British Journal of Anaesthesia **92 (1)**: 71–4 (2004)
DOI: 10.1093/bja/aeh012

BJA

Outcome of ASA III patients undergoing day case surgery

G. L. Ansell* and J. E. Montgomery

Department of Anaesthesia, Torbay District General Hospital, Lawes Bridge, Torquay TQ2 7AA, UK

**Corresponding author. E-mail: gillyansell@hotmail.com*

Background. Day case surgery is becoming more acceptable, even for patients with complex medical conditions. Current recommendations suggest that patients who are graded as American Society of Anaesthesiologists physical status (ASA) III may be suitable for this approach. There is only a small amount of published data available to support this. We present a retrospective review of ASA III patients who had undergone day surgical procedures in our unit.

Methods. We carried out a retrospective case controlled review of 896 ASA III patients who had undergone day case procedures between January 1998 and June 2002 using the existing computerized patient information system. The system records admission rates, unplanned contact with healthcare services and post-operative complications in the first 24 h after discharge.

Results. We demonstrated no significant differences in unplanned admission rates, unplanned contact with health care services, or post-operative complications in the first 24 h after discharge between ASA III and ASA I or II patients.

Conclusion. With good pre-assessment and adequate preparation ASA III patients can be treated safely in the day surgery setting.

Br J Anaesth 2004; **92**: 71–4

Keywords: complications, ASA III; surgery, day case

Accepted for publication: August 29, 2003

Day case surgery is convenient and efficient for both patients and staff. It is also cost effective and safe when patient selection criteria are applied. UK government targets mean that it is likely that 75% of all elective operations will be carried out as day cases.[1] As provision of day case surgery expands, so less restrictive selection criteria are being applied and patients with more complex medical problems are being accepted. Currently no National Health Service Trusts are achieving 75% of surgery on a day stay basis.[1] Widening the selection criteria safely might be a way of helping to achieve this.

Patients can be graded according to criteria set down by the American Society of Anaesthesiologists (ASA grade) where a healthy patient is ASA I, a patient with mild systemic disease is ASA II and a patient with severe systemic disease is ASA III. ASA IV refers to a patient with life-threatening severe systemic disease and ASA V to a moribund patient.[2] A 1992 Royal College of Surgeons document recommends that ASA III patients may be acceptable only for day case urological procedures.[3] The 1994 Association of Anaesthetists of Great Britain and Ireland guidelines do not mention ASA grade at all, but recommend that systemic disease should be well controlled.[4] They also state that there are no absolute criteria of fitness for day surgery. A recent UK government Department of Health Modernisation Agency publication suggests that stable ASA III patients may be appropriate for any type of day surgical procedure.[5] There is some published information regarding outcome measures in the day case population in North America to support this.[6–8]

Torbay Hospital carries out approximately 65% of its surgical procedures as day case procedures. Selection for day case surgery is based on medical and physical condition, social circumstances, and type of surgery proposed. Preoperative assessment is carried out by experienced nursing staff following a written protocol and an anaesthetist reviews the notes of patients who do not clearly meet the criteria for day surgical admission. ASA grade is not necessarily an exclusion criterion.

The unit uses a computerized system to record each patient journey through the day surgery process (Daynamics, Calcius Systems, Ltd). Patients receive a follow up telephone call at 24 h after discharge when they complete a semi-structured interview about postoperative symptoms using a standard telephone questionnaire. Additional free text comments are allowed.

Table 1 Patient characteristics to compare cases and controls

		ASA III	ASA I and II
Age (mean (range))		66.3 (2–98)	65.4 (2–96)
Sex	Male	524 (58%)	520 (58%)
	Female	372 (42%)	376 (42%)
Anaesthetic	Local	389 (43.4%)	387 (43.2%)
Type	General	507 (56.6%)	509 (56.8%)

Methods

Following approval from the local research ethics committed, we carried out a retrospective case controlled review of all ASA III patients who had undergone day case procedures between January 1998 and June 2002. We used the audit module of the computerized patient information system (Epiaudit, Calcius Systems, Ltd) and the data were made anonymous.

Controls were matched for year of operation, type of operation, age, and sex. If an exact age match was unavailable, then the closest age available was used. If an operation match was unavailable then a similar operation was substituted (for example, a trigger finger release was substituted by a Dupuytren's contracture release). Operators were blinded to outcome when choosing controls. Outcome measures included unplanned admission to hospital, unplanned contact with healthcare services and minor morbidity as assessed by the follow-up telephone call.

Data were analysed using the Student's *t*-test for parametric data and the χ^2-test for categorical data and a $P<0.05$ was taken as an indication of statistical significance.

Results

From January 1998 until July 2002, 28 921 patients were treated in the day case unit. Of these, 896 patients were ASA III (3.1%). Of the controls, 444 (49.5%) were ASA I and 453 (50.5%) were ASA II. According to current recommendations, most day case procedures are carried out by consultants or senior clinical staff (over 80% of anaesthetics and over 75% of surgical procedures in both groups).

Table 1 compares the case and control groups. The age or sex distributions of the cases and controls were similar. There was also a similar proportion undergoing local rather than general anaesthetic (local anaesthetic here includes sedation and regional block): 56.6% of ASA III and 56.9% of ASA I and II patients underwent general anaesthesia. There was no difference in the type of surgery that the two groups had undergone. Most of the patients were treated by the urologists (35%) and the ophthalmologists (21%). The general surgeons treated 10% of patients. Other specialities that use the day case unit include gynaecology, maxillofacial surgery, dental surgery, orthopaedics, ear, nose and throat surgery, and plastic surgery.

Table 2 Unplanned admission rates after day case surgery in ASA III patients compared with ASA I and II

	ASA III	ASA I and II	*P* value
No. of admissions	26 (2.9%)	17 (1.89%)	$P=0.16$
Reason for admission			
Observation or investigations	5	1	
Pain	2	3	
Bleeding	2	2	
Vomiting	1	0	
Dizziness	1	1	
Numbness	0	1	
Drowsiness	1	1	
Hypotension	1	0	
Unable to mobilize	3	3	
Surgical reasons	7	4	
Social circumstances	3	1	

The number of unplanned admissions for the ASA III cases was 26 (2.9%) with 17 (1.9%) of the ASA I and II group staying in. This difference was not significant ($P=0.16$). The reasons stated for admission are given in Table 2. Of those admitted for observation or investigation, two patients were admitted with chest pain postoperatively (both were known to have ischaemic heart disease) and one known poorly controlled epileptic had a postoperative seizure. All three were discharged the next day. Surgical reasons for administration included voiding problems, a long operating time, a more complicated procedure that required further surgery in the near future, and a procedure not completed successfully. No patient from either group was admitted with a major anaesthetic complication.

The rate of unplanned contact with healthcare services is low in both groups. Less than 1% of either group sought help from their general practitioner, practice or district nurse, or the Accident and Emergency department. There were no significant differences demonstrated between the two groups.

We managed to contact 72.5% of cases and 73.8% of controls on the first postoperative day. Not all patients answered all the questions so response rates differ slightly. The incidence of the most common post-operative complications was low in both groups and is shown in Table 3. There were no significant differences in postoperative complication rates for nausea, drowsiness, or bleeding. No patient in either group experienced vomiting and incidences of dizziness, breathlessness, and fever were very low indeed (<1%).

The total incidence of postoperative pain was 26.5% in the ASA III group and 23.8% in the ASA I and II group ($P=0.44$). ASA III patients did however experience significantly more moderate pain than those in the ASA I and II group (4.8% compared with 1.8%, $P=0.03$). The difference in the incidence of severe pain was not significant between cases and controls (0.45% for cases compared with 0.74% for controls).

Table 3 Incidence of most common post-operative complications as obtained by follow-up telephone call for all patients

	Drowsiness		Nausea		Bleeding		Pain	
	ASA I/II	ASA III	ASA I/II	ASA III	ASA I/II	ASA III	ASA I/II	ASA III
None	648	637	648	638	578	567	512	485
Mild	9	8	8	6	67	63	143	140
Moderate	1	2	4	2	4	8	12	32 P=0.03
Severe	0	0	0	0	3	3	5	3
Total with symptom	10 (1.6%)	10 (1.5%)	9 (1.4%)	8 (1.2%)	74 (8.2%)	74 (8.2%)	168 (23.8%)	175 (26.5%)

Table 4 Incidence of most common postoperative complications in patients who underwent general anaesthesia

	Drowsiness		Nausea		Bleeding		Pain	
	ASA I/II	ASA III	ASA I/II	ASA III	ASA I/II	ASA III	ASA I/II	ASA III
None	362	354	364	353	314	304	274	274
Mild	9	7	8	6	49	46	96	96
Moderate	1	0	1	1	4	6	9	21
Severe	0	0	0	0	3	2	3	3
Total with symptom	10 (2.6%)	7 (1.9%)	9 (2.4%)	7 (1.9%)	56 (15.1%)	54 (15.1%)	108 (28.2%)	120 (30.4%)

We also looked at postoperative complications in the general anaesthetic subgroup. In this group the rate of postoperative complications remains low and is shown in Table 4. There were no significant differences in the rates of bleeding, drowsiness or nausea between ASA III and ASA I and II patients. 25.1% of those patients who were contacted at 24 h in the ASA I and II group who had general anaesthetics experienced mild pain. This was moderate or severe in 3.1%. In the ASA III group, 24.3% experienced mild pain and 6.1% experienced moderate or severe pain. These differences were not significant. Less than 1% of patients in either the case or control group experienced severe pain.

Discussion

The ASA classification of physical status is accepted as a standard for assessing preoperative fitness. ASA grade III includes patients with severe systemic disease or disease from whatever cause, even though it may not be possible to define the degree of disability with finality. ASA III patients form an enormously disparate group with a huge variety of pathophysiology affecting their lives to a greater or lesser degree.

There is some evidence from North America suggesting that ASA III patients are not at higher risk from post-operative severe morbidity, postoperative adverse events, or postoperative admission. Warner and colleagues[6] followed up 38 598 patients after day case surgery at 72 h and 30 days. They recorded incidences of severe morbidity (respiratory failure, pulmonary embolism, central nervous system deficit, and myocardial infarction) and mortality. 28.2% of these patients were ASA III and there were four deaths (none in the ASA III group). Severe morbidity was spread equally throughout the ASA groups and the study concluded that ASA grade does not affect incidence of severe postoperative complications or death rate. A Canadian study[7] looked at pre-existing medical conditions in 17 638 patients undergoing day case procedures as predictors of adverse outcome. Their adverse outcome measures were all in the immediate postoperative period before discharge from the day case unit. Only 6.5% of patients in this group were ASA III. This study showed a slight increase in the incidence of intra-operative adverse events with increasing ASA grade but ASA II and III patients had a decreased risk of adverse events in the immediate postoperative period. There was no follow up of patients after discharge from the day case unit. Finally, Gold and his group[8] looked at unplanned admission rates in 9616 patients after day case surgery. Four per cent were ASA III and they observed an admission rate of about 1% across all patients. When adjusted for age, there was no increase in admission rate with increasing ASA grade. They concluded that ASA grade cannot be used to anticipate unplanned admission after day case procedures.

Classifying an individual patient to an ASA grade is usually the responsibility of the anaesthetist involved. When no anaesthetist was present, either the pre-assessment staff or the operating theatre practitioner (ODP) was able to grade the patient. This was the case in 159 patients (17.7%) in the control group and 147 patients (16.4%) in the ASA III group. It is impossible to state with confidence that ASA grade is applied consistently by different people. All those people involved in grading our group of patients were experienced and both ODPs and pre-assessment nurses work very closely with anaesthetic staff. Despite its possible inconsistencies ASA grade remains an internationally used and recognized measure of preoperative fitness.

The incidence of admission following day surgery in both groups is low. Guidelines suggest that incidence rates can be expected to be less than 3%. In our unit, overall admission rates are approximately 2.5%. There were no significant differences between our case group and control group although ASA III admission rate was 2.9% and non ASA III rate was 1.9%. Whether this reflects a slight overall increase in need for admission for ASA III patients could only be ascertained by studying even larger numbers of people.

There has long been controversy as to whether day case surgery puts a significant additional burden on community healthcare services. Good communication between hospital and Primary Care Services remains enormously important. Our data suggest that although some people do require unplanned input from healthcare services, this incidence is low, and remains low even when patients have more severe and complex medical problems.

The follow-up rate in our unit is good (~73%) which gives credence to our reporting of postoperative symptoms. Patients are not discharged from the day surgery unit unless they are accompanied for the next 24 h. It is unlikely therefore, that the patients we were unable to contact are too unwell to answer the telephone as we hope their companion would be able to do so. We looked at hospital admission data in case any of the patients we had failed to contact had been admitted as a result of their day surgical procedure. In the ASA III group there were seven patients who were already in GP care facilities, who were transferred to the Day Case Unit for their surgery and returned to their hospital postoperatively. These admissions were all planned. There was also one patient in the ASA III group who was admitted the next day for his routine haemodialysis. There was no record of any patient in the ASA III group being admitted for any other reason. In the ASA I and II group, one patient was admitted after 24 h following a transuretheral bladder tumour resection with clot retention and another was admitted the evening after a breast biopsy with bleeding and bruising. She was discharged 2 days later.

Postoperative complication rates in day surgery patients are low (<2%) in both groups for most symptoms. The most common complaint was pain with an incidence of 26.5% in the ASA III group and of 23.8% in the ASA I and II group. Most of this was described by patients as mild (21.2 and 21.3%, respectively). ASA III patients did experience significantly more moderate or severe pain than ASA I and II patients. From our data we cannot say why this is so. We suspect this may be because of a reduction in non-steroidal analgesia use in ASA III patients secondary to multiple medications and a higher incidence of contraindications. Despite this, the incidence of severe pain was low in both groups (<1%). This compares very favourably with targets published by the Royal College of Anaesthetists[9] who state that severe postoperative pain should be experienced by less than 5% in the first 48 h and 85% or more should report no pain or only mild pain. Within the group of patients receiving general anaesthesia, the incidence of most postoperative complications remains low. The incidence of pain is a little higher (28.2% in the control group and 30.4% in the cases). Perhaps this reflects the more painful nature of procedures requiring a general anaesthetic or a reduced use of local anaesthetic infiltration during the procedure. Despite this, the incidence of moderate and severe pain remains well below recommended levels. Our unit does have written guidelines for post-operative analgesia based on the World Health Organisation analgesic ladder to guide anaesthetists in prescribing analgesia.

In conclusion, our data showed no increase in the incidence of post-operative complications or admission rate in ASA III patients when compared with ASA I and II patients undergoing similar procedures. ASA grade III need not be an exclusion criterion for day case surgery. Patients with more complicated medical conditions may be appropriate for day surgery procedures. With good pre-assessment and adequate preparation ASA III patients can be treated safely in the day surgery setting.

References

1 National Good Practice Guidance on Pre-operative Assessment for Day Surgical Units. September 2002. Modernisation Agency: Operating Theatre Pre-Operative Assesment Programme

2 ASA Physical Status Classification. American Association of Anaesthesiologists: www.asahq.org/clinical/physicalstatus.htm

3 Guidelines for Day Case Surgery. March 1992. The Royal College of Surgeons of England

4 Day Case Surgery: The Anaesthesists Role in Promoting High Quality Care. February 1994. Association of Anaesthesists of Great Britain and Ireland

5 Day Surgery: Operational Guide. Waiting, Booking and Choice. August 2002. Department of Health

6 Warner MA, Shields SE, Chute CG. Major morbidity and mortality within 1 month of ambulatory surgery and anaesthesia. *JAMA* 1993; **270**: 1437–42

7 Chung F, Mozei G, Tong D. Pre-existing medical conditions as predictors of adverse events in day-case surgery. *Br J Anaesth* 1999; **83**: 262–70

8 Gold BS, Kitz DS, Lecky JH, Neuhaus, JM. Unanticipated admission to the hospital following ambulatory surgery. *JAMA* 1989; **262**: 3008–11

9 Lack JA, White LA, Thans GM, Rollin A-M. Raising the Standard: A Compendium of Audit Recipes for Continuous Quality Improvement in Anaesthesia. 2000. The Royal College of Anaesthesists.