New Developments In Anaesthesia

DR JOHN A.W. WILDSMITH MD FFARCS
DR ALISTAIR LEE FFARCS
DEPARTMENT OF ANAESTHESIA
ROYAL INFIRMARY OF EDINBURGH
EDINBURGH
SCOTLAND

Anaesthesia is now a rapidly developing medical speciality which is acquiring new skills and a wider sphere of influence. This is apparent with the involvement of anaesthetics in the field of intensive care; the setting up of clinics for the management of chronic pain; and increasing moves towards greater independence of anaesthetists' specialist organisations.

In Britain, an increasing amount of surgery is being performed on a one day hospital stay basis and this has been helped by the recent development of new British drugs allowing rapid patient recovery.

High technology microprocessor systems are being put to use to improve post-operative pain relief, and to ease methods of administration in order to prevent lack of oxygen occurring during an anaesthetic.

In contrast to this, another problem receiving increasing attention is that of awareness that occurs during general anaesthesia. Interest in this has been expressed in the country, not only by anaesthetists but also by the courts, which are prepared to award large sums in compensation.

Intravenous induction of anaesthesia is the normal method in Britain, with hangover effects lasting hours and are not ideal when fast recovery is desired.

Increasingly Popular

Propofol, released for general use this year, is produced by Imperial Chemical (ICI), under the brand name of *Diprivan*, and is becoming increasingly popular in this situation. It is suitable for short cases and can be given by infusion to prolong its effects without an unacceptable delay in recovery.

Another British drug development currently generating worldwide interest is atracurium which is brand named *Tracrium* and manufactured by Burroughs Wellcome. Atracurium is a paralysing agent similar to the South American arrow poison, curare.

Other drugs of this type have until now depended on the liver and the kidneys to metabolise and excrete them and in this way terminate their action. Atracurium, however, breaks down chemically in the bloodstream by a process known as Hoffman degradation and is therefore independent of the liver and kidneys. This makes it possible to use it in patients with liver or kidneys failure as it self-destructs.

It has long been appreciated that pain control after an operation leaves a lot to be desired. Now it is increasingly being realised that prevention is preferable to pain relief post-operatively and that this is best achieved by the continuous use of drugs.

Effective pain control after major surgery requires the administration of powerful drugs such as morphine in doses near a level that can give rise to dangerous side effects such as respiratory depression. There is great variation from individual to individual and a dose that is dangerous in one person may be ineffective in another. In the absence of new potent pain relieving drugs, advances at the moment are dependent on better administration of the existing ones.

Safe Background

Microprocessor technology allows a safe background infusion of drug to be administered and intermittent small additional doses to be given automatically if requested by the patient pressing a button. Numerous fail-safe mechanisms are built into these systems to ensure patient safety. Although costly, patient controlled analgesia is being used increasingly in Britain, following surgery.

Research now in progress at Oxford University, in conjunction with the anaesthetic equipment manufacturer Penlon, at nearby Abingdon, may revolutionise the design of future anaesthetic machines. At present, oxygen and nitrous oxide gas flows are controlled by flowmeters known as rotameters. These consist of tapered tubes in which a small bobbin rotates in the gas stream.

Problems can arise due to static electricity, leakage or inaccurate setting by the anaesthetist. New systems under investigation use pulsed flows of gases through solenoid valves controlled by microprocessor. The advantage of a system of this type is that the anaesthetist dials up the concentration of gases he would like and the computer can check that the necessary concentrations, particularly of oxygen, are being achieved.

There is at present no monitor that can reliably estimate the depth of anaesthesia. Since the introduction of the curare-type drugs in 1942, there have been a small but worrying number of reports of patients who are aware of events occurring during anaesthesia, or who experience bad dreams. This is because a paralysed patient cannot move to signal that all is not well, and depth of anaesthesia has to be judged indirectly from such measures as pulse rate and blood pressure.

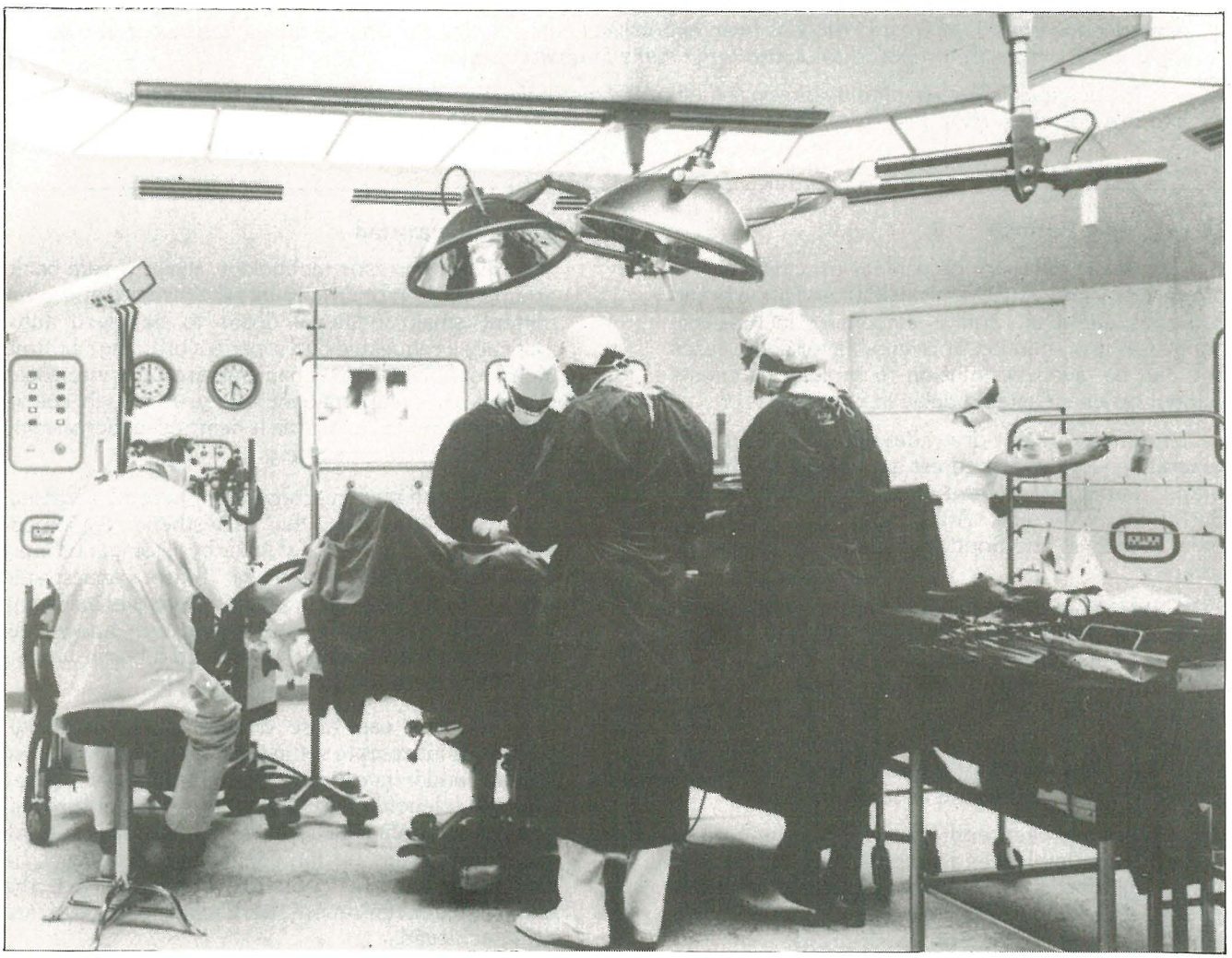
Higher Risk

Some operations carry a higher risk of awareness than others, for example Caesarean section, where the anaesthetist strives to limit the amount of anaesthetic administered, for the baby's benefit. This is an area of concern in the United Kingdom at present and research is in progress to determine the best anaesthetic techniques to help avoid awareness.

In 1954 a legal case came to the British courts concerning two people on the same operating list who were left paraplegic after spinal anaesthesia. For over 20 years after this, regional techniques were little practised in Britain. However, in recent years, there has been a marked revival in local anaesthetic techniques, particularly in epidural pain relief for labour and Caesarean section, and also as a major or sole component of the anaesthetic in many types of operation.

These anaesthetics may be spinals, epidurals, or major nerve blocks of the limbs. Post-operative pain relief in selected cases can be excellent using regional techniques such as continuous epidural administration of local anaesthetic or morphine and these are increasingly being used.

In conclusion, anaesthesia in Britain is becoming increasingly diversified and demands a wide range of skills. This is leading to increased specialisation. Modern technology is at the forefront of some of the advances being made, but despite this, emphasis is clearly on patient safety and comfort.



The role of the anaesthetist is now rapidly changing in the operating theatre as anaesthesia develops into a medical speciality.