvement.

Visiting team

The scheme involves a peer review process whereby one paediatric anaesthetic department reviews another. For logistical reasons the first two reviews were carried out on a reciprocal basis, however, visits are now undertaken by a separate participating department. The visiting team comprises two consultant paediatric anaesthetists from the same children's hospital, one of whom assumes the role of lead assessor, a representative of the APA familiar with the aims and objectives of the process, and a lay person. The APA is aware of the value of including a lay representative in the review process in order to bring the public perspective into the visit and help ensure objectivity and transparency. Initially members of the Patient Liaison Group of the Royal College of Anaesthetists (RCA) were invited to participate.

Conduct of review

Following approval of the Chief Executive and Medical Director, the department being visited nominates two consultant anaesthetists to liaise with the visitors and to organise the local arrangements. Although visitors received no formal training, written guidelines on the conduct of the review have been developed and provided to the lead assessor well in advance of the proposed date of visit. Visitors are required to follow the planned structure of the visit and adhere to the detailed question sheets provided for each interview. This covers areas relating to departmental structure, staffing, staff development and education, clinical guidelines, audit, quality improvement and record keeping.

The guidelines suggest key individuals in the hospital who should be interviewed in person. These include members of the anaesthetic department and hospital management team, and representatives from other clinical departments who worked closely with the anaesthetic department. Specific topics to cover and areas of questioning are recommended. Important clinical areas are identified (operating theatres, recovery facilities, intensive care unit, the day procedure unit, the acute pain service) and these should be inspected by the visitors. Every opportunity is taken by the visitors to talk to children and their parents, and the importance of obtaining information about the anaesthetic service from the patient's perspective is emphasised. No attempt is made to assess quality of training in anaesthesia as this is the proper remit of the RCA. Each review is concluded with a debriefing session, when the reviewers discuss their initial impressions with members of the reviewed department.

Report

A formal report is prepared, highlighting areas of good and outstanding practice and clearly identifying areas for further consideration. So far, reviewers have usually highlighted between ten and 20 areas of good practice in their reports, with approximately equal number of areas requiring further consideration. The areas for further consideration are diverse: they include workload issues, including out of hours work; suggestions on the reorganisation of departmental working practices; improved audit of theatre working practices to guide future planning; further opportunities for staff development, including research and personal development and management opportunities within the hospital administration. The APA Audit Subcommittee is also given a copy of each report, for the purposes of disseminating agreed areas of good practice and monitoring the implementation of any recommendations. There are plans to follow up each visit after 12 months to monitor progress. It is envisaged that good practices will be highlighted on the APA website.

Benefits

All who have participated in this scheme feel their time has been usefully spent and are enthusiastic for the process to continue. Many see it as a unique opportunity to observe the practice of colleagues and to learn from them.

Further information on the scheme can be obtained from Dr Peter Crean, Paediatric Intensive Care Unit, Royal Hospital for Sick Children, Belfast BT12 6BE (**email** peter.crean@royalhospitals.n-i.nhs.uk).

Reference

1 Good Practice: A Guide for Departments of Anaesthesia. The Royal College of Anaesthetists and the Association of Anaesthetists of Great Britain and Ireland, 1998.

Total Intravenous Anaesthesia (TIVA) II:

Pharmacodynamics of intravenous anaesthetics

Dr K J Anderson and Professor G N C Kenny, Glasgow Royal Infirmary

Pharmacokinetics describes the distribution and elimination of drugs by the body, in particular the relationships between drug concentration and time. The relationship between concentration and response is known as pharmacodynamics, and describes what the drug does to the body. For intravenous anaesthetics the plasma is not the site of drug effect.

The relationship between plasma concentration and effect

It is apparent during induction and emergence from anaesthesia, that the plasma concentration (Cp) does not always correlate, with the clinical effects of anaesthetic drugs (Figure 1).

For instance, during induction (at point A) the effect site concentration (Ce) lags behind the plasma concentration, hence the plasma concentration is higher than the effect site concentration. Again during emergence (at point B) the effect site concentration lags behind the reduction in plasma concentration, however at this point the effect site concentration is higher than the plasma concentration. Since time is required for the blood and brain concentrations to equilibrate it has been suggested that when titrating the drug to effect, it would make more sense to consider the effect site concentration which is related to that clinical effect. The mathematics of the equilibration of anaesthetic drug plasma concentration and effect site concentration are described by the pharmacokinetic rate constant k_{e0}.

Effect Site

The principal effects of i.v. agents in which anaesthetists are interested are the sedative and hypnotic effects. Thus the site at which the drug exerts these effects (termed the biophase or effect site) is the brain. Unfortunately it is impossible to measure the actual brain concentration of drug, the closest we have in animal models, is sampling from the cerebral venous system. Even if we could measure direct brain concentration, to relate concentration to effect properly, it would be necessary to know the exact regional concentrations or even receptor concentrations where the drug exerts its effect.

Therefore, we must rely on the clinical effects produced by the drug, to describe the relationship between the blood concentration and brain concentration or effect. The commonly used end points of clinical effect are loss of verbal contact or lack of response to surgical or noxious stimulus. Assessment of this is usually quantified by interval scales such as the Objective Observer's Assessment of Sedation Scale. Other more convenient measures of anaesthetic, or more specifically hypnotic effect have been used, predominantly measures of cortical activity. The most commonly used of these are processed EEG signals such as Bispectral Index (BIS) and 95% Spectral Edge Frequency (SEF95), or by Auditory Evoked Potentials (AEP). These monitors of 'anaesthetic depth' are useful **surrogate markers** of the effect site concentration. They make it easier to relate plasma concentration to effect because they are objective rather than subjective, and also they are measured on a continuous scale.

Effect site model

If the clinical effects of the drug are measured with respect to the plasma concentration, then the apparent rate of drug flow into and out of the biophase can be mathematically modelled. Thus, by the addition of another (effect site) compartment to the three compartment pharmacodynamic model (Figure 2), the expected time course of the clinical effect for a plasma concentration can be calculated.

Figure 1 The relationship of effect site to plasma propofol concentration during induction and emergence with TCI

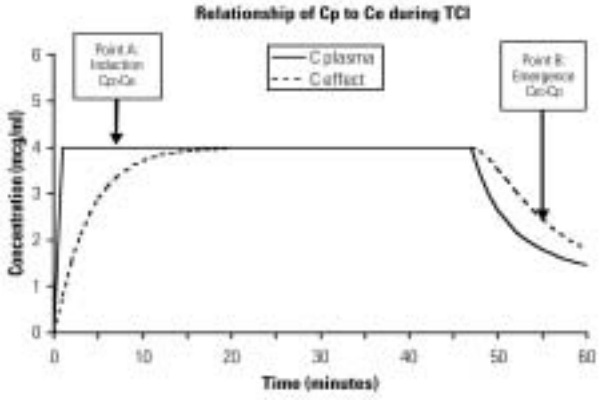
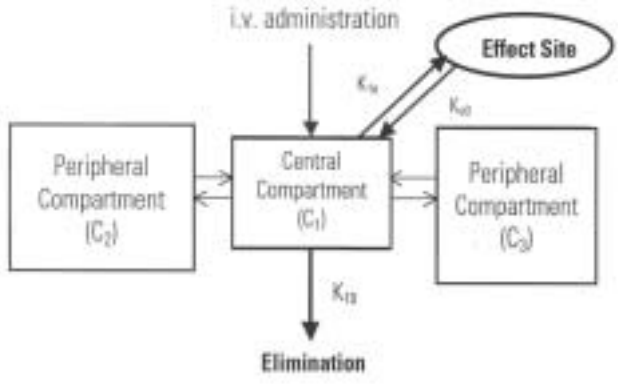


Figure 2 The three compartment pharmacokinetic model with added effect site compartment (Ce)



Movement of drug to and from the central compartment (plasma) is considered a first-order process, and the effect compartment is defined as being negligibly small in comparison to compartments C_1–C_3. Therefore, the addition of this compartment has no effect on the concentration of the other compartments. For this reason some people consider movement from the effect site compartment to be drug eliminated from the model. Accordingly, the rate constants for delivery to and disposal from the effect site are called k_{1e} and k_{e0} respectively ($k_{\chi 0}$ is the time constant for elimination of drug from the model from any compartment named χ). Furthermore, since the effect compartment is negligibly small, k_{1e} is so much smaller than k_{e0} as to be disregarded. Therefore, k_{e0} characterises the equilibration of plasma concentration with drug effect. This allows calculation of the effect site concentration.

Numerous studies have calculated ke0 for various anaesthetic drugs, the value seems to depend on the patient population and the surrogate marker of effect used, e.g. BIS or AEP.

k_{e0}: Describing drug delivery to the effect site

By definition, k_{e0} is the pharmacokinetic rate constant (for the Michaelis Menton equation), which describes the rate of equilibration between the plasma concentration and effect site. Perhaps a conceptually easier term is the $t_{1/2}k_{e0}$. That is the time it takes for half of the equilibration to take place between the plasma concentration (Cp) and the effect site concentration (Ce). Importantly, the concept has been incorporated into the Diprifusor package, which now can calculate and display effect site concentration also. This helps illustrate to practicing anaesthetists the difficulty in relating calculated Cp, or indeed measured Cp to effect. It can be seen from the relationship of Cp to Ce that the same calculated plasma concentration could be associated with greatly different effect site concentrations. It becomes obvious that the clinical effects depend on how long the blood and effector site have been allowed to equilibrate.

The value of this new knowledge can be illustrated if we compare drug disposition and effect following induction of anaesthesia with 2mg·kg^{-1} of propofol with 5mg·kg^{-1} of thiopentone. Simply by observation, we know that the onset of anaesthesia is slower with propofol than with thiopentone. Computer pharmacokinetic simulation confirms this, predicting the peak effect site concentration of the thiopentone bolus at 1.4 minutes and the propofol bolus at four minutes. Firstly, if we consider the effect of the $t_{1/2}k_{e0}$, we can see that for a constant plasma concentration of thiopentone that the effect site will equilibrate more quickly than propofol (Figure 3). The $t_{1/2}k_{e0}$ of propofol is slower at 2.6 minutes compared to 1.2 minutes for thiopentone.

However, in real life, drug redistribution and elimination is also taking place concurrently as the plasma effect sites equilibrate. Since thiopentone is initially redistributed more quickly than propofol ($t^{1}/_{2}$ immediately bolus dose is one minute ten seconds for thiopentone and two minutes 30 seconds for propofol respectively), the concentration gradient for equilibration of plasma thiopentone with the effect site is continually reducing faster. Hence if we plot the plasma concentration and the effect site concentration of the bolus doses, then the peak effects are at the point when the falling plasma concentration crosses the rising effect site concentration (Figure 4).

Figure 3 The effect that $t_{1/2}k_{e0}$ has on time to equilibrate the effect site with a constant plasma concentration of thiopentone and propofol respectively

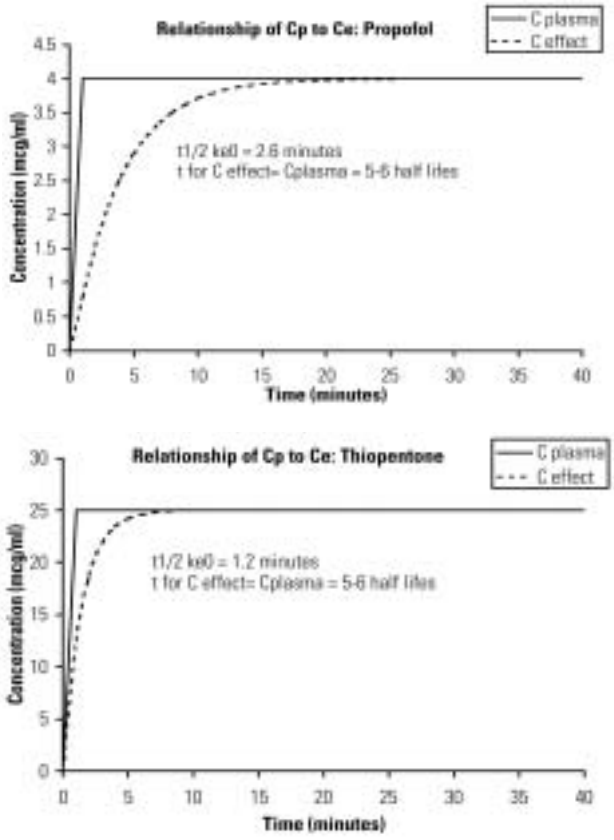
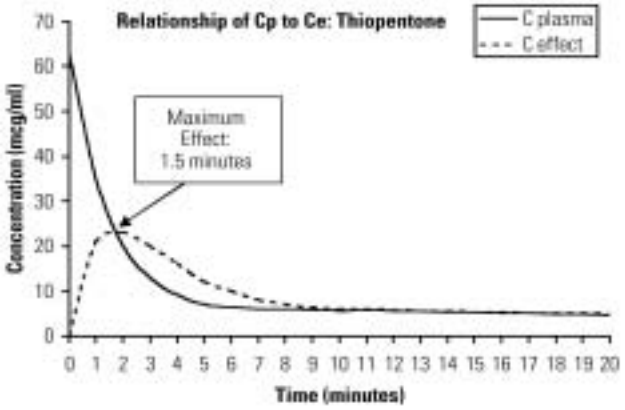
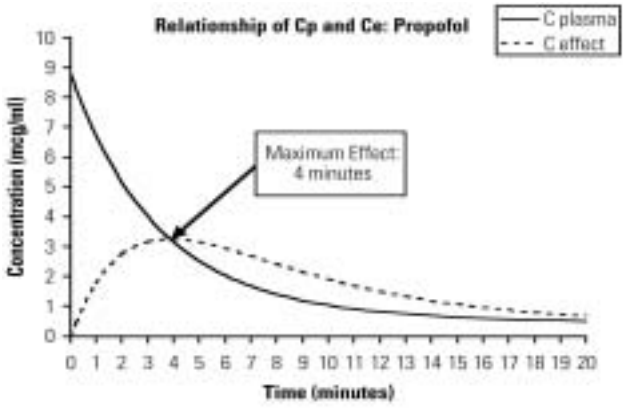


Figure 4 The relationship of plasma concentration and effect site concentration following a 2mg·kg^{-1} bolus of propofol and a 5mg·kg^{-1} bolus of thiopentone





This is because drug will always move down its concentration gradient, that is from plasma to brain when the plasma concentration is greater than the brain concentration. When plasma concentration falls below brain concentration, drug movement reverses.

Population pharmacodynamics

MAC and Cp50

Most anaesthetists are familiar with the term MAC (minimal alveolar concentration of an inhalational anaesthetic which prevents gross purposeful motor response in 50% of unpremedicated patients to skin incision). A similar concept has been developed for intravenous agents, and is referred to as the effective concentration 50 (EC_{50} or Cp_{50}). This is the plasma concentration (Cp) that prevents gross purposeful motor response in 50% of unpremedicated patients to skin incision. It is a preferred term to effective dose 50 (ED_{50}), which relates to the dose of drug that prevents gross movement in 50% of the population to skin incision. In a population, for the same dose of drug, there will be variation in the blood concentration achieved owing to pharmacokinetic variation. This introduces a further level of uncertainty not present when relating plasma concentration to effect. Both Cp_{50} and MAC are useful for comparing the potencies of anaesthetic agents within their respective class, but by definition only provide adequate anaesthesia for 50% of the population. A more useful concept clinically is Cp_{95}, which is the effective concentration for 95% of the population. It is likely that expressing Cp_{50} and Cp_{95} in terms of calculated effect site concentration (Ce_{50} and Ce_{95}) will give even more clinically useful information (Table 1). From this data, dose-response curves for propofol plasma and effect site concentration can be constructed (Figure 5).

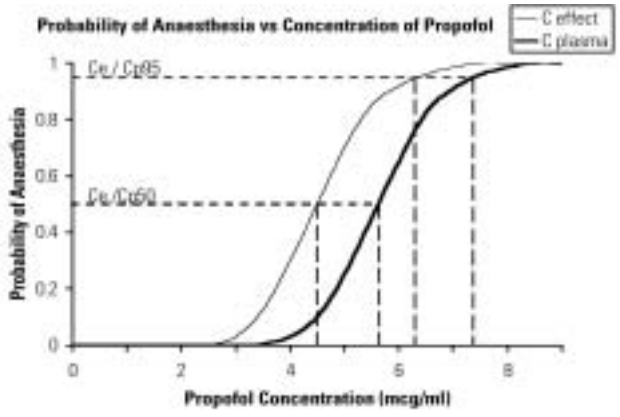
Pharmacodynamic interactions

Similar to the effect on MAC of volatile anaesthetics, concomitant administration of sedative premedication, benzodiazepines, opioids, nitrous oxide or indeed α2 adrenoceptor agonists such as clonidine all reduce the Cp50 for intravenous agents. This effect exhibits a dose response, for example, by increasing the concentration of opioid the MAC and Cp_{50} are reduced further (Figure 6).

Table 1 Relationship between Target and Effect site CP50 and CP95 of propofol for clinical end points. This is without any other sedative or opioid medication. (From Irwin MG et al. Anaesthesia 2002;57:242–248).

Clinical endpoint	CP_{50} (μg·ml^{-1})		CP_{95} (μg·ml^{-1})	
	Effect	Target	Effect	Target
Loss of Verbal Contact	2.7	3.9	3.8	5.4
Loss of purposeful response to surgical stimulus	4.5	5.6	6.4	7.4

Figure 5 The dose response curve for probability of anaesthesia (lack of response to noxious stimulus) versus calculated effect site and plasma concentrations of propofol. (Adapted from data by Irwin MG et al. Anaesthesia 2002;57:242–248)



Similarly increasing the dose of midazolam given prior to induction of anaesthesia with propofol has been shown to reduce the ED_{50}, and increase the proportion of patients successfully anaesthetised with a fixed calculated blood concentration (Figure 7).

Interestingly for opioids it is becoming clear that there is a ceiling to their effect on Cp_{50} and Cp_{95}, and no matter how high the opioid concentration, some hypnotic is necessary to prevent movement to surgical incision (Figure 6). Therefore, it can be surmised that opioids may reduce the magnitude of the surgical stimulus but do not provide hypnosis. It should be noted that although propofol concentration can be reduced in the presence of remifentanil, if the plasma concentration of remifentanil is greater than around 1.5 ng.ml^{-1}, then the patient is likely to become apnoeic and require artificial ventilation (Figure 6). The interaction between opioids and propofol for total intravenous anaesthesia has been studied extensively. Computer pharmacokinetic simulations have been performed to calculate the optimum combination that provides adequate anaesthesia with minimal time to return of consciousness when the infusions are ended. The optimum combination changes depending on how long the infusions have been running (the context sensitive half-time) and the opioids used.

Figure 6 The plasma remifentanil versus plasma propofol concentration associated with no movement to surgical stimulus in 95% of patients (Cp_{95}). Superimposed is the level of remifentanil at which patients may be expected to breath spontaneously (from Mertens MJ. PhD Thesis. ISBN 9090156410. Chapter6)

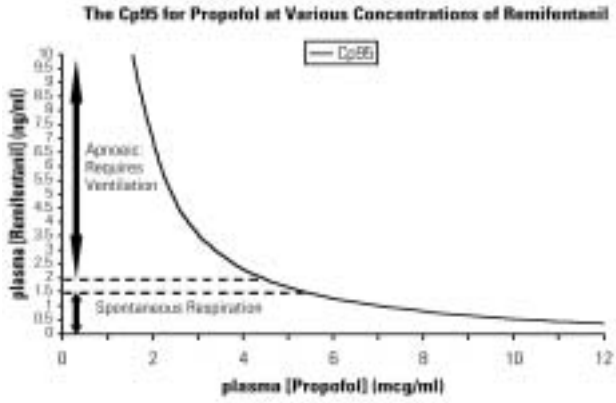
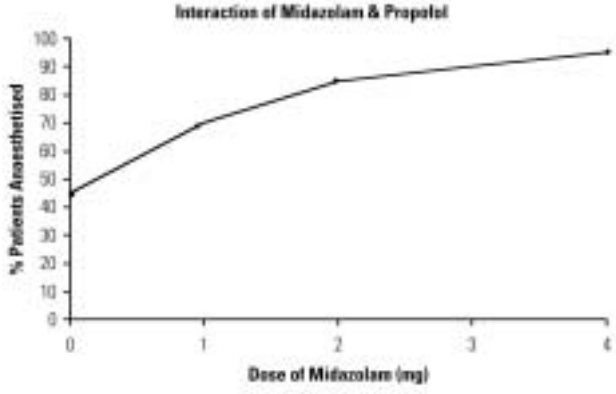


Figure 7 Clinical interaction of midazolam and propofol. The proportion of patients losing verbal contact with a fixed target controlled infusion of propofol at 3 mg·ml-1 after varying doses of midazolam (Tzabar Anaesthesia 1996;51:536–538)



Pharmacodynamic variability

Age

Increasing age has been shown to reduce the Ce_{50} for propofol, showing increased sensitivity of the elderly to the effects of propofol. Importantly they exhibit greater haemodynamic effects also. Interestingly the ke0, hence plasma effect site equilibration has been reported not to be changed by age. In contrast the time to the maximal haemodynamic effect can be delayed.

Similarly for remifentanil the Cp_{50} is reduced with age, however the $t^{1}/_{2}$ k_{e0} is prolonged, reflecting that equilibration between plasma and effect site is slower in the elderly.

These properties suggest that induction in elderly patients should be achieved with lower plasma concentrations than in younger adults, however it should also be titrated more slowly to avoid side effects.

Systemic disease

In contrast to the well characterised effects of systemic disease, especially renal and hepatic disease, on the pharmacokinetics of intravenous hypnotics and opioids, there has been surprisingly very little work performed to examine their relative potency in patients with systemic disease. It has often been assumed that patients with significant disease would require less anaesthetic. This variation could be as a result of increased central nervous system sensitivity to the drug (pharmacodynamic), or an increased free fraction of drug secondary to reduced plasma protein binding (subtle pharmacokinetic changes). An increased clinical effect for a defined blood concentration has not been shown in disease states. In fact, patients with hepatic cirrhosis have been shown to waken at the same plasma concentration of propofol as healthy controls. Furthermore surprisingly little difference in plasma protein binding of propofol has been found in patients with hepatic and renal disease.

Titrating anaesthesia to stimulus

Despite the fact that variation in Cp_{50} for intravenous anaesthetics has not clearly been shown to change with disease there is significant patient variability to the pharmacodynamic effects of intravenous anaesthetics in health, and due to aging. Obviously, the likelihood of response will depend on the depth of anaesthesia, effect site concentration and the degree of surgical stimulation. So in practice the depth of anaesthesia will need to be titrated to the surgical stimulation. To complicate matters further the requirements differ with the effect considered. For example the opioid concentration necessary for intubation is higher than for incision. It becomes obvious that, just as for inhalational anaesthesia, the anaesthetic depth should be individualised by titrating the different components of TIVA to the individual patient and the surgical stimulus at that moment. A sound knowledge of the pharmacokinetic and pharmacodynamic principles of intravenous anaesthetic agents will make appropriate drug selection and administration possible.

Further reading

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Glass PSA. Intravenous infusion techniques: How to do it and why we should do it. Canadian Journal of Anaesthesia 1998;45:R117–127.

Irwin MG et al. Anaesthesia 2002;57:242–248.

Schnider TW et al. Anesthesiology 1999;90:1502–1516.

TIVA trainer pharmacokinetic computer programme is available from www.eurosiva.org (demo version is free).

THE ROYAL COLLEGE OF ANAESTHETISTS

EDUCATION PROGRAMME

Please note that unless indicated otherwise, lunch is included in the registraion fee.

Clinical Governance – How to make it work for you

8 January 2003 (code: C85)

The Royal College of Anaesthetists, London WC1

This workshop is designed to give an overview of a framework for implementing Clinical Governance in clinical practice: it refers to the RAID methodology (Review, Agree, Implement, Demonstrate) as used by NHS Clinical Governance Support Team. It will involve practical examples from the experience of a number of clinical teams including:

- Paediatric surgery
- Accident & emergency
- Acute pain
- Theatres.

This workshop will be useful for any anaesthetist interested in working with their clinical teams to make improvements to their service. It will provide an understanding of the principles of successful change management within the context of Clinical Governance. This workshop is limited to 50 participants and is approved for CEPD purposes. This meeting is financially supported by the NHS. Registration fee: £95

Basic Sciences Course for Primary FRCA

13–24 January 2003 (code: A78)

Clore Management Centre, London WC1

This course is intended to complement study for the primary examination and consists of two weeks of full time lectures on those aspects of physiology, pharmacology and statistics that are of relevance to anaesthetists. Lectures will take place between 0900 and 1630 Monday to Friday. Tutorials will also be held during the course and each participant will be entitled to attend four tutorials. A separate application form is available from the Courses and Meetings Department. Please do not use the generic application form. Registration fee: £530

Airway Day

5 February 2003 (code: C19)

One Birdcage Walk, Westminster, London SW1

A core topic day. The full programme can be found on page 839. Registration fee: £175

How to Teach – Teaching Methods

12–13 February 2003 (code: C80)

Lancashire County Cricket Club, Manchester

An intensive two day workshop for Consultants and senior SpRs. This workshop has limited places. Registration fee: £360

Final FRCA Course

17 February to 7 March 2003 (code: A82)

Birkbeck College, University of London, WC1

This is course is intended for those studying for the Final FRCA Examination and consists of three weeks of full time lectures on anaesthesia, intensive care and pain relief. The lectures run throughout the day between 0900 and 1700. Tutorials will also be held during the course and each participant will be entitled to attend one week of tutorials from 1645–1800 at the College. A separate application form for this course is available from the Courses and Meetings Department. Please do not use the generic application form. Registration fee: £680 (lunch not provided)

College Anniversary Meeting

Changing Practices

19–20 March 2003 (code: A03)

Institution of Electrical Engineers, London WC2

The full programme can be found on page 840. Registration fee: £330 (fee for trainees registered with the Colllege: £250)

Anaesthetic Emergencies – A Core Topic Day

27 March 2003 (code: C49)

Royal College of Physicians & Surgeons, Glasgow

A meeting covering core topics of anaeshetic emergencies. Further details can be found on page 838. Registration fee: £175

Review day for NCCG Anaesthetists

7 April 2003 (code: A12)

Royal College of Aaesthetists, London WC1

This is a clinical study day for non-consultant career grades such as staff grades, associate specialists, and those doing a significant number of clinical assistant sessions who would like to update their knowledge on common areas of practice. The seminar is designed to allow time for discussion and group work around a number of anaesthetic and resuscitation scenarios. Those who have not had a recent opportunity to review anaesthetic practice are particularly welcome. Registration fee: £170

Training for Regional Anaesthesia – Current Challenges

30 April 2003 (code: C77)

Royal College of Anaesthetists, London WC1

The aim of the meeting is to consider the current challenges to proper training in a very wide range of techniques relating to regional anaesthesia, and then to consider new strategies for delivering that training. The strategies considered will be those that optimise patient contact and explore the use of simulation devices. This will consist of a series of formal lectures, but with plenty of time for discussion, particularly at the end of the day. Registration fee to be advised

How to Teach – An Introduction to Teaching for Specialist Registrars

1 May 2003 (code: C18)

Royal College of Anaesthetists, London WC1

A meeting designed to introduce post-FRCA specialist registrars to the skills that are required to facilitate effective teaching and training. Registration fee: £110

Diplomates Day

7 May 2003

Kensington Town Hall, London W8

A ceremony of presentation of diplomates for those doctors who passed their Final Exam in June 2002 and December 2002. Attendance will be by invitation only.

Sleep Apnoea

27 May 2003 (code: C84)

Royal College of Anaesthetists, London WC1

Further details to follow. Registration fee: £175

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NCCG's as Teachers
3 June 2003 (code: D10)
Venue to be advised
A meeting for NCCG's interested in increasing their involvement in teaching anaesthetic trainees. Registration fee: £180

Course on Current Topics in Anaesthesia
9–13 June 2003 (code: A32)
Novotel Hotel, Birmingham
Consisting of lectures and discussion, it is intended as both a refresher course and update on the latest techniques for consultants and NCCGs. Registration fee: £475

Training Paramedic Trainers
16 June 2003 (code: A74)
Royal College of Anaesthetists, London WC1
A comprehensive one day seminar.
Registration fee: £160

Cardiopulmonary Disease and Anaesthesia
19–20 June 2003 (code: C97)
Hotel Russell, London WC1
In addition to the two day programme, there is an opportunity to meet with colleagues and friends at an informal reception on the evening of 19 June.
Registration fee: £330 (trainees registered with the College: £250)

Airway Day Workshop
24 June 2003
The Royal College of Anaesthetists, WC1
With a focus on clinical scenario, group discussion and hands-on skill practice. The Airway Day workshop will cover a number of topics using experienced small group teachers. Further details, including the registration fee for this workshop, will be published in the March issue of the Bulletin.

College Tutors' Meeting
2–3 July 2003
Royal Northern School of Music, Manchester
A two day meeting for all College Tutors, Programme Directors, Regional Advisers, Deputy Regional Advisers, Council Members, Bernard Johnson Advisers and the Scottish Standing Committee. Attendance will be by invitation only.

Basic Sciences Course for Primary FRCA
7–18 July 2003 (code: C12)
Birkbeck College, Universityy of London, WC1
This course is intended to complement study for the primary examination and consists of two weeks of full time lectures on those aspects of physiology, pharmacology and statistics that are of relevance to anaesthetists. Lectures will take place between 0900 and 1630 Monday to Friday. Tutorials will also be held during the course and each participant will be entitled to attend four tutorials. A separate application form is available from the Courses and Meetings Department. Please do not use the generic application form. Registration fee: £530

Final FRCA Course
8–26 September 2003
Birkbeck College, University of London, WC1
This is course is intended for those studying for the Final FRCA Examination and consists of three weeks of full time lectures on anaesthesia, intensive care and pain relief. The lectures run throughout the day between 0900 and 1700. Tutorials will also be held during the course and each participant will be entitled to attend one week of tutorials from 1645–1800 at the College. A separate application form for this course is available from the Courses and Meetings Department. Please do not use the generic application form.
Registration fee to be advised

College Symposium
Best practice
6–7 November 2003
Institution of Electrical Engineers, London
In addition to the two day programme, there is an opportunity to meet with colleagues and friends at an informal reception on the evening of 6 November. Registration fee to be advised

CME Day
8 November 2003
Venue and registration fee to be advised
A joint meeting with the Association of Anaesthetists of Great Britain and Ireland.
Registration fee to be advised

All meetings have CEPD approval on the basis of five points for a full day and three points for half a day.

Retired Fellows continuing to subscribe to the College are entitled to attend meetings at half price.

Please complete the generic application form or contact the Courses and Meetings Department at the College for further information.

The Courses and Meetings Department
Training and Examinations Directorate
The Royal College of Anaesthetists
48/49 Russell Square
London WC1B 4JY

switchboard 020 7813 1900
ansaphone 020 7813 1888
fax 020 7636 8280
email educ@rcoa.ac.uk

Please note that new meetings and updated programmes are available on the College website **(www.rcoa.ac.uk/courses)**

THE ROYAL COLLEGE OF ANAESTHETISTS SYMPOSIUM

Clinical Governance at Work

How to make clinical governance work for you

8 January 2003 (code: C85)

at the Royal College of Anaesthetists, London WC1

0930–1000 Registration and Introduction to Course

1000–1045 **What is Clinical Governance and how to use it**
Dr Sean O'Kelly, Consultant Anaesthetist, Swindon and Marlborough NHS Trust, NHS Modernisation Agency Associate
Where did clinical governance come from? The NHS as a Complex Adaptive System – implications for change.
Is Clinical Governance different and does it work?

1045–1100 **Group work session 'Unwritten Rules'**
Dr Sean O'Kelly, Consultant Anaesthetist, Swindon and Marlborough NHS Trust, NHS Modernisation Agency Associate
Exploring the reasons why making changes in the health care setting can be so difficult.

1100–1115 Break

1115–1145 **Barriers to Change**
Dr Ian Kendal, Consultant in A&E, Swindon and Marlborough NHS Trust
The human dimensions of change. Leadership, engaging stakeholders and providing support.

1145–1215 **RAID I: Reviewing and Agreeing**
Dr Ian Kendal, Consultant in A&E, Swindon and Marlborough NHS Trust
How to start exploring quality issues within a service. Collecting the right information in the right way. Listening to patients. Gaining staff ownership and formulating recommendations for improving the service.

1215–1300 **Learning from real-life experience I**
Course Faculty
Short presentations of lessons learnt and real life experience in several areas:
- Paediatric surgical services.
- A & E.
- Acute Pain Services.
- Theatre activity.

1300–1330 LUNCH

1330–1400 **RAID II: Implementing and Demonstrating**
Dr Sean O'Kelly, Consultant Anaesthetist, Swindon and Marlborough NHS Trust, NHS Modernisation Agency Associate
The art of project management. Working as a team. Effective targeted communication. Helping the service through transition. Troubleshooting.

1400–1445 **Learning from real-life experience II**
Course Faculty
Short presentations of lessons learnt and real life experience in several areas:
- Paediatric surgical services.
- A & E.
- Acute Pain Services.
- Theatre activity.

1445–1515 **Group work session: (How to make RAID work for you)**
Small-group work session designed so that participants can explore the RAID model and how it might be applied within their own clinical service.

1515–1545 Break

1545–1630 **Evaluation and Close**
Dr Sean O'Kelly, Consultant Anaesthetist, Swindon and Marlborough NHS Trust, NHS Modernisation Agency Associate

Course Faculty Dr S O'Kelly (Consultant Anaesthetist, Swindon and Marlborough NHS Trust, NHS Modernisation Agency Associate), Dr I Kendal (Consultant in A&E, Swindon and Marlborough NHS Trust), Dr B Sandhar (Consultant Anaesthetist, Royal Devon and Exeter NHS Trust), Dr J Stock (Consultant Anaesthetist, Hastings and Rother NHS Trust), Ms S Squire (Director of Education and Patient Involvement, Clinical Governance Support Team, NHS Modernisation Agency).

This workshop will be useful for any anaesthetist interested in working with their clinical teams to make improvements to their service. It will provide an understanding of the principles of successful change management within the context of Clinical Governance. Limited to 50 participants. This meeting is supported financially by the NHS.

Registration fee: £95

Approved for CEPD purposes.

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Anaesthetic Emergencies – A core topic day

27 March 2003 (code: C49)

at The Royal College of Physicians and Surgeons of Glasgow, 232–242 St Vincent Street, Glasgow

Topics will include:

- Crisis management
- Cardiac arrest
- Arrhythmias
- Failed intubation
- Head injuries

Registration Fee £175

Approved for CEPD purposes

Review day for Non-Consultant Career Grade Anaesthetists

7 April 2003 (code: A12)

The Royal College of Anaesthetists, London WC1

Please note that there are limited places on this meeting. Topics will include:

- Assessing the airway.
- Managing the difficult airway.
- Assessing the sick patient.
- ITU topics.
- Managing the sick patient on the ward.
- The NCCG and the College.
- Obstetrics.
- Problem scenarios and panel discussion.

Registration fee: £170

Approved for CEPD purposes

Training for Regional Anaesthesia

Current Challenges

30 April 2003 (code: C77)

The Royal College of Anaesthetists, London WC1

Topics will include:

- Current genetic training problems.
- Problems specific to regional anaesthesia.
- The role of nerve stimulators and ultrasound.
- Simulation of specific block techniques.
- Internet resources.
- Does 'certification' have a place?
- Anaesthetic method versus sub-speciality training.

Registration fee to be advised

Approved for CEPD purposes

Airway Day Workshop

24 June 2003

The Royal College of Anaesthetists, London WC1

With a focus on clinical scenario, group discussion and hands-on skill practice. The Airway Day workshop will cover a number of topics using experienced small group teachers. Topics will include:

- Failed ventilation including cricothyrotomy.
- Failed intubation and low skill FOI via airway and LM.
- Awake intubation.
- Retrograde techniques blind and FOI.
- New airway equipment.

Further details, including the registration fee for this workshop, will be published in the March issue of the Bulletin.

Approved for CEPD purposes

Airway Day

5 February 2003 (code: C19)

at the Institute of Mechanical Engineers, One Birdcage Walk, London SE1

10.00 **Introduction**
Dr Adrian Pearce
– ASA guidelines
– UK guidelines
– Definitions
– College SpR – airway syllabus
– Strategy
– Overview of day

10.20 **Preoperative airway evaluation**
Dr Steve Yentis
– History
– How to evaluate the airway
– How accurate/predictive
– Linking evaluation to strategy

10.45 **Failed intubation – core practical skills**
Dr Michael Avidan
– Illustrative case scenarios
– Laryngeal mask
– Intubating laryngeal mask
– Low skill fibreoptic intubation

11.15 **Failed ventilation**
Dr Chris Frerk
– Illustrative case scenarios
– Drill overview
– Emergency cricothyrotomy
– Types
– How to do it

11.45 Teaching airway techniques
Dr Tony Turley
– Teaching within departments

12.15 **Discussion leading to lunch**

14.00 **The shared airway**
Dr Anil Patel
– Anaesthesia for laryngoscopy, bronchoscopy
– Laser surgery
– Foreign bodies

14.30 **The obstructed airway**
Dr Mansukh Popat
– Definition
– Acute vs chronic
– Management
– Awake FOI in some detail/limitations
– Surgical airway
– Illustrative case scenarios

15.15 **New airway equipment**
Dr Tim Cook
– Proseal laryngeal mask
– Trachlight
– Airway Management Device

15.45 **Morbidity, mortality and follow-up care**
Dr Adrian Pearce
– Morbidity detection and treatment
– Patterns of morbidity/mortality
– Documentation and patient notification

16.00 **Discussion leading to close of meeting**

Registration fee: £175
Approved for CEPD purposes

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Anniversary Meeting

Changing practices

19–20 March 2003 (code: A03)

at the Institution of Electrical Engineers, Savoy Place, London WC2

Wednesday, 19 March

09.55 Introduction
Professor P Hutton, President

Critical Care Medicine

10.00–10.30 Management of acute lung injury:
Dr J D Young, Nuffield Department of Anaesthesia, Oxford

10.30–11.00 Management of COPD
Dr Paul Plant, St James's University Hospital, Leeds

11.00–11.15 Discussion and coffee

11.45–12.15 Sedation of the critically ill
Dr Maire P Shelley. Wythenshawe Hospital, Manchester

12.15–12.45 Blood transfusion in the critically ill
Dr Martin Tweeddale, Queen Alexandra Hospital, Portsmouth

12.45–13.00 Discussion and lunch

Perioperative Care (1)

14.00–14.30 Pre-assessment clinics
Dr Wendy E Scott, Derby City General Hospital

14.30–15.00 Pre-optimisation
Dr R Jonathan T Wilson, York District Hospital

15.00–15.30 Management of patients with CAD.
Professor D Mangano, Ischemia Research & Education Foundation, San Francisco, USA

15.30 – 15.45 Discussion and tea

16.15–16.45 Pain management.
Professor David J Rowbotham, Leicester Royal Infirmary

16.45–16.50 Discussion

16.50–17.15 Annual General Meeting

17.15–18.00 Frederic Hewitt Lecture
Professor R Shaw, Chairman, National Patient Safety Agency

18.00–19.00 Reception for delegates

Thursday, 20 March

The airway

09.15–09.45 The difficult airway in adults
Dr Ralph S Vaughan, University Hospital of Wales, Cardiff

09.45–10.15 The airway in the ICU
Dr Andrew R Bodenham, Leeds General Infirmary

10.15–10.45 The airway in resuscitation
Dr David Gabbott, Gloucestershire Royal Hospital

10.45–11.00 Discussion and coffee

Debate

11.30–12.45 Training and anaesthesia competencies
This house believes that the use of the LMA has resulted in the deterioration of Airway skills
For and against

12.45–13.45 Lunch

Peri-operative Care (2)

13.45–14.15 TIVA
Dr Douglas Russell, Southern General Hospital, Glasgow

14.15–14.45 Changing practice with muscle relaxants
Professor Jennifer M Hunter, Royal Liverpool University Hospital

14.45–15.15 Lecture To be announced

15.15–15.30 Discussion and close

Registration fee: £330
(£250 for trainees registered with the College)
Approved for CEPD purposes

COURSES AND MEETINGS
Booking procedures

A generic application form for all events, except FRCA courses, is contained in every edition of the Bulletin. This is also available to download from the College website (www.rcoa.ac.uk/courses).

Application forms for the Final FRCA course and Basic Sciences course for the Primary FRCA are available separately from the Courses and Meetings Department.

Once a course or meeting and the relevant fee have been publicised, bookings on the generic application form will be accepted at any time. The appropriate fee must be paid at the time that the booking is made (bookings will not be accepted for events that do not show a fee). If your Hospital/Trust is paying your registration fee, please pass the completed application form to the relevant person for forwarding with payment.

To ensure that bookings are processed correctly, it is essential that the booking form shows the code number, title and date of the event being booked, e.g. C81 – How to Teach: Small group teaching 20 June 2002.

All courses and meetings are open to all grades of anaesthetist (unless specifically stated otherwise). Bookings will be accepted on a first come first served basis. When a course or meeting is full this will be publicised on the College website. For several weeks before major meetings, details of vacancies will be available on the Courses and Meetings Department ansaphone.

Fees and cancellations

Payment for all College courses and meetings can be made by Sterling cheque, payable to 'The Royal College of Anaesthetists', Switch, or Credit Card (Mastercard/Visa/Delta).

Notice of cancellations must be given in writing to the Courses and Meetings Department at the Royal College of Anaesthetists at least ten working days before the course or meeting commences in order to qualify for a refund. All refunds are made at the discretion of The Royal College of Anaesthetists and are subject to a £25 administration fee. Delegates cancelling after this date will NOT be entitled to a refund unless the Royal College of Anaesthetists considers there to be exceptional circumstances that would warrant a refund.

Accommodation

Local hotel information will be sent to you on receipt of your application.

Application forms

Completed generic application forms should be returned to the:

Courses and Meetings Department
Training and Examinations Directorate
The Royal College of Anaesthetists
48/49 Russell Square
London WC1B 4JY

switchboard 020 7813 1900
ansaphone 020 7813 1888
fax 020 7636 8280
email educ@rcoa.ac.uk

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PLEASE COMPLETE THIS FORM IN BLOCK CAPITALS USING BLACK INK

This form is to be completed in conjunction with the programme for Courses and Meetings. If you wish to apply for more than one meeting, please photocopy this form and use one form per application. Please state below the name and code of the meeting. This form should be returned to:

The Training and Examinations Directorate, Courses and Meetings Department)
The Royal College of Anaesthetists, 48/49 Russell Square, London WC1B 4JY

Switchboard 020 7813 1900 **ansaphone** 020 7813 1888
fax 020 7636 8280 **email** educ@rcoa.ac.uk

Name of meeting _____

Registration Fee: ** ☐ **CODE:** ☐☐☐

Surname: _____ **Forename 1:** _____

Forename 2: _____ **College Reference No (if issued):** ☐☐☐☐☐☐

Address line 1: _____

line 2: _____

line 3: _____

Town/City: _____ **Country:** _____

Postcode: ☐☐☐☐☐☐☐ **This address is (tick ONE only):** ☐ **Temporary** ☐ **Permanent**

Date of B irth: ☐☐☐☐☐☐☐☐

Telephone number (including STD code): ☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Fax number (including STD code): ☐☐☐☐☐☐☐☐☐☐☐☐☐☐

email address: _____

Present appointment and Hospital: _____

Dietary requirements: _____

Payment can be made by Sterling cheque, made payable to The Royal College of Anaesthetists, or by credit card below:

Please charge my credit card: ☐ **Visa** ☐ **Delta** ☐ **MasterCard** ☐ **Switch** **Total Remittance:** _____

Card number: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Expiry date: ☐☐☐☐ **Issue No (Switch only):** ☐ **Start date (Switch only):** ☐

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****Retired Fellows, paying the retired Fellows subscription rate, are permitted to attend College meetings at half price.**

Reduction of postoperative mortality and morbidity with epidural or spinal anaesthesia

Results from overview of randomised trials

How to assess a paper that reviews other papers

Dr C Hopkins, SpR, Charing Cross Hospital, London, Dr C J Doré, Senior Statistician, MRC Clinical Trials Unit, London and Dr A Holdcroft, Reader and Honorary Consultant Anaesthetist, Chelsea and Westminster Hospital, London

Earlier in this series, it was demonstrated how critical appraisal of the literature can help answer important clinical questions. All too often however we are unable to draw conclusions from the reports of single trials, which may simply lack sufficient numbers of patients. In this article we will discuss how information obtained from a well conducted systematic review can help to resolve uncertainty where multiple small trials yield conflicting and hence inconclusive results. The basic rationale of a systematic review is to gather together all the available information in a standardized format, to minimise biases and, where appropriate, to pool data from the identified trials in a meta-analysis to derive a single combined estimate of treatment effectiveness. The process of bringing together information from all the relevant trials is referred to as a systematic review. A statistical analysis, which combines this information to provide a single estimate of treatment effectiveness, is referred to as a meta-analysis. When first introduced into medicine, meta-analysis quickly achieved notable success by combining the information from several small inconclusive studies, a good example being a review of thrombolytic therapy for myocardial infarction.[1] This meta-analysis demonstrated that streptokinase was associated with a highly significant decrease in mortality before this was confirmed by two large scale trials.[2,3] As a result it was hoped that meta-analysis could identify effective treatments sooner and perhaps make large randomised trials unnecessary.

However, recent discrepancies between the results of meta-analysis and findings of large randomised trials have led to questions about its use. For example, meta-analysis of several small trials suggested that magnesium would reduce the risk of mortality after acute myocardial infarction by 55%,[4] but a large randomised trial found no evidence of benefit.[5] With these provisos in mind, we decided it would be useful to consider the benefits of systematic reviews in answering important clinicalquestions whilst also highlighting some pitfalls. We have selected as an example a recent systematic review which assesses a fundamental question in anaesthetic practice: Does regional anaesthesia offer significant benefits over general anaesthesia?[6]

Mortality and morbidity with regional versus general anaesthesia

The selected benefits of regional anaesthesia that are quantifiable include mortality and, perhaps more qualitatively, morbidity. The conclusions drawn by the authors of our chosen systematic review[6] are very impressive for regional anaesthesia. They claim a reduction in mortality of one third that does not differ by surgical group, type of regional nerve blockade or use of general along with regional anaesthesia. The results of the meta-analysis also demonstrated that 'neuraxial blockade reduced the risk of deep vein thrombosis, pulmonary embolism, transfusion requirements, respiratory depression, myocardial infarction and renal failure'. On initial assessment, these accumulated results from 141 randomised controlled trials appear clinically significant but before accepting this conclusion, as with articles earlier in this series, we will evaluate the systematic review using a series of appraisal questions.

1 What question was the systematic review trying to answer?

Central to any publication that stands the test of time is a clear definition of its objectives. The aim of our example of a systematic review was 'to obtain reliable estimates of the effects of neuraxial blockade with epidural or spinal anaesthesia on postoperative morbidity and mortality'. This was to be achieved by a systematic review of all trials where patients were randomised either to receive intraoperative neuraxial blockade, with or without general anaesthesia, or general anaesthesia.

2 How were the trials included in the systematic review identified?

If a review is to help us resolve uncertainty then it needs to be based on all the available evidence. It should therefore clearly describe the methods by which trials were identified and selected so that the reader can check that the appropriate steps were taken. Fortunately, the identification of appropriate trials has become easier in recent years with the introduction of specific terms into Embase and Medline to identify randomised controlled trials.

The Cochrane Collaboration also produces a large register of published controlled clinical trials accessible via the Internet or on CD. However, some trials, particularly those with a negative outcome, and those not published in English, will be missed by a search of these databases making it necessary to examine other sources of information as illustrated in Table 1.

When we check our example review, we see that the authors searched the electronic databases Current Contents (1995–1996), Embase (1980–1996), Medline (1966–1996) and the Cochrane Library (1998). When initial trials were identified, a further search was performed using the authors' names and study titles.

Table 1 Data sources for a systematic review

Medline, Embase and other medical databases.
Cochrane controlled trials register.
References cited in trials identified from search results.
Authors of trials identified.
Hand searching of key journals.
Experts in the field.
Conference proceedings.
Registers of ongoing and/or unpublished trials.

Reference lists were examined and authors were contacted for information regarding their trials and to ask if they were aware of any other trials, including those that were unpublished.

3 What were the inclusion and exclusion criteria for the trials selected?

Randomised controlled trials are generally considered to provide the best quality evidence, but this does not mean that they are immune to bias. Trials that are to be included in a systematic review therefore need to be carefully assessed to both minimise bias and ensure the results are sufficiently comparable to be combined in a meta-analysis. Our example review included 'all trials where patients had been randomised to neuraxial blockade or not', thus trials where the neuraxial blockade group also received general anaesthesia were included. Attempts were made to identify unpublished trials but none were found. It is understandably difficult to find unpublished data but it is important as trials with positive findings, and trials which are written in English, are more likely to be published.

A total of 158 trials, published in any language, were identified initially but 16 were then excluded because they had not been fully randomised. Trials that had been 'quasi-randomised', for example where the allocation to groups was based on date of birth, were excluded. One further trial was excluded because the treatment groups differed with respect to heparin treatment as well as to the anaesthetic technique, leaving 141 trials containing 9,559 patients. Two reviewers independently extracted information from the published findings of each study. A third reviewer compared the information extracted by the two reviewers and any differences were resolved by discussion.

The trials came from a wide range of specialties with differing objectives over the period 1971 to 1996. One of this article's authors conducted an included trial, published in 1979, which measured temperature differences between young fit women undergoing elective surgery under epidural blockade plus general anaesthesia or general anaesthesia alone.[7] We will need to consider how appropriate it was to combine the results of such diverse studies when we consider the results.

4 How were the outcome measures defined?

The outcomes considered by the review were mortality, deep vein thrombosis, pulmonary embolism, transfusion requirements, pneumonia, other infections, respiratory depression and renal failure. Apart from mortality, definitions of these events were not standardised, but were those used in the individual trials. In a meta-analysis, the risk of an adverse outcome in patients receiving regional anaesthesia is only compared with the risk in those patients not receiving regional anaesthesia in the same trial, so variable definitions of the adverse outcomes between trials will not introduce bias into the comparison of risks. However, the lack of a standardised definition across all trials makes it difficult for the reader to determine the actual risk of an adverse event.

5 What were the numerical results and how were they interpreted?

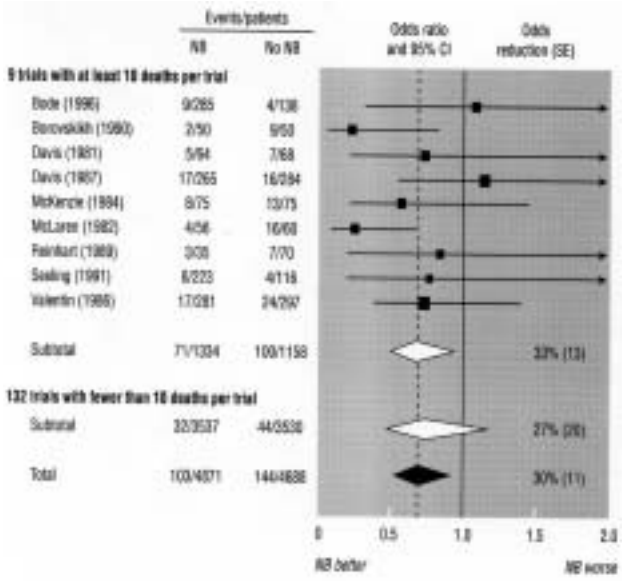
Mortality

A total of 247 deaths occurred in 35 trials within 30 days of randomisation. Of these 247 deaths, 103 were from 4,871 patients in the regional group and 144 deaths were from 4,688 patients in the general anaesthesia only group. These results can be expressed as a fraction referred to as the odds by dividing the number of patients in the group who died by the number who did not. For the regional group, 103 patients died whilst 4,871-103 = 4,768 survived, giving rise to odds of 103/4,768 or 0.02. In the non-regional group the odds are 144/(4,688-144) or 0.03. Dividing the odds in the regional group by the odds in the general group gives 0.02/0.03 or 0.7. This is referred to as the odds ratio, the ratio of the odds of dying in the regional anaesthesia group relative to the odds of dying in the general anaesthesia group. The 95% confidence interval is reported which indicates the range of values that would contain the true (but unknown) odds ratio 95% of the time. The odds ratio is 0.7 with a 95% confidence interval from 0.54 to 0.90. If the 95% confidence interval does not include 1, then the odds ratio is significantly different from 1 at the 5% significance level.

It is common practice for results from a meta-analysis to be displayed graphically in a 'forest plot' (Figure 1), where each trial is represented by a horizontal line corresponding to the 95% confidence interval and a square representing the odds ratio. Combined estimates of the odds ratio are plotted as diamonds with the widest point of the diamond denoting the pooled odds ratio and the ends of the diamond the 95% confidence interval. If there were no difference in the odds of dying between the two groups then we would expect the odds ratio to be equal to 1 and an unbroken vertical line is drawn through this point on the horizontal odds ratio axis that extends the full height of the chart.

Figure 1 shows that of the 141 trials reviewed nearly 70% of deaths came from just nine trials (those with at least ten deaths in each trial). The pooled result from these nine trials is included below them as a diamond which lies to the left of the no effect/odds ratio equals 1 line making the pooled result significant

Figure 1 Effect of neuraxial blockade (NB) on postoperative mortality within 30 days of randomisation. Diamonds denote 95% confidence intervals for odds ratios of combined trial results. The vertical dashed line represents the overall pooled result. Size of shaded boxes is proportional to number of events. *Reproduced from the British Medical Journal 2000;321:1493–1505 with permission.*



where most of the individual trial results were not. Below the nine trials is another diamond corresponding to the pooled result from the 132 remaining trials (those with fewer than ten deaths per trial) that has a 95% confidence limit that includes 1 and is not statistically significant. When all of the mortality results are combined however an odds ratio of 0.7 (which we calculated earlier) is obtained with a 95% confidence limit which excludes 1, representing a statistically significant overall decrease in mortality for those patients receiving regional analgesia. The shaded diamond towards the bottom of Figure 1 depicts this.

As well as an overall reduction in mortality the review suggested that this difference was independent of surgical subgroup, type of neuraxial blockade used, or whether general anaesthesia was used in addition to neuraxial blockade. When we review Figure 2, however, only the orthopaedic patients showed a clear difference with the 95% confidence intervals for each of the other types of surgery including an odds ratio of 1. Whether this is due to there genuinely being no difference in the subgroups or simply insufficient power to show a difference remains unclear. However, there was no evidence for heterogeneity between the different types of surgery based on the c2 test, P=0.9. The c2 test of homogeneity assesses whether the individual study results are likely to reflect a single underlying distribution, or whether there is more variation between the study results than we would expect to see by chance. This increased variation would suggest that the study results are drawn from a mixture of more than one underlying distributions. Also from Figure 2 only the spinal and thoracic epidural groups reached significance with the lumbar epidural group having confidence limits including 1 (test for homogeneity, P=1.0). Finally combining general with regional anaesthesia and comparing it to general anaesthesia alone did not generate a significant benefit (test for homogeneity, P=0.3). The author's claim that 'reductions in mortality did not differ by surgical group or in trials in which neuraxial blockade was combined with general anaesthesia' in the key points box now becomes a little misleading. A reasonable interpretation is that no clear, statistically significant difference between the groups could be demonstrated rather than that neuraxial blockade benefits all surgical subgroups equally.

Morbidity

Venous thromboembolism, cardiac events and stroke

A total of 365 deep vein thromboses (DVT) were reported from 18 trials, 145 in the regional group and 220 in the general anaesthesia only group (odds ratio 0.56, 95% confidence interval 0.43 to 0.72), demonstrating a significant reduction in the risk of DVT in the regional group. More than 80% of DVTs however occurred in orthopaedic patients. Many of these orthopaedic trials were published in the 1980s when DVT prophylaxis was not widely used, making it difficult to generalise these findings to patients today.

A total of 96 pulmonary emboli were reported from 23 trials, 30 in the regional group and 66 in the general anaesthesia only group (0.45, 0.29 to 0.69). Nearly 89% of the pulmonary emboli however were from orthopaedic patients.

104 myocardial infarctions were recorded in 30 trials with a one third reduction in the neuraxial group and an odds ratio of 0.67. The confidence limits however were wide and just compatible with no effect (0.45 to 1.0). The confidence interval was also wide for the 42 strokes reported, (0.85, 0.46 to 1.57) demonstrating no significant difference in risk.

Bleeding and transfusions

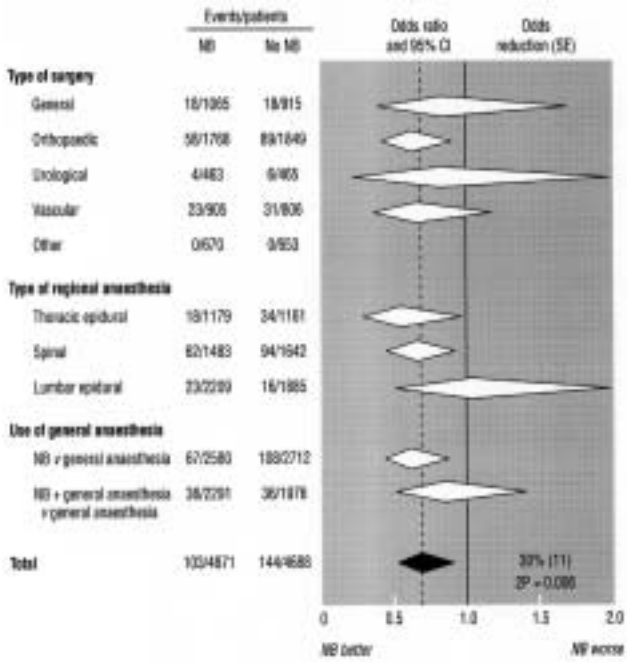
473 patients from 16 trials required a perioperative transfusion of two or more units (0.50, 0.39 to 0.66), and 100 patients from 12 trials suffered a postoperative bleed needing transfusion (0.45, 0.29 to 0.70). The requirement for transfusion was reduced in the neuraxial group by approximately one half for both outcomes.

Postoperative pneumonia and respiratory depression

In 28 trials, 387 cases of pneumonia were recorded, of which 38 were fatal. A total of 147 orthopaedic and 163 general surgery patients developed pneumonia postoperatively. The risk of developing pneumonia was less in patients in the regional anaesthesia group (0.61, 0.48 to 0.76). A similar decrease in risk of pneumonia was reported both in groups where regional anaesthesia was used alone, as well as where this had been combined with general anaesthesia, when compared to general anaesthesia alone.

A total of 64 cases of respiratory depression were reported in just eight trials with all but two cases coming from six trials in general surgery and vascular patients. Ten vascular surgery patients who had regional anaesthesia suffered postoperative respiratory depression compared to 22 who had general anaesthesia

Figure 2 Effect of neuraxial blockade (NB) on postoperative mortality, by surgical group, type of neuraxial blockade, and use of general anaesthesia. Obstetrics and gynaecology trials are included with other surgery. One trial with unknown details of anaesthesia was grouped with lumbar epidural and neuraxial blockade plus general anaesthesia versus general anaesthesia comparisons. Diamonds denote 95% confidence intervals for odds ratios of combined trial results. The vertical dashed line represents the overall pooled result. c2 test for heterogeneity between different surgical groups, P=0.9. Reproduced from the British Medical Journal 2000;321:1493–1505 with permission



alone. This compared to 16 and 14 respectively in general surgery patients. Overall however there was still a 59% reduction in the odds of respiratory depression in patients allocated to regional anaesthesia (0.41, 0.23 to 0.73).

Renal failure

Fifty cases of renal failure were recorded in ten trials. The 95% confidence interval for postoperative renal failure was wide and compatible with both a two-thirds reduction in risk and no effect (0.57, 0.32 to 1.0).

6 Are the results important clinically and will they help me care for my patients?

Once we are satisfied that the systematic review was carried out in an unbiased way that has produced a set of statistically significant results, we then have to decide how the results apply to our own practice. We should ask: Are the results significant not only statistically but also clinically? The scope of the example review was very impressive, identifying a large number of trials with a diverse set of aims coming from a variety of specialties over a long period of time. It certainly seems from the results that there is a decrease in mortality in patients receiving neuraxial blockade. A simple way of interpreting these results is to calculate the number of patients who would need to receive regional analgesia in order to prevent one death. This is known as the number needed to treat (NNT).[8] The risk of death in the regional group is 103/4871 = 0.0211, while the risk of death in the general anaesthesia group is 144/4688=0.0307, so the risk difference is 0.0307-0.0211 = 0.0096, with 95% confidence interval 0.0032 to 0.0160. The NNT is calculated from the reciprocal of the risk difference, so the number of patients who would need to receive regional anaesthesia to prevent one death is 1/0.0096 = 104, with 95% confidence interval 63 to 313.

However, the NNT will vary depending on the underlying risk of mortality in the relevant population. We can take account of this by using the relative risk. The risk of death for patients in the regional analgesia group is 103/4871 = 0.0211, the risk of death in the general anaesthesia group is 144/4688 = 0.0307, so the relative risk is 0.0211/0.0307 = 0.69. If we were considering the benefits of using regional analgesia in a lower risk group where mortality without regional analgesia is 1%, or 0.01 (rather than the risk of 2.6% reported in this series), then the mortality risk with regional analgesia is 0.01 x relative risk = 0.01 x 0.69 = 0.0069. The risk difference is 0.01–0.0069 = 0.0031, and the NNT = 1/0.0031 = 321. So if the mortality risk is 1%, the number of patients who would need to receive regional analgesia to prevent one death is 321.

Nearly 70% of deaths came from nine trials, with five orthopaedic trials accounting for just over 50% of deaths. Many of these orthopaedic trials used regional anaesthesia as the sole technique without general anaesthesia and did not continue the regional anaesthesia postoperatively. Compared with normal anaesthetic practice, this has important implications since many of us are using neuraxial blockade in high-risk general surgical patients receiving a combination of intraoperative general anaesthesia and neuraxial blockade that is then continued as postoperative analgesia. Even when considering the conclusions made by the example review regarding orthopaedic patients, it remains unclear how these results apply in general with the likely differences in thrombosis prophylaxis we have already mentioned.

Perhaps more relevant to our own practice is the reduction in postoperative pneumonia demonstrated by the example review, although this is not that unexpected when we consider the likely improvements in the ability to breath and cough free of pain that might be afforded by regional anaesthesia. With the majority of cases of pneumonia in the review occurring in general and orthopaedic patients this seems to better suit many of our own circumstances. Despite this, there is still not quite enough information included in the review to compare with present day practice. For example, it is unclear whether the regional technique was continued postoperatively, what drugs were used and where the patients might have been cared for. It may have been the practice for patients with epidural infusions to be cared for in a different, more high dependency, environment compared to those who received just general anaesthesia.

Conclusions

Rodgers and colleagues[6] should be congratulated for their painstaking efforts. Their example review certainly seems to provide evidence from randomised controlled trials that regional anaesthesia is associated with reduced morbidity and mortality. None the less, there are a few specific points that should be considered when evaluating the results. Firstly, the authors' conclusions that the 'reductions in mortality did not differ by surgical group, type of blockade, or trials in which neuraxial blockade was combined with general anaesthesia' are somewhat misleading. There is indeed evidence of a decrease in mortality but only the results from the orthopaedic group reach statistical significance. Also mortality did in fact appear to differ by type of blockade with the confidence interval for lumbar epidurals compatible with no effect. The combination of general anaesthesia with regional anaesthesia when compared to general anaesthesia alone also showed no significant benefit. The authors acknowledge that their systematic review had only limited power to assess subgroup effects of moderate size. This apparent discrepancy should highlight the importance of reading an article closely before simply accepting the 'key points' on the front page.

Secondly, a meta-analysis should be the statistical combination of studies that considered the same or similar questions but the trials included in the review came from diverse backgrounds over a long period of time. Thus it is not surprising that some of the trials chosen added little to the review.[7] 101 of the 141 trials were published before 1991 when mortality from general anaesthesia was higher and prophylaxis for deep vein thrombosis was used infrequently so it is questionable to what extent these findings may be relevant to our own current practice.

Meta-analysis has undoubtedly proved its place in modern medicine, but it is important not to be intimidated by the technique and simply accept the results at face value. Meta-analysis is not without its pitfalls but it is likely to continue to be a valuable tool. The inability of the technique to demonstrate an unequivocal benefit of regional anaesthesia in a group of patients relevant to our own practice is not necessarily a failing but simply reflects the need for further research with larger numbers of patients. Until then the review provides evidence of the benefits of regional anaesthesia without evidence of harm leaving us to decide upon the use of the technique on an individual patient basis before further research supports its more widespread use.

We hope this article has helped the understanding of meta-analysis and provided guidance on how to assess a paper that reviews other papers. We have highlighted the need for a review to state clearly its objectives and describe its methods paying particular attention to the means by which trials included in the review were identified. In doing so, we can appreciate the attempts made by the authors to eliminate bias. Finally, we have highlighted the importance of deciding how we can interpret the results and apply them to our own practice.

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The wrong nephrectomy

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Introduction

The trial of two surgeons accused and later cleared of manslaughter after removing a patient's only healthy kidney attracted much attention in the media and was widely reported in the press as a matter, not only of medical, but of public interest. Despite intensive care management Mr Reeves, the patient, died five weeks postoperatively from septicaemia and ARDS. The Judge directed the jury to acquit both surgeons as the pathologist on behalf of the Crown could not be sure that Mr Reeves died as a direct result of the operation.

At the trial reference was made to the possibility of adrenal failure as the blood supply to the diseased kidney, and therefore adrenal, was compromised while at operation. When the nephrectomy was being performed on the good kidney the adrenal gland was damaged.

The causes of failure to operate on the correct side or site are often multifactorial and this case proved to be no exception.

Surgery

The Crown Prosecution alleged that the 'bungle' was the result of a 'fateful chain of events' initiated by the house surgeon indicating the wrong side on the admission slip, misinformation which was transmitted to the operating list. The consent form for surgery was completed correctly by another junior doctor in the surgica[1] team, but he was not present in the operating theatre. It would appear that neither the specialist registrar, who carried out the operation under the supervision of the consultant, nor the consultant himself, perused the consent form. The site of the operation was not marked and the x-rays were misinterpreted, despite a warning from a medical student that the wrong kidney was about to be removed. Good Surgical Practice[1] reiterates advice on consent given in 1997 in The Surgeon's Duty of Care[2] and also draws attention to the necessity of marking the side of operation, proscribing the use of abbreviations such as R and L for right and left. An operative script is available on the website of the Royal College of Surgeons of Edinburgh[3] reminding surgeons to ensure that they have checked that they are about to operate on the correct patient, the diagnosis is correct, the site of operation is correct and the consent form is correct.

Since the tragic event at Llanelli, at least one major surgical department has stipulated that, in future, the operative list would not indicate the side to be operated on to ensure that the surgeon personally checked the notes and x-rays and marked the correct side.

Nursing

A witness, on behalf of the Crown, said that every system had the potential for failure and in this case it failed 'all the way along the line'. The nursing staff admitted that they only checked that the consent form had been signed by the patient but there was no cross-check with the operating list. The surgeon entered the operating theatre expecting to operate on the right side but was misled by a theatre nurse who informed him that the operating list indicated that the operation was for a left nephrectomy. Since this episode theatre procedure has been altered.

Guidelines for nursing staff are contained in a booklet entitled Theatre Safeguards (1988).[4] This was originally published in 1986, revised in 1988, and was endorsed by all the defence societies, the National Association of Theatre Nurses and the Royal College of Nursing. When enquiry was made to these institutions for a copy of the booklet only the Medical Defence Union were aware of its existence and produced a photocopy from their library. The document gives advice for ensuring that the correct patient receives the correct operation. It states that the consent form should be checked, presumably by nurses, in the anaesthetic room, by the anaesthetist and also by the surgeon and his assistant. The operating list should be altered as little as possible. The document is clearly dated, but contains a further pearl of wisdom 'Questioning the premedicated patient is undesirable and unreliable'.

That booklet has been superceded by Safeguards for Invasive Procedures: the Management of Risks (1998),[5] endorsed by the Royal College of Nursing, the Medical Protection Society and other theatre and recovery staff associations. The document states: 'This document is relevant to all who undertake such (invasive) procedures', including anaesthetists, dental practitioners and surgeons, even though medical and dental staff do not appear to have been consulted about the guidelines. They re-emphasise that the clinician performing the procedure should see the patient before sedation or anaesthesia commences and should personally check the consent form and any other records to ensure that the documents relate to the patient, confirm the procedure that is to be performed and the site and side of the operation.

It is worthy of note that Safeguards for Invasive Procedures: The Management of Risks[5] states it is no longer the prerogative of the anaesthetist to check the consent form but checks should be performed by an appropriately trained person.

Enquiries have revealed that in many hospitals it is standard practice for the consent form to be checked against the operating list by operating department personnel (not medical), often two in number, and with a signature to confirm that the procedure has been undertaken. Any discrepancy between the operating list and the consent form results in the operation being cancelled until the matter has been rectified. At one hospital this checking procedure is undertaken on the ward, in the reception area of the theatre suite and by the nurse who assists at the operation.

Anaesthesia

Reference to the anaesthetist having to check the consent form (for surgery) in guidelines for nursing staff entitled Theatre Safeguards (1988)[4] may have been one of the factors that prompted the police to investigate the possibility of indicting the anaesthetist, as well as the surgeons, on a charge of gross negligence. Careful scrutiny of the patient's notes, amounting to over 900 pages, which included the anaesthetist's preoperative assessment and anaesthetic management, concluded that the anaesthetist was not guilty of negligence, let alone gross negligence.

Guidelines for anaesthetists are set out in Risk Management (1998),[6] Good Practice published by the Royal College of Anaesthetists and the Association of Anaesthetists of Great Britain and Ireland (1998)[7] and Guidelines for the Provision of Anaesthetic Services by the Royal College of Anaesthetists (1999).[8]

Consent

Reference was made to consent (Blame the Anaesthetist!)[9] indicating that the consent form is essentially a misnomer and it should read 'consent for surgery'. Guidelines for seeking patients' consent have been laid down by the General Medical Council,[10,11] the Department of Health (2001),[12] the British Medical Association[13] and The Royal College of Surgeons of England.[1] Although the Department of Health recommended in 1990[14] that consent for anaesthesia should be sought, the Association of Anaesthetists 1999[15] did not endorse the need for a separate consent form. This view is no longer tenable as the Department of Health has issued a Model Policy for Consent to Examination or Treatment which became effective in April 2002.[16] There are now four forms: Form 1 – patient agreement to investigation or treatment, Form 2 – parental agreement to investigation or treatment for a child or young person, Form 3 – patient/parental agreement to investigation or treatment (procedures where consciousness is not impaired), Form 4 – adults who are unable to consent to investigation or treatment. In section III (7) it states it is the responsibility of the anaesthetist, not the surgeon, to seek consent for anaesthesia and the discussion with the patient and the consent is documented in the anaesthetic record, in the patient's records or on the new consent form.

Comment

A lesson to be learned from this case emphasises the dangers of anaesthetists being unwittingly drawn into surgical misdemeanours. It is suggested that the surgeon has a conversation with the patient in the anaesthetic room prior to induction of anaesthesia. This should be confined to a few pleasantries to reassure the patient that the surgeon is present for the operation. It would appear that some surgeons conduct a preoperative visit in the anaesthetic room, unaware that detailed enquiries are undesirable and unreliable in the premedicated patient.

Conclusion

A maxim propounded by a senior surgeon stated that the duty of the anaesthetist was to anaesthetise the correct patient and the duty of the surgeon was to perform the correct operation. Indulgence is sought for the fact that the preparation of this article was constrained by the need to omit reference to the patient's medical notes, records, witness statements and inquiries which are not in the public domain.

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Flow-volume loops, flow limiting segments and wave speed

True stories based on fact*

Professor J G Jones, formerly Professor of Anaesthesia, Cambridge

Rocket salad science

Seeing the flow-volume loops in Tillyard and Holdcroft's article *(Bulletin 14, July 2002)* reminded me of Tony Benn's contribution to medical research. When he was Minister of Technology he killed off Britain's Blue Streak rocket launcher programme. Afterwards some of the engineers involved were despatched by the Ministry to meet various medical researchers in the UK to see if rocket science could be watered down and applied in medicine. One group visited our lab in Birmingham, then sent us a report with many exciting ideas to elucidate some outstanding problems in physiology. One was the flow-volume loop whose shape was unexplained. The North American doyens of lung mechanics, such as Fry, Hyatt, Macklem, Mead and Permutt had all proposed various theories. Nowadays few people realise that Tony Benn, with his rocket salad science (RSS) initiative, enabled a Fellow of the College, when still a trainee, to be the first to elucidate this mechanism.

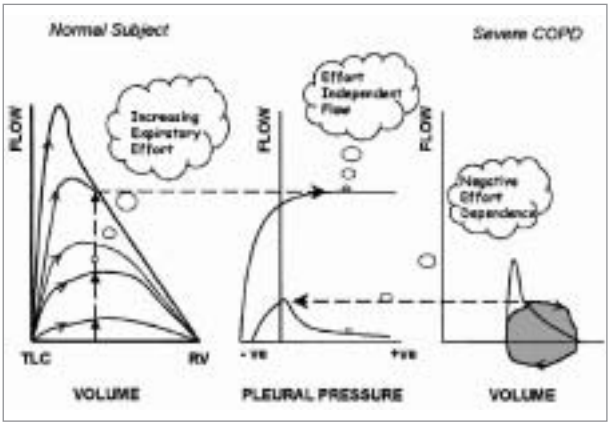
The miracle of effort independent flow

Most people know that resistance to flow through a tube is pressure drop divided by flow. How, then, can the resistance of the lungs be inferred when flow alone is measured (e.g. flow-volume loops or FEV1.0)?

This miracle is due to 'Effort Independent Flow' illustrated in Figure 1. In the left panel a normal subject has made a set of flow-volume curves, each with increasing expiratory effort, from total lung capacity (TLC) to residual volume (RV). Up to a point, increasing effort increases flow. The middle panel re-plots these data at one particular lung volume and shows that above a certain effort, shown as pleural pressure, flow remains constant – Effort Independent Flow.

Some patients with severe airway obstruction have an alarming airflow pattern where maximum expiratory effort gives a small peak followed by lower flow than during tidal breathing (shaded loop, right panel Figure 1).

Figure 1 Effort dependent and independent expiratory flow



This is Negative Effort Dependence, also shown in the middle panel. Finding an explanation for these entities became an obsession when, armed with my RSS report, I began post fellowship life in San Francisco.

In the shadow of the Vietnam war

As I arrived in California, a US invasion of Cambodia precipitated demonstrations across America. Six students were shot dead and 21 wounded at two State Universities. Arsonists burnt buildings at three other Universities, a bomb killed a physicist in a teaching centre in Wisconsin. To celebrate my arrival Ronald Reagan, the State Governor, closed all the campuses of the University of California because of further rioting against the Viet Nam war. Spared the tear gas of the National Guard I waited in my Marin County apartment for the University to reopen. Its cathedral ceilings, stained glass windows and over-water decks screamed tranquillity. Hardship followed hardship. My daily commute was across the Golden Gate Bridge. At the north end giant radar antennae searched the Pacific for bombers and ICBM's incoming from the Soviet Union. Nuclear powered aircraft carriers commuted between Oakland and Viet Nam. The navy scheduled their passage under the Golden Gate Bridge at the peak of the morning traffic causing mass rubber necking. Passing cars had

*'Victory at Sea', the American TV series describing US naval operations in World War II, was subtitled 'True stories based on fact.'

bumper decals with 'Make Love not war' but one said presciently 'Become a doctor and support a lawyer'.

Cardiovascular Research Institute (CVRI)

My lab in the CVRI was on the thirteenth floor of the University of California Hospital next to Golden Gate Park. Then, with more world renowned professors than most UK medical schools, the CVRI was directed by a physiologist, 'Uncle' Julius Comroe, the first to popularise lung physiology. Part of my job involved training groups of exceptionally ambitious clinical fellows in pulmonary physiology. Most of the people who worked in my lab (anesthesiologists, 'chest docs', pediatricians and even surgeons) became eminent researchers and clinicians; one became editor of the New England Journal of Medicine and another a professor of anesthesia at Mayo Clinic. However, two New Yorkers, whom the Reverend W A Spooner would call 'shining wits', practised arterial catheterisation on anyone that they could find waiting in the corridor. I soon learnt a useful lesson. Imbued with Fellowship training in the importance of knowing how everything worked, I asked the fellows how a pressure transducer worked. This was greeted with incredulity. 'If it doesn't work we throw it away and get one that does'.

Tantalum bronchography

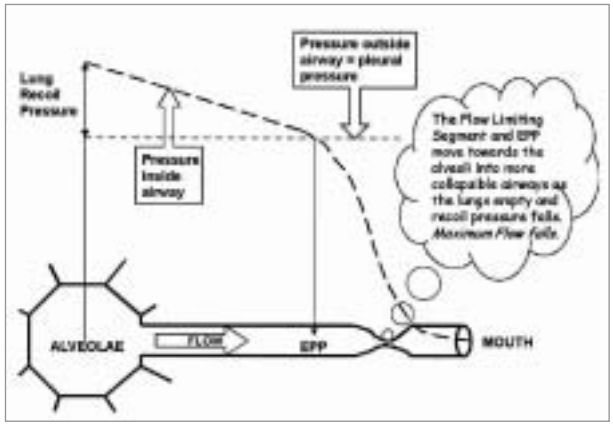
My immediate boss, Jay Nadel, had three brains, being professor of medicine, pharmacology and radiology. He had developed a non-invasive method for bronchography in man, outlining the airways by inhaling powdered tantalum. A static electric spark could ignite dry tantalum powder in oxygen but despite this frisson of danger, I was not anxious to volunteer to be cremated from the inside by a dust explosion in my airways. Nevertheless, tantalum proved to be invaluable in later experiments on maximum expiratory flow.

The mechanism of effort independent flow

I was joined by Dr Robert (Bob) Fraser a plasma physicist who was heavily into transcendental meditation (TM). For weeks we ploughed through papers on expiratory flow limitation and Prandtl's book on fluid mechanics. The more we read the more we absorbed other peoples' prejudices.

What happens during maximum expiratory flow? There is a pressure drop from the alveoli to the mouth (heavy dashed line, Figure 2). At the Equal Pressure Point (EPP) the pressure inside the airway equals the pressure outside. Downstream of EPP the pressure in the airways is less than that outside (pleural pressure) and these airways may collapse depending on their compliance.

Figure 2 The EPP and Flow Limiting segment move upstream during maximum expiratory effort



We believed that effort independence was due to a choke point or Flow Limiting Segment (FLS) downstream of EPP and acting like a Starling resistor.

It was time to design an experiment to elucidate the mechanism of effort independent flow. To do this we had to:

- Find the precise location of the FLS during a forced expiration.
- Measure the mechanical properties of this airway segment.
- Link the mechanical properties of the FLS to maximum flow using fluid mechanics.

The snakes and ladders of research

We predicted that; (1) Maximum flow was precisely determined by the collapsibility of the FLS, (2) The more collapsible the FLS the lower would be the maximum flow, and (3) The Bernoulli effect would link FLS mechanical properties to maximum flow. This was all technically difficult to demonstrate because we were studying the inside of a non-uniform, collapsing, branched airway of variable length and mechanical properties. 18 months went by. There were few ladders to balance the profusion of snakes. One of our ladders was the first research application in the USA of a miniature fiberoptic bronchoscope. A second was cine photography of the tracheo-bronchial cross sectional area during expiration using trans-illumination (the problems being film sensitivity and low light levels at high cine speed). Third was the construction of minature Pitot tubes. Fortunately tantalum tracheo-bronchography with high-speed cine was already available in our lab.

Each experimental run lasted a few seconds; but setting up, trouble shooting and acquiring the data lasted late into the night. Analysis of the large numbers of pressure measurements from each of our studies took weeks. Slide rules and log tables were used because PC's and hand held calcu-

lators hadn't been invented. Snakes came in the form of many aborted experiments and a host of technical failures. Nevertheless we gradually located the flow-limiting segments and measured their compliance. Our American Physiological Society (APS) meeting abstract was accepted (as usual, months in advance of completing our data analysis). Then we slid down a disastrous snake. With only weeks before we were to present at the APS our calculated flows were consistently less than experimental flow.

TM to the rescue

How could we possibly go to the APS with the wrong answer? About a week before the APS Bob went to a talk on transcendental meditation by the Guru, J Krishnamurti, in Los Angeles. When Bob came into the lab on his return he was very calm as usual and said 'I've cracked it'. We had made a mistake by measuring the compliance of the trachea at the end of the experiment by stepwise changes in transmural pressure. What we really needed was the airway compliance data of the very short FLS measured 100ms after the onset of flow. We knew that we had these data in the cine frames collected during each actual run.

Of course this gave the answer that we anticipated. I don't remember any celebrations; no dining on nightingales' tongues at the Spinnaker restaurant in Sausalito, just relief that we had solved the problem before the APS meeting. Was it rocket salad science or transcendental meditation that had helped to find the solution? Who knows?

Wave speed theory

Our papers, published in the Journal of Applied Physiology[1,2] explained effort independent flow and negative effort dependence. Two years later another group, confirming our results, explained maximum flow in terms of a Wave Speed theory.[3,4] The implication was that our study was just a consistency check on their equation. Bob and I, working on different projects in different countries didn't see these papers until, years after, an engineer in Stellenbosch University, Dr A E Bunn, sent me a photocopy of our paper. On the back he had pencilled 'I have shown here that your equation is the same as the Wave Speed Equation'. 20 years later Bob visited me in York to look at mediaeval churches. We never discussed flow limitation. We had solved the problem long ago.

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The author acknowledges with gratitude the contributions of Mr Tony Benn and Dr A E Bunn.

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AS WE WERE ...

The Birth of Intensive Care?

Oliver St John Gogarty, reminiscing, in his 'Rolling Down the Lea,' about the Dublin of his youth, gets as far as Mountjoy Square. In No.1 lived Sir William Wilde, eminent ENT surgeon, and father of Oscar. Farther along, the customary granite steps were replaced by ostentatious steps of white marble. 'This was the house of the famous sporting surgeon, Johnny MacCardle, who may have missed a patient or two, but never missed a race meeting. At one of these a jockey fell and broke his neck. Instinctively the crowd turned to the grand stand. They were right. The surgeon was there, but not exposed to the cold of the seats so much as to that of the ice surrounding the Heidseick. His acolytes took him by the Persian-lamb lapels, and led him out protesting that there was no such thing as an urgent accident. He knelt down and found that the jockey's neck was a grating universal joint. He arose. Silence for the pronunciamento: 'Boys, he's dead; but I'll do all I can.'

David Zuck
History of Anaesthesia Society

Role play, the anaesthetist and the Primary FRCA

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Introduction

Primary FRCA Candidates who pass the MCQ are invited to attend for a viva and Objective Structured Clinical Examination (OSCE). In the OSCE, they will come across a new breed of person, neither patient nor medical professional, the role-play actor. Many candidates have found this aspect of the exam daunting, and do not feel comfortable with this new species, first encountered under difficult circumstances. We hope in this article to present the history of this technique, and to give candidates and tutors information and help on preparing to meet these exotic creatures in the exam.

History and background of role play

Simulation and role-play have been used extensively in law and medical education since the 1960s. Role play has also been used in aircrew development training to foster teamwork in the cockpit by providing targeted practice and feedback of specific behaviours.[1] There are two major classes of simulation: tactical-decision simulations and social-process simulations.[2] In tactical-decision simulations the emphasis is on the collection and interpretation of data and the development of a strategy of use to achieve a specific goal, for example taking a history and constructing a plan of treatment for the patient.

In social-process simulations the emphasis is on human interactions and communication, for example obtaining informed consent. Almost all studies on simulations as teaching tools have highlighted their ability to provide students with direct experience of complex systems (manikins are the least technologically sophisticated form of simulation, being used in the main to teach and assess manual skills). However, considerable effort is required in setting up a simulation scenario for use in an examination.[3] Andrew has identified a number of key issues which need to be addressed to assess the kinds of complex cognitive and interpersonal skills required of trainee anaesthetists.[4] Any evaluation techniques must:

- Define the skill and specify the criteria against which performance is assessed.
- Develop a method of evaluation that permits accurate and reliable observations of performance of the skill.
- Standardise the content and form of the evaluation procedures.
- Establish standards to identify those candidates who do not achieve acceptable levels of proficiency.

The validity (the degree to which the test truly measures what it is intended to measure), the reliability (measure of consistency and precision) and the feasibility (basically, cost) of the exam are also important. The use of actors trained to take the roles of patients is central to this, as they enable standardization and allow assessment of candidates on the basis of the same testing conditions. Actors think nothing of repeating without variation the same scene over and over. This, after all, is what they do on the stage. It must not be forgotten that the performance of examiners is important in the principles of assessment, and that familiarization with the scenarios and the marking schemes is required.[5]

History of the clinical examination

As many consultant anaesthetists will remember, the last time the exam was in two parts, during the 1970s and 1980s, the Final FFARCS included a clinical examination. This took the form of the classic 'clinical' of the type taken at Final MB BS; a long case. Candidates were given 20 minutes to take a history and examine a patient, and then presented their findings to the examiner. This was an organisational nightmare for all involved in the exam. One of the authors was a senior registrar at a London teaching hospital during this time and is still scarred by the experience of trying to find five patients each day who were suitable for the exam. This meant clerking them personally to ensure fluency of English and sufficiently obvious clinical signs, persuading them to spend the morning in their night clothes at the examination hall at Queen's Square, organising fleets of taxis to take them to and from, explaining to their medical firms that they would be missing for the day, and writing a summary for the examiner, who invariably rang up later and complained that the patients were not ideal! Later the clinicals were held in the wards of one of the London teaching hospitals, which did ease the transport problems, but still put a tremendous burden on that department.

Even if they were in plentiful supply, in terms of sound educational assessment, real patients are less than ideal. They lack the important characteristics of reproducibility and internal consistency. In other words they get bored and forget what they are supposed to say from candidate to candidate. As they are taking part for a cup of tea and a very

small fee, they feel no obligation to treat each candidate in the same way, or even to stay until the end of the morning, and it is a tiring experience when you are not well in the first place. In the days when this sort of exam was held, patients stayed in hospital for much longer and were able to go off for the morning without serious inconvenience. In the modern NHS, this would be much more difficult.

Introduction of the OCSE

The long case format did not give the examiner any feeling for the candidate's abilities in each stage of the process of history and examination. The final presentation of the findings could gloss over poor practice in eliciting the history and signs. Assessment in the undergraduate education arena had begun to address some of these issues with the OSCE, the Objective Structured Clinical Examination. This allowed a much more detailed deconstruction and examination of skills. This type of examination lends itself to testing a wide variety of skills, not just clinical skills. It was adopted by the College of Anaesthetists nearly ten years ago. The first OSCE used by the College was included in the third part of the Fellowship examination. With the introduction of the two-part exam in 1995, the OSCE was moved to the Primary examination. It was felt that many of the skills tested were fundamental to anaesthetic practise and as such should be tested early in the training process.

The introduction of the OSCE ended the use of real patients. In the old clinical exam, a patient might see four candidates in a morning. In the OCSE, 16 candidates would be tested at each skill at each round, with four rounds a day as a minimum. Patients would not be able to do this. Professional actors, however, can give 64 consecutive performances of a part with great consistency. The vast majority of organisations who test interpersonal skills do so with actors. Medicine is no exception. Agencies will provide actors familiar with role-play as a form of teaching and assessment. The examiners write the patient scenarios, and set the criteria for marking but the role of 'patient' in the scenario is taken by an actor, who interacts with the candidate.

How to manage the role-play scenario

In essence the key for the candidate is to treat the actor exactly as if he or she were a real patient. The doctor should introduce him/herself with the usual courtesy. At History stations, actors are given a fairly detailed description of who they are (age, family, occupation, where they live, current interests and concerns) as well as the details of their medical problems. They have a past history, and they are given more detail about that past than are required to answer the questions necessary to pass the station. None of the information they are given is weighted so they do not necessarily realise the significance of what they have been told, The skill lies in eliciting relevant information, as in the real world.

In the Communications station, the actor may be playing the part of some one who is in a particularly stressful situation, and they will play the part in response to the candidate's lead, and will stay 'in role' for the whole station. The actor can become the anxious mother and she will repeat that performance with consistency for every candidate.

Using actors as 'standardized patients' to assess communication skills has been shown to satisfy the requirements for validity, fairness and reliability.[6]

In the Physical Signs station the actors will be told where they will feel pain or tenderness. If the candidate is rough, they will respond as if hurt. The physical signs station is one which candidates find difficult. They often talk about what they would do, rather than do it. The purpose of having the actor present is to allow trainees to demonstrate what they would do, not just describe it! Many candidates seem shy, or reluctant to approach or touch the actor; perhaps they are also out of practice at physical examination?

In the Resuscitation station it is the candidates themselves who are expected to 'role-play'. Many candidates will have attended a Resuscitation Council (UK) Advanced Life Support (ALS) course and so will be familiar with role-playing. For those candidates who have not attended an ALS course they should remember that, once again, it is important to demonstrate what they would do, not just to describe it. Finally, artificial as it may seem they are expected to 'talk' to a manikin. However, it is not necessary to shout at the top of your voice for everyone in the examination room to hear!

Do the actors contribute to the marks of the candidate? This practice is common in many undergraduate medical examinations and there are arguments for and against, particularly in the area of communication skills. However, the Royal College of Anaesthetists has decided not to include a mark from the actor, on the basis that candidates shall be marked in the examination only by an examiner of the College. The examiner is often asked to assess the fluency with which the candidate performs the task, and may consult with the actor. However, the final decision rests with the examiner.

Summary

What do the candidate and the tutor need to know about role-play? Firstly, that it has a sound basis in medical education, has been extensively researched, and shown to be a valid method of assessment. Secondly, that every attempt will be made to make the situation as real as possible. The

actors are professional and have a detailed script to work from. They are not told to withhold information, or to tell the whole story after the first leading question. They are to respond to the candidate.

The History station is designed to test the skill of the candidate in eliciting information from the patient, including the presenting condition as well as the usual, anaesthetic-specific questions. This is history taking in its purest form, with the only source the patient.

Skill in imparting information is tested in the Communications station. Here the object is for the candidate to explain something to the actor playing the role of a patient, a relative or another member of the medical staff. The response to the information conveyed may not be entirely positive and the candidate may need to manage that.

In the Physical Signs station, the candidate should examine the patient, not just talk about it!

As with all examinations, only good can come from practising the exam technique as well as learning the facts. Trainees should practise these skills on their own patients at work, but also try to set up role play situations, and practise the five minute history, communication and physical signs stations. That way lies success in the OSCE.

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Experience of sub-specialty anaesthesia in intensive care and pain management

Dr V J Webster, Consultant Anaesthetist, The Royal Hallamshire Hospital, Sheffield

For anyone who reads Anaesthesia News, you may recognise me as the careless skier who achieved multiple trauma status on the piste in Canada. The shortened version of the story being that I ended up on intensive care with thoraco-abdominal injuries and respiratory failure. Being on the other side of the stethoscope was a salutory experience. I tried to be a 'good' patient but fear I failed; I was just too questioning. I found it extremely difficult to let go and allow my doctors to continue my medical care without analysing every action and asking for results of every investigation.

Intensive care

Since my return to the UK, I have been quizzed by my ICU colleagues; how have I changed? What can be improved from the patient's viewpoint? I have considered these questions at length and come up with a few simple things that made me, as a patient, feel better.

When I was transferred from HDU to ICU I left the luxury of a fully controllable HDU bed for a hard ICU cot which only had controls at the end of the bed. My initial transfer was grim, I was awake, in pain, unable to breathe and scared, very scared. Nurses, used to dealing with unconscious patients, didn't interact with me. For what seemed like hours, no-one told me what was happening and I seemed to be ignored which, as I thought I was about to be fully ventilated, seemed weird. Of course, I wasn't ignored, they were doing the usual hand-over and planning, but as a patient I didn't see that. I know about ICUs, the monitors and what happens on admission and the one I was on, although considerably bigger than ones I have worked on, was no different. I was frightened and I knew the drill, how much more frightened must my patients be?

Those little things really do mean a lot. Once my medical care was established, I had plenty of time to experience life as a patient. I think the quality of that life is all down to basic nursing care and consideration. During ward rounds, I was talked to from the end of the bed, but I could not hear

thanks to the ventilator. I could not see who was talking unless I had my specs on, but could not fit them over the NIPPY mask. The more casual doctors sat on my bed which meant I could hear and see better but in the early days, even the epidural didn't prevent searing pains with the slightest movement of my mattress. Having my hair brushed and later washed, being offered a mouthwash and lip salve became highlights of my ICU days. I found that my PCEA and nurse-call buttons became lifelines to my world, as I could not exactly shout for help. Being able to see a clock became important as I improved, I realised how much of my day at work is dependent on time and never appreciated that my patients might use the same time-table to plan their day.

Although, in many respects, Canada is similar to the UK, it took time to decipher accents and vagaries of vocabulary. I had to get used to the idea of being cared for by physicians and respiratory technicians, while the anaesthetists appeared to trouble shoot ventilation and pain.

It was not just me on the ICU learning curve; my medical family had to learn to be relatives. My Father, after 30-odd years talking with the relatives of his patients on ICU, found himself in their position for the first time. He learnt the patience and calmness required in letting go and allowing others to make decisions and he saw the value of regular and realistic discussion between cares and family. He must also have felt the helplessness that engulfs many of our patients' relatives as they sit for hour on hour waiting for news.

When I left ICU to return to trauma HDU I was demonitored and wheeled away. Going from continuous monitoring and one-to-one care, to four hourly observations was extremely disconcerting. The sudden shock of demonitoring came as a surprise. Having discussed this with my fellow patients I realised that it wasn't just me, as a medic, who thought I couldn't possibly be OK without seeing my heart beat along on the ECG and hear my O2 sats go beep at a constant pitch. It is easy to reduce the level of monitoring once a decision has been made to transfer from ICU instead of waiting until discharge.

Pain management

I have never had 'real' pain before, but tried the entire spectrum of analgesia before I left Canada. I started off with intra muscular, then PCA morphine, later I had to be persuaded to have an epidural. It amazes me how I spend a lot of my working life assuring patients that an epidural will be best after a major operation or for labour, but when it came down to it I was happy with the PCA. Having acquiesced, I had the epidural and found that, for all its faults, it was indeed superior. As could have been predicted, my thoracic epidural gave me a hemi-block on my uninjured side. The top-up to improve it rapidly gave me good analgesia, but as my face and scalp began to numb I became slightly concerned. The block stopped at C3. How was I still breathing? … well I was on NIPPY by then and it continued to do its job without me! For technophiles, the department uses PCEAs of 0.1% bupivacaine with 2 mg/ml fentanyl as standard. However, I only had good analgesia once 0.2% bupivacaine was used. Over seven days I became extremely attached to my friendly pump and was scared to let it go. I now realise how strong the psychological element of control of analgesia is for me in practice, no longer just in theory. One of my most stressful times was during the change from PCEA to nurse delivered, PRN, analgesia. Once the epidural was stopped I was asked to score my pain using a ten point scale. It took me two days to work out how to get the analgesia I needed based on my pain score … score too low you don't get a thing, score too high you have nowhere to go when the pain gets worse. I eventually discovered that '3' only brought paracetamol, but the magic number of '5' gave me access to the entire analgesic cupboard. Paracetamol is a very good analgesic when used appropriately, but when used in combination with codeine etc, I found it very difficult to get the right balance, as further combined analgesia was refused as I reached maximum paracetamol levels. Separating the two allowed me to wean off the opiates and keep good analgesia with paracetamol.

And finally

I was discharged to a local hotel under the care of my Mum, an SRN. Having been pretty fit before the accident, I couldn't believe how quickly my physical condition had deteriorated. I was unable to dress myself, struggled with one flight of stairs and, even more surprisingly found I could not float in the hotel pool. Sinking like a stone is something I have never done. It took a further fortnight before I could don TED stockings and pick the kettle up! As for rib pain, it has taken four months to be able to sit up in bed without wincing. Here's a top tip for broken ribs; triangular pillows support parts other pillows cannot reach.

Finally, in case they are reading this, I would like to take this opportunity to thank all of those in Canada and the UK involved in my care, my family and my friends. Thank you.

55th Anniversary Dinner

Wednesday, 19 March 2003

The 55th Anniversary Dinner will be held on the evening of Wednesday, 19 March 2003 in the Riverside Dining Room at the Institute of Electrical Engineers, Savoy Place, London WC2R.

The dinner will be at 7.00 pm for 7.30 pm and is expected to finish at approximately 11.00 pm. Please note that dress will be Black Tie on this occasion. Tickets are £40.00 each, and Fellows, Members and trainees are warmly invited to bring guests to join us in our celebrations. Seating will be on round tables of ten on a first come, first served basis. If you wish to make up a table with friends, or sit with nominated friends, please indicate in the space provided below.

Please complete this application form, including the name(s) of your guest(s), and send it to Mrs Mandie Kelly at the Royal College of Anaesthetists, 48/49 Russell Square, London WC1B 4JY. your cheque should be accompanied with the form and be made payable to 'The Royal College of Anaesthetists'. Alternatively, please add you credit card details below. Please ensure that applications are made no later than **Wednesday, 5 March 2003**.

I would like _____ tickets at £40.00 each

Payment can be made by Sterling cheque, made payable to The Royal College of Anaesthetists, or by credit card below:

Please charge my credit card: ☐ **Visa** ☐ **Delta** ☐ **MasterCard** ☐ **Switch** **Total Remittance:** _____

Card number: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Expiry date: ☐☐☐☐ **Issue No (Switch only):** ☐ **Start date (Switch only):** ☐☐☐☐

Cardholder's signature: _____ **Cardholder's name:** _____

Full Name (please use capital letters): _____

Address Line 1: _____

Address Line 2: _____

Address Line 3: _____

Address Line 4: _____

My guest(s) at the dinner will be: _____

Special dietary requirements for you and your guest(s)
(please state clearly to whom they apply): _____

I would like to sit with: _____

‘Joint Information for Patients’ Project News update

Dr J A Lack, Chairman, Editorial Board

The first two patient information leaflets ‘Anaesthesia explained’ and ‘You and your anaesthetic’ from this joint project of the Association of Anaesthetists of Great Britain and Ireland (AAGBI) and the Royal College of Anaesthetists (RCA), have been printed and circulated to all anaesthetic departments. These leaflets have been written by a partnership of patient representatives, patients and anaesthetists. ‘Anaesthesia explained’ has been certified by ‘Plain English’ and received its crystal mark. ‘Anaesthesia explained’ is designed to be placed in clinics, wards and surgeries. ‘You and your anaesthetic’ is designed to be sent out to patients expecting to have an anaesthetic.

We have produced a sequel to the Audit Recipe book – a ‘how to do it’ guide and a set of copyright- free text from which anaesthetists or others interested can construct their own information leaflets. The UK consent initiative and the increasing importance of information for patients has led to a considerable demand for publication.

A joint website (www.youranaesthetic.info) has been set up and will be further developed. It will hold all the outputs from the project. The patient information leaflets will be held in a range of file options to allow easy access, including word, .pdf, large print, A5 leaflet format and text only files. The leaflets meet the design criteria set out in the new NHS toolkit for producing patient information (www.doh.gov.uk/nhsidentity/toolkit-patientinfo.htm).

The project finished at the end of the year. The book – ‘Raising the Standard: Information for Patients’ contains sections on developing patient information, the patient’s perspective, communicating risk, samples of existing anaesthetic information for patients, text for nine further leaflets on specialist topics and an extensive resource guide. There will also be an accompanying CD. These will be circulated to all anaesthetic departments very early in the New Year. Working copies of the other nine leaflets can be obtained as a zip file from the website.

The AAGBI and RCA have no plans at present to keep and distribute large numbers of these leaflets, as they will be available from the website and it is thought that hospitals may want to customise them. Arrangements have been made with our printers Alden Press Ltd (contact details below) who hold the files to print further copies if they are needed; please contact them directly about ordering. If organisations want to use the design and layout, the original print files are available and will be on the CD to be circulated in the New Year.

The AAGBI and RCA are particularly grateful to the Department of Health for financial support during the project’s consultation phase and for Abbott Laboratories Ltd for their support towards the end of the project through an educational grant. This made possible the professional design, a larger print run and this distribution.

Enquiries about supplies of further leaflets may be made to:

Mr John Morgan
Commercial Manager
Alden Press Ltd
Osney Mead
OXFORD OX2 0EF
tel 01865 253200 **fax** 01865 249070
mobile 07774 472344 **email** jmorgan@alden.co.uk

NICE Technology Appraisal Guidance No.49

The use of ultrasound locating devices for placing central venous catheters

COMMENTS FROM THE ROYAL COLLEGE OF ANAESTHETISTS

The College was invited to contribute to the provision of expert advice to inform this NICE Technology Appraisal. The College response was coordinated by Dr Peter Simpson and the expert advice was provided by Dr Andrew Bodenham and Dr Charlotte Gilhooly. The Guidance itself is entirely the work of NICE and the College has only had opportunity to comment at the draft stage. The College was well aware of the implications of a wholesale recommendation of the use of 2D ultrasound for the placement of central venous lines, recognising that there was a significant difference between anaesthetists, expert in their insertion in the intensive care and cardiac surgery situation, and inexperienced junior staff inserting feeding lines in less than ideal circumstances. Nevertheless, there are a growing number of clinicians who feel that, given appropriate equipment and training, the use of 2D ultrasound represents a major advance in the safety of central venous cannulation.

At the draft stage the College made strenuous representation that, although NICE considered that 2D ultrasound represented a significant advance, wholesale recommendation would produce major problems as follows:

1. Subsequent failure to use 2D ultrasound could have major medico-legal implications.
2. In certain situations such as ITU or cardiac theatres, serious delays in instigating monitoring and subsequent treatment could occur.
3. It is relatively impractical in the emergency situation.
4. It would result in deskilling with regard to use of the landmark technique.
5. A significant financial burden on Trusts, since a number of machines (4-6) would be required on each site and training would be necessary for all users.

As a result of this, the final document has been considerably modified to take account of these anxieties. Although the Guidance (1) implies that ultrasound guidance should be used whenever possible, it is important to read the document more fully. **1.1** emphasises the **elective** situation only and **1.2** just states that 2D should be **considered** in all situations.

It is also important to read 4.3.5 and 4.3.6 concerning the practicality and financial implications, which are detailed under 6. The financial implications for the NHS are enormous. Unless a Trust provides both the equipment and the training, clinicians have no alternative but to use the landmark technique. Furthermore, if ultrasound equipment is unavailable for whatever reason, it is clearly essential to maintain landmark skills. This is of particular importance for trainees, who move between hospitals with varying ultrasound provision, at regular intervals

The College draws attention to 4.3.6, in which it is emphasised that we should continue to use and teach the landmark technique. Regrettably, this recommendation is not emphasised in the guidance, which has been a major source of clinician's anxiety. We also note **4.3.3** in which the part played by the skill and experience of the operator is emphasised. This is confirmed under **7.6**.

In summary, the College feels that the guidance is fair and sensible but considers that utilisation of the landmark method is still an acceptable alternative, whether or not 2D ultrasound is available. **We would recommend that whenever a central venous catheter is inserted, a note is made of which method of localisation, i.e. 2D ultrasound or landmark technique, is used.** This would have the added benefit of allowing future comparison of the two techniques.

Report of a meeting of Council

At a meeting of Council held on **Wednesday, 16 October 2002** the following was re-appointed **Regional Adviser**:

South West
Dr M B Coates, Derriford Hospital, Plymouth

The following were appointed **Deputy Regional Adviser** *(Re-appointments are marked with an asterisk)*:

Mersey
*Dr A R Bowhay, Royal Liverpool Children's Hospital

West of Scotland
Dr J A Patrick, Glasgow Royal Infirmary (in succession to Dr T T C McLintock)
Dr N G O'Donnell, Western Infirmary, Glasgow (in succession to Dr A D MacLeod)

The following were appointed **College Tutors:**

Oxford
Dr A Bilolikar, Kettering General Hospital (in succession to Dr J Szafranski)
*Dr R M Russell, John Radcliffe Hospital, Oxford
*Dr J P Hall, Milton Keynes General Hospital
*Dr J Everatt, Horton General Hospital, Banbury

Yorkshire
*Dr L D Caldicott, St James's University Hospital, Leeds

Northern Ireland
Dr B V McCloskey, Royal Group of Hospitals, Belfast (in succession to Dr T J McMurray)
Dr D W Lowry, Craigavon Area Hospital (in succession to Dr H E Bunting)

North Thames (West)
*Dr S A Kirby, Hammersmith, Queen Charlotte's and Chelsea Hospitals

North Thames (Central)
Dr S Gowrie Mohan, Lister Hospital, Stevenage (in succession to Dr I Sockalingam)

North Thames (East)
Dr D M Halfpenny, Homerton Hospital (in succession to Dr P R Howell)
*Dr M T Healy, The Royal London Hospital
*Dr D Radhakrishnan, Whipps Cross Hospital
*Dr A R Visram, Queen Elizabeth Hospital for Children

Mersey
*Dr D P L Atherton, Whiston Hospital
*Dr A J Martin, Leighton Hospital, Crewe

North Western
Dr D G Greig, South Manchester University Hospital NHS Trust
(in succession to Dr C L Tolhurst-Cleaver)

South East Scotland
*Dr S C S Russell, Victoria Hospital, Kirkcaldy

West of Scotland
Dr C W Brydon, Western Infirmary, Glasgow (in succession to Dr N G O'Donnell)
Dr P A Stone, Western Infirmary, Glasgow *(second College Tutorship established)*
Dr E M McGrady, Glasgow Royal Infirmary (in succession to Dr J A Patrick)
Dr F M M Bryden, Glasgow Royal Infirmary *(second College Tutorship established)*
Dr D F Cossar, Institute of Neurological Sciences, Glasgow *(new College Tutor post established)*

South Western
Dr T J Scull, Yeovil District Hospital
(in succession to Dr C P Elsworth) *(with effect from 1 September 2002)*

South Thames (East)
*Dr C K Guest, Queen Elizabeth, The Queen Mother Hospital, Margate

Leicester and South Trent
*Dr A C Norton, Pilgrim Hospital, Boston

Nottingham and Mid Trent
Dr C R Mackaness, South Derbyshire Acute Hospitals NHS Trust *(second College Tutorship established)*

West Midlands
Dr J L Isaac, Queen Elizabeth University Hospital, Birmingham (in succession to Dr A D Wilkey)
Dr L P Sykes, Russells Hall Hospital, Dudley (in succession to Dr J L Danks)
*Dr H Brunner, Royal Shrewsbury Hospital

Correspondence

Please make your views known to us via **email** (preferred option) to: bulletin@rcoa.ac.uk, or by post accompanied by an electronic version on floppy PC disk, preferably written in Microsoft Word (any version), to: The Editor, c/o Mrs Mandie Kelly, Editorial Officer, The Royal College of Anaesthetists, 48/49 Russell Square, London WC1B 4JY. Please include your full name, grade and address. All contributions will receive an acknowledgement. The Editor reserves the right to edit letters for reasons of space or clarity.

To AMBU or not to AMBU? That is the question!

Madam, – We read with interest Dr T Sivagnanam's article on the availability of self-inflating (AMB/Laerdal) bags, especially in the light of recent, well publicised, critical incidents associated with blocked anaesthetic tubing *(Bulletin 13, May 2002)*.

An audit in our Trust revealed similar results, suggesting that 63% of anaesthetists favoured such a device as an alternative means of ventilation, should the anaesthetic machine fail. In addition, despite 10% of anaesthetists admitting they had required other means of ventilation in the past year, 90% of theatres had no alternative device (the nearest being in recovery). Those theatres that did have an alternative means of ventilation had Waters' bags.

We disagree with Dr Sivagnanam that the AAGBI guidelines are sufficiently clear. At present, the guidelines only state that an alternative means of ventilation should be available in the event of ventilator malfunction. This lack of clarity may lead to uncertainty as to how they should be implemented. We feel that they should be more specific in citing the self-inflating bag as this alternative device and that it should be immediately accessible, i.e. next to the anaesthetic machine. Indeed, our audit also measured the time taken for operating department practitioners to obtain any form of alternative ventilation. This revealed an average time of 51 seconds to collect a device and, where necessary, a further 26 seconds to attach it to an oxygen supply. Not only is this an unacceptably long time in an emergency , but it also removes a skilled assistant when they are most needed.

We propose that a self-inflating bag on the anaesthetic machine would be a simple, effective and inexpensive solution to a life-threatening situation. This would eliminate the delay associated with connecting an oxygen supply to devices such as a Waters' bag and the potential delay posed by unfamiliar agency staff searching for emergency equipment.

R Swanton, SHO, Poole
M Grayling, SpR, Poole

Perioperative arrhythmias

Madam, – I note that the authors of this article say: '... there are no definitive guidelines for temporary perioperative pacing in patients with bifascicular block' (Bulletin 15, September 2002).

My own physician colleagues advise that asymptomatic patients with a high degree of block do not need pacing. However, I have always thought it prudent to have access to isoprenaline when involved with such patients. Would the authors like to comment?

WG Sellwood, Consultant, Stafford

Reply from the author, Dr T J McMurray: Dr Sellwood is, of course, right.

Performance indicators

Madam, – Dr S M Yentis has made a brave attempt to use recovery indicators to assess individual anaesthetists' performance *(Bulletin 16, November 2002)*. He readily acknowledges in the extensive discussion the many flaws in the audit. I feel that there are additional, fundamental problems with this type of assessment, which further question its validity and reliability.

- Firstly, the way a patient recovers from their operation is a complex result of several interventions by various personnel. For example, the competence of the surgeon when providing local anaesthetic infiltration can greatly influence the immediate post-operative analgesia. In other words, there is a team of people who influence recovery, not just the anaesthetist. The awareness of team-work in the success of procedures is now well recognised in many work situations and team-based appraisal is increasingly being advocated by management experts.
- Secondly, the experience of the patient is of paramount importance. Patients may, for instance, have good immediate analgesia in the recovery room from relatively short-acting drugs but have a much worse experience on the ward. In addition, hang-over effects of the anaesthetic may impair the patients' recall of recovery events, but they are likely to recall later events on the ward. I feel this would be a more meaningful time to elicit their responses. (Moreover, a quiet word with the ward Sister usually identifies anaesthetists' strengths and weaknesses!).
- Thirdly, whilst there is the understandable attraction of simple, quantitative measures, these may not be the most appropriate way to analyse complex patient experiences. A qualitative approach may be more suitable, for example, using semi-structured interviews with patients after their operation.
- Finally, we must avoid the danger, well-expressed by the words attributed to a US general in the Vietnam war, 'we must stop making the measurable important, but make the important measurable!'

I endorse the sentiment that we do need to measure and improve the outcomes of our care: our clinical effectiveness. The measures should be valid and reliable, take into account teamwork and most importantly, focus on the experience of the patient. It is

possible, that a well-designed form of 360 degree appraisal, with patient surveys, is the way forward, and the Clinical Governance group of our directorate is currently investigating this method.

P Shannon, Deputy Clinical Director, Anaesthetics & Critical Care, Doncaster Royal Infirmary

National Anaesthesia Day – continued

Madam, – I have been rather cynical about National Anaesthesia Day (NAD). After all, I know what I do, my surgeons at least think they know what I do, and my patients know what I do because I tell them. There's no National Orthopaedic Surgery Day or National Pathology Day is there? In my time, I have answered questions about needing O Levels to be an anaesthetist, no you can't do the course at night classes or at the Open University; and yes, I will stay around for the operation as well. So, are we over-reacting?

Well, now I'm not so sure. Last week, BBC Scotland showed 'Baby ER', the first of five documentaries profiling the excellent work done by neonatal paediatricians in Glasgow's Princess Royal Maternity Hospital. It was an excellent programme, well put together, slickly presented (as the title would suggest) with suitable doses of drama, joy, tragedy, and human interest, and yes, there was a 'George Clooney' too. Cue the labour ward theatre where an emergency caesarean section for triplets was about to start. The obstetrician and paediatrician both set the scene for the cameras and there was a little good-natured banter as staff prepared for surgery. Under the drapes lay a smiling relaxed mum, whose joy was apparent as she saw the babies safely delivered, one by one, before the paediatricians took over. Unless the section was done with extensive local infiltration, some capable anaesthetist had performed a very good spinal or epidural – but where was he/she? Why did no-one explain how the mother could stay awake and comfortable whilst undergoing surgery? Why did no-one praise the expertise involved in producing such a state of relaxation? Why, if the operative delivery and the paediatric resuscitation were shown in detail, did no-one think to mention the preoperative regional block.? So maybe we are paranoid but yes, they are ignoring us as well.

So, NAD notwithstanding, what to do? Dr R Orme from Oxford *(Bulletin 16, November 2002)* suggests targeting the media. I think medical soap operas are the answer. 'Casualty' and 'Holby City' have around eight million viewers each, I am told, and I am one of them. Operations happen where the consultant surgeon instructs an invisible person behind the screen how to give the anaesthetic, deal with anaesthetic crises and on one memorable occasion, how to diagnose and treat malignant hyperthermia. The patient was sitting up having tea only a few hours later, so he did pretty well. The AE consultant in Casualty frequently intubates patients using etomidate and suxamethonium, no anaesthetist in sight. In fact the only notable anaesthetic presence in recent years was an SHO in 'Casualty' who stalked a female colleague, kidnapped and tried to kill her using IV Sux, and then murdered another colleague's husband before himself jumping out of a window to his death. Not really the sort of image we want to project. Who on earth advises these people?

Some of us find theatre and ICU quite exciting places to work – we need to communicate that excitement to the viewing public and for that we need a good scriptwriter. And lunch with some producers. Let's see, 'Trauma Theatre', perhaps, or '222 ICU', or 'Gas 'n Go' or …

VT Reid, Consultant, Lanarkshire, Scotland

Epidural injections

Madam, – Dr I Makkison raises an interesting question concerning the recommendations for the use of epidural injections for the management of back and leg pain of spinal origin *(Bulletin 16, November 2002)*.

The recommendations state that epidural injections for these indications should not be performed without good reason on a patient whose conscious level is depressed (as a result of anaesthesia or sedation). Dr Makkison seeks clarification as to what constitutes a good reason and explains that sedation is used regularly in his hospital.

The Pain Management Committee and College Council agreed that these recommendations should aim to reduce the likelihood of any adverse outcomes from epidural injections performed for spinal pain. The use of epidural steroid injections in particular is an area of considerable concern for some patient groups who have made representations to members of Parliament and high level health administrators.

The consensus views of the Pain Management Committee was that there was an increased likelihood of causing unrecognised damage to anatomical structures (such as a nerve root) in a sedated or anaesthetised patient. This view was endorsed by Council of the Pain Society.

If, as Dr Makkison argues, a patient is unable to tolerate an epidural injection without sedation or anaesthesia, then that could be construed as a 'good reason'. In such circumstances it would appear desirable to provide the patient with an explanation of the advantages and disadvantages of this approach and to record this in the notes.

A final observation that Dr Makkison may wish to consider is that there are many institutions throughout the UK in which the vast majority of epidural injections for spinal pain are performed on patients without any sedation at all and without causing the patients any distress.

DM Justins, Chairman, Pain Management Committee

The Association of Anaesthetists of Great Brtain and Ireland

January 2003
Winter Scientific Meeting (venue to be confirmed)

June 2003
GAT Annual Scientific Meeting (venue to be confirmed)

More detailed nformation can be obtained from the Association of Anaesthetists of Great Britain and Ireland, 21 Portland Place, London WC1B 1PY **tel** 020 7631 1650 **fax** 020 7631 4352 **email** meetings@aagbi.org **website** www.aagbi.org

European Society of Regional Anaesthesia and Pain Therapy

VI Annual Workshop
'Neural Blockades on Cadavers'
20–22 February 2003
Innsbruck, Austria

XXII Annual ESRA Congress
10–13 September 2003
Malta

For further details, please contact: Options Eurocongress Belgium sprl/bvba, Rue de l'Instruction 126b, B-1070 Brussels, Belgium **email** esra@optionsglobal.com **website** www.esraeurope.org

National CEPOD Report

On 11 November 2002, NCEPOD published its fourteenth Report entitled: 'Functioning as a team?'

A sample of deaths within three days of a surgical procedure (performed by a surgeon, anaesthetist or gynaecologist) has been reviewed. The sample was determined by looking at the first death for each consultant surgeon or gynaecologist that occurred on the day of or within three days of the procedure during the data collection year 2000/01. The report follows the patient journey from pre-operative care to the autopsy.

Further information can be obtained from NCEPOD **tel** 020 7831 6430 **website** www.ncepod.org.uk **email** info@ncepod.co.uk

The Conscious Sedation Society of the United Kingdom

The Conscious Sedation Society was founded in 2001 and promotes good practice standards and encourages the development of training and education in conscious sedation. It also aims to promote evidence-based practice, research and exchange of ideas between all clinicians with an interest in this field. The Society encourages the implementation of the Academy of Medical Royal Colleges Report Safe Sedation Practice.

The first annual scientific meeting will be held on 6 May 2003 – venue to be announced. The President of the Society is Professor Tony Wildsmith.

Membership

Membership is open to all practitioners with an interest in conscious sedation. The annual subscription is £25.

For further information, please contact the Honorary Secretary, Dr Vincent Argent, c/o Little Friston, Jevington Road, Friston, East Sussex BN20 0AG **tel** 01323 423131 **email** Vincent_argent@hotmail.com

GMC Performance Procedures Anaesthetics

We are looking for volunteers to participate in a validation exercise on 11 February 2003 at UCL in London. The GMC conducts validation days to establish a reference group against which to judge the scores of a doctor in the Performance Procedures. The day will consist of sitting an Anaesthetics Knowledge Test and an OSCE (Objective Structured Clinical Examination) designed to assess clinical and communication skills. Feedback from the day is available and all scores are used only in reference to the validation day and are completely confidential.

All travel and accommodation expenses will be covered along with an honorarium of £100. We are looking for a broad spread of experience and so would welcome staff grade, senior SpR level (last two years), associate specialists or consultants. Many doctors find participating in these days valuable training for exams and the feedback helpful to their professional development.

If you are interested and would like further information, please contact Ms Anne-Louise Stripp on email a.stripp@ACME.ucl.ac.uk.

Appointment of Members, Associate Members and Associate Fellows

The Royal College of Anaesthetists would like to congratulate the following who have been admitted after the introduction of the new Membership criteria in August 2001:

October 2002

Associate Fellows

Dr Jennifer Susan Smith
Dr Baha Zeki Taha Al-Shaikh

Members

Dr Raad Nasser Zaidan
Dr Rolf Vogel
Dr Javaid Rashid
Dr Garikipati Muralikrishna
Dr Anoop Kapoor
Dr Mofizuddin Ahmed

Associate Members

Dr Mikel Isorna Monedero
Dr Rajeswara Prasad Kasthala

November 2002

Member

Dr Rachel Jane Awan

Associate Members

Dr Iftikhar Ahmad
Dr Dushaytha Ranjith De Silva
Dr Parul Arvindbhai Talati

Appointment of Fellows to consultant and similar posts

The College would like to congratulate the following Fellows on their consultant appointments:

Dr Susan Abdy, Queen Elizabeth Hospital, Kings' Lynn, Norfolk

Dr Rod Gouldson, Tauranga Public Hospital, Tauranga, New Zealand

Dr Bernice Hewson, University Hospitals, Coventry and Warwickshire NHS Trust

Dr Arif M Moghal, Mayday University Hospital, Croydon

Dr R K Rao Rebbapragada, Addenbrooke's Hospital, Cambridge

The Medical Devices Agency

Evaluation Centre for Infusion Devices

The Medical Devices Agency Evaluation Centre for Infusion Devices have just completed a series of 27 web reports on infusion devices, including 12 ambulatory pain control pumps. If you have acccess to the NHSWeb (the Health Service Intranet), this information is available free of charge and can be located at nww.mda.nhs.uk/pumpevaluation.

For further information, please contact Ms Teresa S Dunn, BIME Centre Manager, Royal United Hospital, Bath BA1 3NG **email** t.s.dunn@bath.ac.uk **tel** 01225 824106 **fax** 01225 824111

'Unfinished Business'

The Royal College of Anaesthetists response to the DOH document: 'Unfinished Business: Proposals for reform of the Senior House Officer Grade', is available to download from the College website home-page (www.rcoa.ac.uk).

The Mersey School of Anaesthesia and Perioperative Medicine

For information on courses in 2003 please see our website www.msoa.org.uk

Death

The College regretfully records the death of the following Fellow:

Dr Alison S J Prosser, Hampshire

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Mr Kevin Storey

Deputy College Secretary and Training & Exams Director
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Ms Claudia Lally
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Mr John McCormick
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