Editorial II

Time to light the grey touchpaper! The challenge of anaesthesia in the elderly

New ideas, although they may sound as though they are the logical consequences of progress, are often found to be based on past experience. Hindsight is always a factor driving innovation. In the last few years we have seen major changes in the way our profession trains, maintains standards and plans the delivery of services. Paediatric anaesthesia, for example, has developed in response to alleged shortcomings in the services that were delivered to a unique group of patients. The profession has taken time to accept these truths, but it has ultimately conceded. A subspecialty has evolved. Is there a place for such thinking in anaesthesia for the elderly? Recently, Dodds and Allison have challenged the profession for casual acceptance of a troublesome complication in the elderly, postoperative cognitive dysfunction, stating that it ‘should attract the same interest in further research that a similar 25% incidence would obtain in a young adult or paediatric group’.¹ To pursue the topic further, it is necessary to ask three questions. First, is there a case for considering that the elderly are ‘different’ from other adults encountered in anaesthetic practice? Second, is there a deficiency in the service? Third, is study of the elderly patient undergoing anaesthesia worthwhile?

Are elderly patients ‘different’?

Priebe distinguishes between age-related physiological cardiovascular changes and age-related pathological cardiovascular disease, and supports the view that the elderly deserve special consideration.² In the healthy elderly patient there is a loss of functional reserve that may make the system vulnerable to challenge. Examples are age-related upregulation of sympathetic outflow, with desensitization of beta-receptors and an increasing reliance on the Frank–Starling mechanism for the regulation of cardiac output. These are important physiological changes of clinical relevance. However, it is easy to get distracted into thinking about cardiovascular pathology when thinking about the elderly. This may lead to a complacent attitude towards the needs of the healthy elderly patient. It is
possible to take a view that the problems of the elderly are the consequence of age-related diseases, and that all that is necessary is an understanding of the disease, an essential prerequisite for any anaesthetist. This view does not support the idea that the elderly are a unique group of patients. To some extent this is the view taken in an article in this issue: Jin and Chung discuss the differences between elderly and younger adults with reference to whether complications can be prevented.3 It is clear from the discussion of the cardiovascular system that some concepts, for example the Goldman risk index, are well established in the collective consciousness of the profession. One is left with the conclusion that even if age were taken as an independent indicator of risk, it would be dwarfed by the risks of age-related cardiovascular disease.

Those who would make the case for elderly patients being special must, therefore, look away from the cardiovascular system for unqualified support. Here Jin and Chung have the answer: the brain.3 The brain changes with age. The loss of neurones, the reduction of grey matter, the reduction of neurotransmitters and receptors for norepinephrine and dopamine is progressive, physiological and symptomless. The lowered requirement for propofol in the older patient can be explained in pharmacokinetic terms. It can also be explained in pharmacodynamic terms: the aged brain needs less anaesthetic agent.4 5 The concept of brain aging as a progressive loss which gives no symptoms until a functional reserve is exhausted is attractive, and one which has implications for our understanding of anaesthetic-related morbidity. As far as pathological processes are concerned, we have one model, Parkinson’s disease, in which it is said that up to 80% of nigrostriatal neurones can be lost before the disease is clinically apparent.6

Could the neurological complications of anaesthesia and surgery in the elderly be a result of an insult on an aging population of neurones, or should they be explained purely in terms of the known pathological processes affecting the cerebral arteries? Control of the cerebral circulation may be important in preventing perioperative stroke, but it would appear that prevention of stroke does not reduce the burden of perioperative cerebral morbidity. According to the International Study into Postoperative Cognitive Dysfunction (ISPOCD), 14% of the over 70s have not returned to baseline mental state functioning 3 months after surgery.7 Applying our knowledge of cerebrovascular pathology and physiology, doing all the ‘right things’ to maintain optimal cerebral oxygenation and tight control of the circulation, does not reduce the incidence. If ever evidence were needed that the elderly brain, even that of the otherwise healthy patient, responds ‘differently’ from the young brain, this observation suffices. The only significant risk factor for ‘late postoperative cognitive deficit’ seems to be age.

Postoperative cognitive dysfunction is an enigma. The presence of a lucid interval suggests that the origins may lie with neurotransmitter failure that has taken a day or two to become apparent. Alternately, the dysfunction may result from the cumulative stress of hospitalization, trauma, and pain. There is evidence that early postoperative delirium (by this I refer to a common, reversible, and acute phenomenon) results from poorly managed pain rather than as a complication of analgesic administration.8 There is also evidence that the use of meperidine and long-acting benzodiazepines such as diazepam is associated with delirium in elderly surgical patients.9 No such correlations are clear when long-term deficit is considered, but a forthcoming ISPOCD study may provide information about minor and day case surgery in an elderly population, that is, a population in which the ‘stress’ of hospitalization is minimized. Even if drugs are cleared of blame for long-term dysfunction, ‘the anaesthetist’ may remain a convenient scapegoat (in the same way as it is for postoperative nausea). The fact is that we still do not know what anaesthetic drugs or techniques do to the elderly brain, and in what way their actions are different from their actions in the younger brain. Predictably, spinal anaesthesia, presumably by virtue of the risk of hypotension, may be associated with more cerebrovascular risk in elderly patients with hip fracture.10 However, as discussed above, overt cerebrovascular incidents are only the tip of the iceberg of cerebral complications. Many elderly patients are ‘never quite the same’ after surgery. This observation in itself justifies the view that the elderly are a unique group of patients whose anaesthetic-related morbidity cannot be explained in terms of conventional models of age-related disease.

Is there a deficiency in the way the service is delivered?

The 1999 Confidential Enquiry on Perioperative Deaths (CEPOD) reported on 1077 deaths within 30 days of surgery in England and Wales in the over 90 yr age group.11 Given that there is no control data (from survivors), and that the life expectancy in that age group is only 3.6 (males) and 4.5 yrs (females), it is difficult to know to what extent the results can be blamed on inadequate delivery of services. For all its weaknesses, CEPOD does offer a useful snapshot of current British practice. For example, 90% of the patients who died had an underlying medical disorder but few received shared care between surgeon and a specialist physician in the final illness. As ever, CEPOD is useful mainly for its case reports directing the ways in which management could be improved. The use of large volumes of i.v. fluids is noted in many of the deaths.

Poor application of basic principles of fluid management underlies some of the problems. An article in the British Medical Journal was notable for its elevation of a single case report, of an elderly orthopaedic patient who received inappropriate i.v. fluid, to editorial status.12 It also generated what the editor described as an ‘emotional response’ in the correspondence columns and electronic responses.13–15 No
firm conclusions were reached, but one was left with an impression that the fluid requirements of seriously ill, elderly surgical patients were poorly understood, and not addressed by experienced surgical staff or others, such as anaesthetists and clinical biochemists, who could provide expert advice. It is not only failures of management that can provoke criticism. Apparent successes can do also. A woman of 113 yrs survived surgical fixation of a fractured shaft of femur (after a delay of several days during which she was not expected to live), and a stay in intensive care, and lived for another 9 months.16 There was a spirited discussion of the appropriateness of using intensive care resources for a patient who survives wheelchair dependent and confused.17 The evidence that a low in-hospital mortality can be achieved where there is adequate high dependency care suggests that some of the problems of using intensive care could be avoided by early intervention and close perioperative supervision.18 The two case reports are similar in that they demonstrate failure of coordinated decision making by experts in surgery and perioperative medicine, something which the authors of CEPOD would have us believe also. There would appear from these reports to be concern that vulnerable elderly patients are not getting the service that the authors of the reports feel is appropriate, and that there is a deficiency in the way the service is delivered.

Is study of the elderly patient undergoing anaesthesia worthwhile?

Conclusions about anaesthesia in the elderly may be made by extrapolation from studies on younger, and healthier, patients. While the study of the younger population may be easier to reconcile with Ethics Committees and has the undoubted benefit of providing a homogeneous group of patients, extrapolation of the results to the elderly has to be done carefully. Ideally the elderly should be considered as a separate group in research, for example in a direct comparison with a younger group.

Specifically with respect to drug doses and the process of aging, the central cholinergic system has come under scrutiny. It is perhaps a reflection of the lack of communication between medical specialties that the risk of causing severe disturbance of cognition with centrally acting anticholinergic drugs has long been known to medical specialists who care for the elderly, but is only now receiving due attention from anaesthetists. Many drugs in common use have antimuscarinic effects and combinations may potentiate this tendency. For example, an elderly patient taking frusemide and prednisolone may have increased risk of cognitive impairment.19 There is a suggestion that integrity of the cholinergic system is required in the normal mechanism of action of propofol.20 There has been recent interest in the cholinergic system in the mechanism of aging, at least in the pathological aging of Alzheimer’s disease. Alzheimer’s disease is a degenerative disease of the cholinergic central nervous system. In a manner analogous to the treatment of Parkinson’s disease by substituting dopamine, progress has been made by substituting acetyl-choline in selected patients with Alzheimer’s disease.21 When it comes to physiological age-related neuronal loss, the cholinergic system may also be the major pathway involved. Here there is an interesting finding of relevance to anaesthesia. Repeated anaesthesia is implicated in accelerating the loss of cholinergic neurons in aging rats.22

It is when the role of the cholinergic system is considered outside the narrow confines of anaesthesia that the enormous implications for future research are clear. Fifteen years ago there was a hypothesis that Parkinsonism could be the result of neural toxicity of opioid analogues on dopaminergic neurons.6 These days it is worth considering chronic postoperative cognitive dysfunction as an aging process triggered by anaesthesia. The consequences are far reaching. For years we have talked of the ‘ideal’ anaesthetic as one which has no long-term or cumulative effects on the body, and the process of anaesthesia which, properly practised, leaves no traces. It may be that we shall have to modify that view and accept that the brain, at least that of the elderly patient, is not as tolerant of anaesthesia as we previously thought.

Elderly patients present to anaesthetists with very special problems. They are uniquely sensitive to the stresses of trauma, hospitalization and surgery in ways that are only partly understood. Yet at present there is no systematic attempt to train anaesthetists to study these vulnerable patients and care for them more effectively. Anaesthetists concentrate their experience by working with individual surgical specialties in which the concept of age as a normal process is less important than the surgically relevant age-related disease. They do not learn about the elderly in the structured way in which they learn about small children. A generation after a group of far-sighted colleagues persuaded the profession to look at paediatric anaesthesia as ‘special’: it is time for the emergence of a new ‘subspecialty’. A generation hence and it could be too late. In this issue of the British Journal of Anaesthesia we can learn how to start.3

A. M. Severn
Royal Lancaster Infirmary
Lancaster LA1 4RP
UK

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