changes in labelling or package inserts have often been required even though questions about their relevance have been simultaneously permitted. Consequently, in the interests of regaining time and perhaps achieving other economies, I recently circulated among some colleagues a proposal for a universal package leaflet. It was received so stonily that I realised I had been serious by accident, and therefore decided to submit the proposal to a serious journal. Here it is:

The universal package leaflet

(1) The active principle of this drug will doubtless at some time in the future be shown to be highly toxic to one or more bacterial or other species, if indeed this has not already happened.

(2) A group of epidemiologists will also demonstrate that people who are ill are more likely than those who are not to have taken drugs. This discovery will be interpreted by some to mean that taking *this* drug has caused you to be sick with the disease for which you are taking it.

(3) Because patients find it as difficult to understand the relevance of such findings as the finders do to admit their irrelevance to patients, you are strongly recommended to *take this compound only if it is essential that you do so*.

The last sentence contains advice with which, surely, no one will quarrel.

Today's Treatment

Uses of anaesthesia

The anaesthetist in the accident and emergency service

PETER J F BASKETT

The basic training of the anaesthetist in the operating room is orientated around secure airway control, artificial ventilation, monitoring and support of the circulation, and the relief of acute pain. It is precisely these skills that are essential in managing the suddenly ill and seriously injured patients cared for by the accident and emergency services and departments (fig 1).

FIG 1—Roles of the anaesthetist.

Prehospital care

Increasing awareness in several countries of the world of the value of expert prehospital care has led to the development in Britain of schemes designed to bring skilled assessment and treatment to the patient on site and during transport to hospital. In certain rural areas general practitioners¹ have organised on-

site immediate care schemes. Through training in hospital with anaesthetists in the anaesthetic rooms, operating theatres, and recovery rooms they have acquired the skills of intravenous cannulation and transfusion, airway control using endotracheal intubation, and reliable artificial ventilation with a self-inflating bag or mechanical resuscitator. In urban areas general-practitioner schemes are not so practical, and several centres^{2,3} have now followed the United States practice of training selected ambulance personnel to a paramedical standard, which includes the practical skills mentioned above combined with a thorough knowledge and understanding of the systematic assessment and monitoring of the seriously ill patient.⁴

All of these paramedical schemes rely on anaesthetists for a large part of their training and, in several instances, the entire scheme has been masterminded and organised by anaesthetists working in collaboration with their colleagues in the accident and emergency department and in the ambulance service. There are now moves to improve the efficiency of the emergency side of the ambulance service in Britain by separating this part away from the routine transport service, thereby creating a top tier of highly trained men to concentrate on the patients requiring skilled emergency care. As this development is adopted by more and more centres, so anaesthetists will become increasingly concerned. It is important, however, that they do not confine their participation to training only. They should also work on site from time to time with the trainees in their own environment to appreciate the problems of attempting resuscitation away from the complex and organised surroundings of their hospital.

Obstetric flying squad

With improving antenatal care by general practitioners and obstetricians and the increasing trend towards hospital rather than domiciliary confinement, the need for obstetric flying

squads has declined considerably in the past decade. The anaesthetist was an essential member of such squads, providing sedation for patients with eclampsia and resuscitation and anaesthesia for the serious postpartum haemorrhage. With the contracting requirement, many maternity units have abandoned the formal obstetric flying squad and prefer to treat the isolated case by arranging for the ambulance service to transport the anaesthetist and obstetrician and their essential equipment to the patient in a normal ambulance.

Thus the current emphasis is to provide resuscitation to ensure that the patient is fit for the journey to the local maternity hospital. Obstetric procedures outside hospital are kept to the bare minimum compatible with the patient's safety. Naturally, obstetric emergencies may be included in the facilities provided by any established mobile resuscitation unit for prehospital care in the area without appreciable extra organisation or use of resources.

Accident and emergency department

In most hospitals receiving emergency patients an anaesthetist in the accident and emergency department helps resuscitate seriously ill or injured patients brought into the department. The anaesthetist works as a member of the team with colleagues in the ambulance service, the accident and emergency staff, and, on occasion, other specialists relevant to the patient's illness or injury—for instance, neurosurgeons or thoracic surgeons, cardiologists, etc.

Several centres have appointed a consultant anaesthetist to the accident and emergency department on a part-time basis to help train the staff, both nursing and medical, and to advise on selection of resuscitation and life support equipment in the unit. This forges a link between the two specialties that is becoming stronger as more specialist consultants in accident and emergency work are appointed and the formal training of senior registrars in the specialty becomes established.

Major disaster

Every area health authority has a responsibility to ensure that there is provision to cope with a major disaster. Part of the arrangements must include the dispatch of a mobile hospital team to the disaster site to organise triage and provide treatment of the casualties.⁵ The anaesthetist is a member of this team and works alongside colleagues in surgery, nursing, and the ambulance service. They are indeed fortunate if they have had experience of working outside hospital with the emergency services in a mobile resuscitation unit designed to provide a day-to-day prehospital care service.

In some area plans the anaesthetist will act as the site medical officer, whose responsibility is to deploy the medical and paramedical teams in the most effective manner, liaise with the other emergency services, and communicate with the receiving hospitals. It is perhaps more important that the anaesthetist's special talents are reserved for the "hands on" resuscitation and treatment on site and in hospital rather than becoming concerned with administration and liaison, which can be performed by another, perhaps not so essential, doctor.

Hospital cardiac arrest service

Every district general hospital provides a team to attend to acute emergencies such as cardiorespiratory arrest occurring within the hospital precincts.⁶ The anaesthetist is a vital member of this team, attending expertly in the emergency to artificial ventilation, endotracheal intubation, and the establishment of an intravenous route. The last may present considerable difficulty in the patient with circulatory standstill but can often be achieved by cannulation of the internal jugular or subclavian vein—

techniques which are part of the anaesthetist's skills learnt in the operating theatre and intensive therapy unit and which have particular application in an emergency.

Variety of patients

During their work in accident and emergency anaesthetists become concerned with a wide variety of patients due to their particular expertise (fig 2). In trauma they will make a particular contribution to patients with head, chest, and maxillofacial injuries where death is often caused by hypoxia and hypercarbia due to airway obstruction and inadequate pulmonary ventilation.

FIG 2—Expertise of the anaesthetist.

The passage of an endotracheal tube in a patient with bizarre distortion of the normal anatomical features caused by a severe maxillofacial injury is extremely hazardous and calls for special experience and skill in the technique. Control of ventilation in a patient with a chest injury complicated by pneumothorax and a ruptured bronchus requires a detailed knowledge of pulmonary mechanics and physiology and may require unique specialist skill in placing an endobronchial or double lumen tube to isolate the damaged lung. In certain isolated cases the two lungs may have to be ventilated separately using two different ventilators.

The prognosis of many patients with head injuries can be improved considerably by hyperventilation and, here again, the anaesthetist's expertise in techniques of artificial ventilation makes a major contribution. Hyperventilation reduces raised intracranial pressure, permitting an improvement in cerebral perfusion. Although the technique is usually applied by a mechanical ventilator in the intensive care unit, to be most effective it should really be instituted at the earliest possible opportunity during transport to hospital and in the accident and emergency department.

Any case of multiple trauma or acute surgical emergency, such as haematemesis or ruptured aortic aneurysm affecting massive blood loss, will need an anaesthetist to establish multiple reliable intravenous routes for blood replacement and to insert catheters to monitor the effects of resuscitation by arterial, central venous, and indirect left atrial pressures and cardiac output measurements.

Patients with trauma are normally in severe pain, which should be relieved, not only for humanitarian reasons but also because of the deleterious effects on tissue perfusion caused by the excessive secretion of catechol amines. The anaesthetist's detailed knowledge of analgesics and anaesthetics, their merits and their hazards, is of particular value in the early management of the trauma victim.

In accident and emergency the anaesthetist is not just concerned with surgical patients. Acute epiglottitis requires special intubating skills, and patients with an acute exacerbation of their chronic obstructive airways disease present conditions demanding accurate control of oxygenation and ventilation, which are part of the anaesthetist's basic training. Detailed knowledge of pharmacology of sedative, hypnotic, tranquillising, and narcotic

agents combined with resuscitative expertise ensures that the anaesthetist has a place in the emergency management of patients suffering from drug overdose. These skills are also valuable in controlling patients with persistent convulsions. Many fatalities associated with acute myocardial infarction may be avoided by skilful dysrhythmia control and early defibrillation in ventricular tachycardia and fibrillation. The anaesthetist, who is familiar with the pharmacological control of arrhythmias and with the defibrillator from his experience in the operating room, has a definite contribution to make as both teacher and participant.

Conclusion

The anaesthetist has a fundamental role in the immediate care of the critically ill and injured patient. Participation in the accident and emergency services at all stages is but one example of the breadth of skill that members of the specialty can offer in

the care of patients, both inside and outside the operating room. The wide scope of interest and participation is an essential element in making the present-day work of an anaesthetist so varied and satisfying.

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Lesson of the Week

Accidental intra-arterial injection of diazepam

MYRDDIN REES, JOHN DORMANDY

Intravenous diazepam is widely used for treatment of patients in convulsive states and as a premedication for minor surgery. Because it is easy to use and safe and allergic reactions are rare, and because it produces varied degrees of desirable amnesia, diazepam is used routinely in most gastroenterology units before endoscopy. In the past four years two patients out of about 8000 prepared in this way suffered serious injury from the accidental injection of diazepam into an artery. We suggest how to manage such an accident.

Case reports

Case 1—A 73-year-old man underwent oesophago-gastro-duodenoscopy for a chronic duodenal ulcer. During the injection of diazepam through a cannula on the dorsal and radial aspect of the right wrist the patient complained of pain in the hand. This subsided, and he was discharged the same day. The next day he returned complaining of intense pain in the thumb and index finger. On examination his hand looked normal, wrist pulses were palpable, and sensation was normal. He was therefore reassured but returned the following day. In addition to the same pain there was discoloration, decreased sensation, and poor capillary return of the distal aspect of the right thumb and index finger. Severe ischaemia in the distribution of the radial artery was diagnosed and the artery explored under general anaesthesia. An operative arteriogram showed obstruc-

Accidental intra-arterial injection of diazepam causes pain that radiates distally, but clinical signs of ischaemia and gangrene may not occur for days.

tion of the first and second digital arteries. A regional streptokinase infusion was started through a fine cannula inserted into a small branch of the radial artery. Heparin was substituted for the streptokinase after three days and continued for a further three days. During this period the hand became oedematous and was raised. The pain gradually subsided and the circulation improved, but a month after the initial accident the pain returned with further discoloration of the distal part of the same two digits, which required partial amputation. He made an uneventful recovery but again complained of increasing pain in the amputated digits, which was relieved by a cervical sympathectomy. He has had no further pain since.

Case 2—A 53-year-old woman underwent colonoscopy for iron-deficiency anaemia, during which 15 mg diazepam was injected through a cannula inserted in the middle of the ventral aspect of the left forearm. She came back to the casualty department the next day complaining of pain along the ulnar side of the left hand, but there were no abnormal local signs. She was given a soft collar for a presumptive diagnosis of cervical spondylosis. She returned two days later with the same pain accompanied by discoloration of the ulnar side of the middle finger, the radial side of the little finger, and the hypothenar eminence. Acute ischaemia was diagnosed and the puncture mark was noted to be overlying a superficial pulsating vessel in the midline proximal to the wrist joint on the ventral aspect. Both radial and ulnar pulses were present and of equal

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