Today's Treatment

Use of anaesthesia

Implications of day-case surgery and anaesthesia

T W OGG

In 1977 hospital day-case surgical procedures performed in England numbered 536 893, mainly in the specialties of urology, gynaecology, orthopaedics, and general surgery. Outpatient surgery was especially common in the larger regions—namely Mersey, W Midlands, North-west, and Trent.

By definition day-case surgery is surgery performed on an outpatient basis with patients being admitted and discharged between 8.30 am and 5 pm. Ideally, surgery needing general anaesthesia should be undertaken during morning operating sessions.

British doctors are aware of the long NHS surgical waiting lists and of the need to increase efficiency and make financial savings within the expensive hospital service. Indeed, the Department of Health's planning guidelines for 1977-8 emphasised the need for the development of more day-surgery facilities.

In 1908 Nicoll operated successfully on 2392 children as outpatients in Glasgow.¹ Since then the work of several day-case units has been described.²⁻⁴ The advantages and disadvantages of day surgery are outlined in the table.

Advantages and disadvantages of day-case surgery

Advantages	Disadvantages
Patients like day-case surgery	A second-rate service?
Ideal for children	Patient selection
Waiting lists decrease	Suitability of anaesthetic techniques
Infection rates decrease	Postoperative minor sequelae
Economic benefits	Medicolegal implications
Easy nursing staff recruitment	
Community services concerned	

Several questions must be answered before establishing a programme of day-case surgery (1) Where will the surgery be performed? (2) Which surgical procedures can safely be undertaken? (3) Where, when, and by whom will the day cases be medically assessed? (4) Are modern general anaesthetic techniques satisfactory for outpatient work? (5) What will happen to these outpatients once discharged from hospital? and (6) Will the general practitioner and community nursing services be able to cope?

Organisation

Day surgery is an organisational exercise affecting the patient, medical records department, laboratories, hospital specialists, community services and ambulance drivers. Ideally a separate

day-case unit should be established. A 10 to 12-bed unit will satisfy the needs of most British district general hospitals, and it need not be too expensive.⁵ If senior hospital personnel are to participate in day-case surgery then the operating lists should be of suitable size to fill an operating session.

Patients scheduled for surgery should be issued with clear written and verbal instructions at their first surgical outpatient appointment. In every case the patient's general practitioner should be contacted for his advice on the suitability, both medical and social, of his patient attending for outpatient surgery.

An important factor is the availability of sufficient nursing staff for day-case units. The work entails a five-day week with no evenings or weekend duties. The advantages for the married nurse are obvious.

Preoperative aspects

Where, when, and by whom should these patients be medically assessed? The general practitioner can play a major part in the preoperative medical assessment. Essentially healthy patients with good home conditions should be selected. Some day units impose an upper age limit of 65 years.

Before surgery these patients may be medically assessed in the surgical outpatient clinic, a preoperative anaesthetic clinic, or in the day unit on the day of operation by an experienced anaesthetist. All patients will have been instructed in advance to take nothing by mouth from the midnight before surgery. They will also have received advice not to take alcohol, return to work, or drive any vehicle or machinery for 24 hours after general anaesthesia. Ideally all patients should be accompanied home by a responsible adult.

A preoperative assessment questionnaire has been used to assess 200 day cases.⁶ The results showed a high incidence, almost 50%, of pre-existing medical conditions and a drug history in 59% of cases. Great care should be taken in selecting these patients for day-case surgery.

Surgeons need not confine themselves to treating simple lumps and bumps. A few of the successful conditions operated on as day cases are the vaginal termination of pregnancy, cystoscopy, vasectomy, inguinal herniorrhaphy, varicose vein stripping, and hand surgery.

Intraoperative aspects

The challenge of outpatient anaesthesia for the anaesthetist is to produce a "street-fit" patient with few complications as soon as possible after the surgical procedure. The prerequisites of good day-case anaesthesia are a swift, safe induction with good intraoperative conditions, rapid recovery, and minimal post-operative morbidity.

Addenbrooke's Hospital, Cambridge

T W OGG, MA, FFARCS, consultant anaesthetist

Premedication is often omitted. Oral lorazepam 2 mg has been given to outpatients,⁷ but its prolonged duration of action makes it unsuitable for patients returning home within eight hours of premedication. Furthermore, the routine use of the anticholinergic drugs, such as atropine and hyoscine, before minor surgery appears unnecessary.⁸

Which anaesthetic induction agent should be used? The popular thiobarbiturate, thiopentone, is inappropriate for day-case anaesthesia because of its slow metabolism and elimination from the body. Anaesthetists have therefore turned to methohexitone, propanidid, alphadolone/alphaxalone (Althesin), and etomidate in recent years. Unfortunately, each of these agents has well-documented side effects. These include histamine release, thrombophlebitis, pain on injection, cardiovascular depression, involuntary muscle movements, and anaphylactic reactions. The fact is that the ideal anaesthetic induction agent, free from these undesirable side effects, has yet to be marketed.

In British hospitals the inhalational anaesthetic agent of choice for outpatients is halothane. A high incidence of post-operative sequelae, however, has been recorded after general anaesthesia with this agent.⁹ An alternative may be the fluorinated ether, enflurane.¹⁰ This inhalational anaesthetic agent gives a pleasant, safe induction with minimal cardiovascular depression and swift recovery.

Most anaesthetists will consider that their own day-case anaesthetic techniques are quite sufficient despite the pharmacological points already mentioned. More research is needed before the ideal outpatient anaesthetic of choice is found. Indeed, many surgical procedures may be satisfactorily performed under local analgesic. Some of these regional techniques include intravenous analgesia (Biers block) for limb surgery, digital nerve blocks for the wedge resection of toe-nails, and caudal analgesia for circumcision and anal procedures.

The use of muscle relaxants for outpatient operations is not without its problems. The common short-acting depolarising muscle relaxant, suxamethonium, is known to produce an appreciable incidence of vague muscle pains if early ambulation after surgery is encouraged. Small doses of non-depolarising relaxants, if given before suxamethonium, reduce but do not eliminate these muscle pains.

After using fentanyl and methohexitone¹¹ it has been my practice in Cambridge to avoid inhalational anaesthetic agents for outpatients presenting for vaginal termination of pregnancy. For a woman weighing 70 kg I administer fentanyl 100 µg intravenously five minutes before surgery. This is followed by an induction dose of althesin 0.7 µl/kg. Anaesthesia is maintained with supplements of althesin 0.35 µl/kg as required while the patient breathes spontaneously room air or 100% oxygen. In 500 outpatients this technique has produced good operating conditions with swift recovery and minimal postoperative sequelae. This total intravenous approach to anaesthesia also eliminates the hazards of operating theatre pollution by inhalational anaesthetic gases.

When faced with dental outpatients needing 30 minutes of general anaesthesia how does one proceed? In my own dental practice I rarely use nasal endotracheal intubation. Using fentanyl and althesin as outlined above I pass a nasopharyngeal tube and pack the oropharynx with a Bristol oral V-pack. This technique is currently being investigated.

Recently the use of the non-specific respiratory stimulant doxapram¹² has been described for outpatient urological cases. This drug appears to ensure the swift, safe return to consciousness after simple anaesthesia.

Postoperative aspects

In one series 44.5% of patients undergoing day surgery had postoperative symptoms attributable to the general anaesthesia.¹³ One hundred day cases have been assessed during the post-operative period¹⁴ to discover what happened to them once they left the hospital confines. An appreciable morbidity was

recorded—for instance, nausea, vomiting, dizziness, and drowsiness. Of these patients, 30% had disregarded medical advice and journeyed home unaccompanied while 9% of car owners had driven themselves home.

These findings have important medicolegal implications. Car owners should be instructed not to drive for 24 hours after general anaesthesia or at the very least until after they have had a good night's sleep. Much research has detailed the adverse effects of alcohol and driving. Apart from laboratory studies, surprisingly few reports have outlined the dangers of general anaesthesia and impaired driving ability.

The early discharge of day cases from hospital does not impose an intolerable work load on general practitioners. It is the community nursing services which become most concerned with these patients. All day-case units should have easy access to hospital inpatient beds if the occasional patient has to be admitted. Any problems that may arise once the patient returns home should immediately be notified to the surgeon or anaesthetist concerned with the case.

Why do patients often disregard medical advice in the immediate postoperative period? Recently it has been found that patients suffer from considerable memory impairment for new facts after simple general anaesthesia.¹⁵ Further research is in progress to determine which anaesthetic agents produce the least disturbance of memory. At present, anaesthetists have no single, simple, reliable practical test of recovery for assessing patient street-fitness after general anaesthesia.

Finally, patients will often need postoperative analgesia once they return home. Many will be satisfactorily treated with simple oral analgesics—for instance, paracetamol and dextro-propoxyphene (Distalgic). On occasion, however, an opiate needs to be prescribed. An interesting drug is buprenorphine, a synthetic, non-addictive opiate with a prolonged action, which can be administered sublingually.

Postoperative pain relief may also be treated by several local analgesic techniques. Caudal analgesia with bupivacaine 0.5% or 0.25% solution has a definite place after painful anal or penile surgery.

Conclusions

If surgical waiting lists continue to increase and financial allocations to the NHS decrease then doctors will have to consider suitable alternatives to present-day practices. Day-case surgery is one method of reducing these large waiting lists. There are many problem areas, but they are not insurmountable. The establishment of more day-case units should be encouraged and the organisation of these units must be first class. The following guidelines are essential for safe day-case surgical and anaesthetic practice.

- (1) Day-case surgery should not be a second-class service.
- (2) Separate day units should be established.
- (3) Senior hospital staff must participate.
- (4) Efficient preoperative screening is essential.
- (5) More research into simple anaesthetic techniques should be performed.
- (6) The recovery period must have a low morbidity.
- (7) Co-operation among the patient, hospital consultants, general practitioner, and community nursing services is essential for the project to succeed.

References

- ¹ Nicoll JH. Surgery of infancy. *Br Med J* 1909;ii:753.
- ² Stephens FO, Dudley HAF. An organisation for outpatient surgery. *Lancet* 1961;ii:1042-4.
- ³ Berrill TH. A year in the life of a surgical day unit. *Br Med J* 1972;iv:348-9.
- ⁴ Rainey JB, Ruckley CV. Work of a day-bed unit 1972-8. *Br Med J* 1979;ii:714-7.
- ⁵ Calnan J, Martin P. Development and practice of an autonomous minor surgery unit in a general hospital. *Br Med J* 1971;iv:92-6.

- ⁶ Ogg TW. Assessment of preoperative cases. *Br Med J* 1976;i:82-3.
- ⁷ Loach A, Fisher A. Lorazepam as a premedicant for day-case surgery: an assessment. *Anaesthesia* 1975;30:545-9.
- ⁸ Mirakhur RK, Dundee JW, Connolly JDR. Studies of drugs given before anaesthesia. XVII Anticholinergic premedicants. *Br J Anaesth* 1979;51:339-45.
- ⁹ Smith BL, Young PW. Day stay anaesthesia: a follow-up of day patients undergoing dental operations under general anaesthesia with tracheal intubation. *Anaesthesia* 1976;31:181-9.
- ¹⁰ Black GW, Johnston HML, Scott MG. Clinical impressions of enflurane. *Br J Anaesth* 1977;49:875-80.
- ¹¹ Goroszeniuk T, Whitwam JG, Morgan M. Use of methohexitone, fentanyl and nitrous oxide for short surgical procedures. *Anaesthesia* 1977;32:209-11.
- ¹² Riddell PL, Robertson GS. Use of doxapram as an arousal agent in outpatient general anaesthesia. *Br J Anaesth* 1978;50:921-4.
- ¹³ Fahy A, Marshall M. Postanaesthetic morbidity in outpatients. *Br J Anaesth* 1969;41:433-7.
- ¹⁴ Ogg TW. An assessment of postoperative outpatient cases. *Br Med J* 1972;iv:573-6.
- ¹⁵ Ogg TW, Fischer HBJ, Bethune DW, Collis JM. Day case anaesthesia and memory. *Anaesthesia* 1979;34:784-9.

Lesson of the Week

Carbon monoxide poisoning mimicking gastroenteritis

JOHN M HOPKINSON, PETER J PEARCE, JOHN S OLIVER

A family of five presented with symptoms of gastroenteritis that were subsequently attributed to carbon monoxide (CO) poisoning. Although CO poisoning may occasionally be confused with drunkenness,^{1 2} the fact that it mimics gastroenteritis is, we believe, not so well recognised. We draw this to the attention of practitioners who may be called on to treat patients within caravans or other confined quarters where there is a possible source of CO.

Case report

One of us (PJP) was called in the early morning to a family of five newly arrived holidaymakers in a static caravan. They complained of nausea, vomiting, and abdominal pain after their evening meal. After examination in the heated, dimly lit caravan gastroenteritis was diagnosed, prochlorperazine prescribed, and the practice telephone number left. Some 30 hours later a neighbour became suspicious on noticing a collapsed curtain rail at one of the caravan windows. Looking inside he saw the father slumped on the floor and summoned help.

The scene on entering the caravan, in which three of the family had died, is shown in the figure with the carboxyhaemoglobin (COHb) levels in the deceased. Only one small window was ajar at the end of the caravan, where the father lay on the floor alongside two healthy caged birds. Heating and cooking were by propane gas, which was not lit at the time. The postmortem examinations, which showed bright, pinkish, livid stains and similar coloration of the body musculature and internal organs, led to the diagnosis of CO poisoning in the three who died and in the two survivors. The survivors had been unconscious, pale, and hyperventilating on admission to hospital. Analysis of blood samples, taken four hours after the

Consider carbon monoxide poisoning when the occupants of a closed environment show symptoms of gastroenteritis.

survivors were removed from the caravan, showed 30% COHb in the mother and 27% COHb in the father. Bacteriological tests on vomit and food removed from the caravan, on blood, faeces, and gastric contents from the deceased, and on samples from the survivors showed no evidence of food poisoning. The fatal accident inquiry established that a faulty gas fire was the source of the CO, an altered flue having contributed to poor ventilation in the caravan. Gas analysis on lighting the fire under conditions as they were at the time of the tragedy proved this, a potentially lethal level of CO soon arising. Previous occupants of the caravan reported having been ill with symptoms that were attributable to CO poisoning.

Dumfries and Galloway Royal Infirmary, Dumfries DG1 4AP
JOHN M HOPKINSON, MB, MRCPATH, consultant pathologist

The Health Centre, Kirkcudbright DG6 4BE
PETER J PEARCE, MB, MRCP, general practitioner

Department of Forensic Medicine and Science, University of Glasgow G12 8 QQ
JOHN S OLIVER, BSC, PHD, lecturer in toxicology

Comment

Any flame-burning carbonaceous matter in an insufficient amount of air is a potential source of CO. CO is a non-irritant, colourless, odourless gas that combines with haemoglobin to form COHb. Having an affinity for haemoglobin some 250 times that of oxygen, it is extremely dangerous even in low