Recovery after oral surgery with halothane, enflurane, isoflurane or propofol anaesthesia


SUMMARY

We have compared the recovery characteristics of four different techniques for maintenance of anaesthesia in 99 day-case patients admitted for oral surgery. All patients received propofol for induction of anaesthesia followed by halothane, enflurane, isoflurane or propofol infusion for maintenance of anaesthesia. Each patient was subjected to a battery of psychometric tests which included Spielberger state, trait, mood stress and mood arousal questionnaires, Maddox-Wing test and five-choice serial reaction time. All tests were performed before operation and at 0.5, 1, 2, 4, 24 and 48 h after operation. Performance in the reaction time test decreased significantly in the immediate postoperative period, returning almost to preoperative values by 4 h. However, only those patients who received enflurane or propofol had returned to their performance level before surgery by 4 h, although all four groups had achieved this target by 24 h. There was a further improvement in performance at 48 h. Anxiety and stress were high before surgery and decreased rapidly in the postoperative period. The Maddox-Wing test demonstrated a significant impairment in performance in the first 1 h after surgery, which returned to normal by discharge at 4 h. There were no significant differences between the four groups in these latter tests. (Br. J. Anaesth. 1994; 72: 559-566)

KEY WORDS

Propofol has a recovery profile which is superior to that of thiopentone or etomidate [1, 2] and either indistinguishable from [3, 4] or slightly better than [5] methohexitone. The recovery profile from volatile agents is, however, less well defined. In theory, less soluble inhalation agents (e.g. isoflurane) should have a shorter recovery time than a more highly soluble one (e.g. halothane). In practice, this has not been confirmed [6-8], although Korttila [9] reported more rapid awakening after isoflurane anaesthesia when the duration of surgery exceeded 90 min. Recovery from inhalation anaesthetic agents may also be affected by the induction agent [10].

The rate of recovery of mental function is an important component of the recovery profile. Many of the tests used to measure this form of recovery have been simple and decrements in mental ability may go undetected. Therefore, we have performed a detailed comparison of the recovery characteristics of four anaesthetic techniques used for day-case surgery: propofol infusion, halothane, enflurane and isoflurane. The recovery profile was assessed comprehensively for up to 48 h after operation.

PATIENTS AND METHODS

Approval for the study was obtained from the Central Manchester Hospitals' Ethics Committee and informed consent was obtained from each patient. We recruited 105 patients, aged 19-45 yr, ASA I-II, undergoing day-case oral surgery. Five of these patients declined to participate further and one patient could not understand the computer tests. Recruitment was by direct request on admission to the day-case unit on the morning of surgery. Patients who had received a general anaesthetic within the previous 6 months or had reported allergy or sensitivity to any anaesthetic agent were excluded.

A full history and examination were obtained for routine preoperative assessment. None of the patients received premedication. Patients were allocated randomly to one of four groups to receive the following agents for maintenance of anaesthesia: group A, halothane; group B, enflurane; group C, isoflurane; group D, propofol infusion. Skin fold measurements were performed on each patient to assess lean body mass content [11].

On arrival in the anaesthetic room, monitoring by pulse oximetry, ECG and intermittent non-invasive arterial pressure measurement was commenced. In
addition, three surface silver–silver chloride (ECG type) electrodes were attached to the forehead to record spontaneous EMG activity from the frontalis muscle using an anaesthesia and brain activity monitor (ABM, Datex). An i.v. cannula was placed in one forearm and all drugs were given into a fast running infusion through this cannula.

Anaesthesia was induced with propofol 4 mg kg\(^{-1}\) followed by suxamethonium 100 mg. A nasotracheal tube was inserted and a gauze pack placed in the pharynx. Ventilation was assisted until spontaneous ventilation returned. End-tidal carbon dioxide concentration was monitored throughout using a capnograph. All patients were allowed to breathe 67% nitrous oxide in oxygen. No opioid analgesics were administered at any time.

The volatile agent selected was added to the gas mixture from a vaporizer (Tec 3 family, Cyprane), calibration of which had been verified previously. The anaesthetist was permitted to adjust the vapour concentration as required, depending upon the perceived clinical need of the patient. The time and change in vaporiser setting were noted with each adjustment.

The patients who received propofol infusion were not given a volatile agent. The propofol infusion regimen used was as follows: 25 mg kg\(^{-1}\) h\(^{-1}\) for 5 min, 20 mg kg\(^{-1}\) h\(^{-1}\) for 5 min and 10 mg kg\(^{-1}\) h\(^{-1}\) thereafter. The infusion was administered from a Vickers Tricon IP3 syringe pump, calibration of which had been verified previously using a Biotec IDA (infusion device analyser). The anaesthetist was permitted to administer additional bolus doses of propofol as required, depending on the clinical needs of the patient.

The following tests were performed at predetermined intervals: the Spielberger state–trait questionnaires [12]; mood stress and mood arousal questionnaires [13]; the Maddox–Wing test [14] and the five-choice serial reaction time [15, 16]. Each measurement was made before anaesthesia and at 30 min, 1, 2, 4, 24 and 48 h after anaesthesia.

All tests up to and including that at 4 h were undertaken on the day-case ward. The number of distractions were minimized within the constraints of a busy ward. The tests at 24 and 48 h were undertaken in the patient’s home. Each patient underwent a familiarisation session before the preoperative assessment.

The Spielberger state–trait anxiety inventory [12] consists of two questionnaires. The first is designed to examine individual differences in anxiety susceptibility (trait anxiety); this is completed only once in the preoperative session. The second examines the response of individuals to stressful stimuli or conditions (state anxiety); this is completed at each session. The score for each questionnaire has a minimum of 20 and a maximum of 80.

The mood adjective checklist [12] consists of two questionnaires, one of which describes mood and the other arousal states. Scores for stress vary from 0 to 19 and for arousal from 0 to 15. Both questionnaires were completed at each session.

The Maddox–Wing test [14] is based on the fact that the physiological position of the eye at rest is in divergence and normal congruent vision is maintained through an active process. After general anaesthesia there is an increased tendency to divergence of the eyes and this can be measured in the conscious co-operative subject using the Maddox–Wing apparatus. The subject looks through the eyepiece into the instrument. The field of view is divided by shaped wings such that one eye sees a numbered horizontal scale and the other sees an arrow. Divergence of the eyes causes the arrow to appear to move along the scale and the patient is asked to specify to which number the arrow is pointing when it has become stationary. This number is the divergence of the eyes measured in prism dioptres.

The apparatus for measuring the five-choice serial reaction time [15, 16] was operated by a Zenith 181 laptop computer attached to a portable response board via the RS232 interface. The response board consisted of five light emitting diodes arranged in a semicircle next to five response discs and equidistant (14.3 cm) from a central start disc. After a randomised delay of between 0 and 1 s, one of the five lights on the response board was turned on in a randomized sequence. Using the dominant hand only, the subject was required to extinguish the light as quickly as possible by touching the adjacent response pad. The time to move from the centre pad to the response pad was defined as the decision time, and that to return to the centre pad, movement time. The next delay interval and subsequent light sequence was triggered by returning to the centre pad. The test lasted for a total of 4 min which was subdivided into two 2-min periods.

Time of discharge from the ward was noted for each patient and in addition, the nursing staff was asked to record subjective discharge time, that is, the time they considered the patient fit to return home.

Statistical analysis

With respect to the choice reaction time, the first 2 min (period 1) and the final 2 min (period 2) of each 4-min test were analysed separately. Throughout both periods, the position of each light illuminated was recorded, as were the times taken to extinguish the light (decision time), time to return to the centre pad (movement time) and delay before the next light came on (trial delay). All times were recorded in milliseconds. For statistical evaluation, the trial delay was subdivided into four “delay bins” (<250, 251–500, 501–750, 751–1000 ms).

At every assessment session, the total number of lights extinguished, mean decision time and mean movement time were calculated separately for each delay bin within each of the two periods. Mean values across the four delay bins were computed also. The three outcome variables were analysed separately using repeated measures analysis of variance (ANOVA). Type of anaesthetic used (treatment group) was included as a between-subjects factor; session (time since anaesthetic administered) was included as a within-subjects factor. A small number of patients did not manage to complete certain sessions because they were too drowsy after anaesthesia; these “missing values” were replaced by
the maximum reaction time for that particular session within the same treatment group. Some sessions were not completed for reasons of feeling unwell or practical considerations related to transport; these "missing values" were replaced by maximum likelihood estimates computed from all available data.

Individual decision and movement times tended to have a slightly positively skewed distribution but, as predicted by the central limit theorem, the mean data followed approximately normal distributions. Consequently, all three variables were analysed without transformation. The adequacy of each analysis was confirmed by constructing half-normal probability plots and by computing the Filliben correlation coefficient [17].

The Maddox-Wing, state, trait, mood arousal, mood stress and patient characteristics were analysed using repeated measures ANOVA. Patient data were analysed using standard one-way ANOVA, subjective and actual discharge times using paired t tests.

All computations were carried out using the BMDP and GLIM 3.77 statistical computer packages. Statistical significance was set at the 5% level.

RESULTS

Patient characteristics

Eighty-three percent of patients had between one and four wisdom teeth extractions, 1% had clearance surgery, 3% had root surgery and 14% either extractions or apicectomies. One patient required analgesia during the study and was excluded from analysis.

The characteristics and discharge times of the remaining 98 patients are summarized in table I. Because of technical difficulties, only 93 of the five-choice serial reaction time data were available for analysis. No significant differences were found in age, gender, weight, lean body mass or duration of anaesthesia. Significant differences were found within groups for the difference between actual discharge time and subjective discharge time ($P < 0.0001$). The actual discharge time was later than the subjective discharge time in every case. There were no significant differences between the groups for either actual or subjective discharge time.

Of 78 patients who were followed-up with questionnaires after operation, 10 patients reported nausea or nausia and vomiting in the first 12 h and 16 patients in the first 48 h; the occurrence was distributed evenly between all four groups.

Five-choice serial reaction time

Number of trials in period 1. The mean numbers of lights extinguished during period 1 (the first 2 min of each assessment) were similar for the four treatment groups ($F(16,534) = 0.95, P = 0.517$) (fig. 1a). Overall, the decrease from a mean level of 51 before surgery to 33 at 30 min after surgery was significant, as was the subsequent increase to levels before surgery at 4 h after cessation of anaesthesia (the time at which the patients were discharged home) ($F(6,534) = 32.99, P < 0.001$). The average number of trials completed at the 48-h assessment was 57 (not significantly greater than before surgery).

Number of trials in period 2. The general pattern appeared to be similar to period 1, but there were significant differences between the four treatment groups ($F(18,5304) = 1.95, P = 0.007$) (fig. 1b).

The mean number of trials completed 30 min after surgery was markedly smaller than at the assessment before surgery; this change was significantly greater in the isoflurane and propofol groups ($P = 0.05$). On average, only those patients treated with enflurane and propofol had returned to their performance levels before surgery when discharged home, although all four groups had achieved this target after 24 h. A small, non-significant improvement relative to levels before operation was noted at the 48-h assessment.

Decision time over session. Averaged over both periods, mean decision time deteriorated significantly ($F(6,534) = 114.5, P < 0.001$) between assessments before and 30 min after surgery (fig. 1c); this tended to be greater for propofol than the other four groups ($F(18,534) = 1.61, P = 0.054$). Mean decision time had returned to a level just significantly short of the level before surgery at 4 h. Performance was improved significantly in all four groups at the 48-h follow-up assessment ($P = 0.05$).

Movement time over session. The corresponding changes in mean movement time (fig. 1b) differed significantly between the four treatment groups.
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FIG. 1. Mean number of lights extinguished in period 1(A), the first 2 min of the five-choice serial reaction time test, and in period 2(B), the final 2 min of the five-choice serial reaction time test for all groups at each session. Mean decision time (C) and mean movement time (D) averaged over the whole session in the five-choice serial reaction time test. ■ = Halothane, ▲ = enflurane, ● = isoflurane, ◆ = propofol for figures A-D. Pre = Before operation.

(F(16, 534) = 2.58, P < 0.001). The variation in the treatment effects was confined to the 30-min assessment after surgery. The greatest deterioration in performance relative to before surgery occurred in the propofol group and the least change was observed in patients treated with halothane. Preoperative levels had been regained in all four groups 2 h after surgery.

Movement time, period 1, with respect to delay bins. The effects of the four different delay bins on mean correct movement time are shown in figure 2 for the first 2-min period and in figure 3 for the second 2-
min period. In the first period, significant differences were found between the four treatments for delay bin 2 ($P < 0.001$) but not for bin 1 ($P = 0.734$); the differences between the study groups approached significance for delay bins 3 ($P = 0.085$) and 4 ($P = 0.093$). Overall, highly significant ($P < 0.001$) in-

Fig. 3. Mean movement time (time to return to centre pad) for each of the four delay bins ($\leq$ 250 (1), 251–500 (2), 501–750 (3), 751–1000 ms (4)) for period 2, the final 2 min, after halothane (■), enflurane (▲), isoflurane (●) and propofol (●) anaesthesia.

Table II. Mean (SD) scores for the Spielberger trait-anxiety questionnaire for all groups

<table>
<thead>
<tr>
<th></th>
<th>Halothane group</th>
<th>Enflurane group</th>
<th>Isoflurane group</th>
<th>Propofol group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop.</td>
<td>37.25 (6.58)</td>
<td>35.25 (6.22)</td>
<td>36.31 (12.42)</td>
<td>37.22 (9.05)</td>
</tr>
</tbody>
</table>

Table III. Mean (SD) scores for the Spielberger state-anxiety questionnaire for all groups before (Preop.) and after (Postop.) operation

<table>
<thead>
<tr>
<th></th>
<th>Halothane group</th>
<th>Enflurane group</th>
<th>Isoflurane group</th>
<th>Propofol group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop.</td>
<td>43.50 (8.76)</td>
<td>41.04 (8.22)</td>
<td>46.02 (10.16)</td>
<td>45.47 (11.36)</td>
</tr>
<tr>
<td>Postop.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 h</td>
<td>41.97 (9.10)</td>
<td>42.92 (9.57)</td>
<td>46.88 (8.53)</td>
<td>46.08 (7.01)</td>
</tr>
<tr>
<td>1 h</td>
<td>40.95 (10.59)</td>
<td>39.53 (10.05)</td>
<td>42.79 (12.57)</td>
<td>41.37 (9.24)</td>
</tr>
<tr>
<td>2 h</td>
<td>34.85 (6.16)</td>
<td>35.93 (9.72)</td>
<td>35.83 (8.15)</td>
<td>37.77 (10.42)</td>
</tr>
<tr>
<td>4 h</td>
<td>34.97 (4.40)</td>
<td>37.63 (8.99)</td>
<td>33.04 (5.78)</td>
<td>33.71 (5.29)</td>
</tr>
<tr>
<td>24 h</td>
<td>33.83 (6.26)</td>
<td>34.88 (9.89)</td>
<td>30.60 (5.02)</td>
<td>30.60 (7.56)</td>
</tr>
<tr>
<td>48 h</td>
<td>32.81 (8.70)</td>
<td>33.43 (8.62)</td>
<td>32.94 (7.47)</td>
<td>32.94 (8.21)</td>
</tr>
</tbody>
</table>

Table IV. Mean (SD) scores of the self-reported mood stress questionnaire for all groups before (Preop.) and after (Postop.) operation

<table>
<thead>
<tr>
<th></th>
<th>Halothane group</th>
<th>Enflurane group</th>
<th>Isoflurane group</th>
<th>Propofol group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop.</td>
<td>8.64 (4.2)</td>
<td>7.42 (3.73)</td>
<td>8.97 (5.19)</td>
<td>8.95 (5.49)</td>
</tr>
<tr>
<td>Postop.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 h</td>
<td>5.79 (4.73)</td>
<td>6.64 (3.78)</td>
<td>7.05 (4.42)</td>
<td>6.04 (3.17)</td>
</tr>
<tr>
<td>1 h</td>
<td>5.40 (4.62)</td>
<td>6.10 (4.24)</td>
<td>6.50 (4.72)</td>
<td>5.53 (4.35)</td>
</tr>
<tr>
<td>2 h</td>
<td>2.67 (2.54)</td>
<td>4.88 (4.22)</td>
<td>4.06 (3.3)</td>
<td>4.28 (3.96)</td>
</tr>
<tr>
<td>4 h</td>
<td>3.25 (2.39)</td>
<td>5.24 (4.47)</td>
<td>3.50 (2.54)</td>
<td>3.95 (3.49)</td>
</tr>
<tr>
<td>24 h</td>
<td>1.80 (1.69)</td>
<td>4.50 (4.51)</td>
<td>2.39 (2.0)</td>
<td>3.20 (3.83)</td>
</tr>
<tr>
<td>48 h</td>
<td>2.25 (3.43)</td>
<td>4.21 (4.41)</td>
<td>2.55 (2.57)</td>
<td>4.20 (4.51)</td>
</tr>
</tbody>
</table>
creases in decision time were found between assessments before and 30 min after surgery. Levels before surgery were achieved by discharge (4 h) in delay bins 2, 3 and 4, but not in delay bin 1 which required 24 h to achieve preoperative levels. Significant differences between the treatment groups were confined to the assessment 30 min after surgery, with enflurane, isoflurane and propofol tending to produce greater reductions in performance than halothane.

Movement time, period 2, with respect to delay bins.
In the second period, significant differences were found between the four treatments for all four delay bins (bin 1, $P < 0.001$; bin 2, $P < 0.001$; bin 3, $P < 0.001$; bin 4; $P < 0.001$). Highly significant ($P < 0.001$) increases in mean movement time were found between assessments before and 30 min after surgery for all four delay bins; this change was significantly greater for the propofol group than for the remaining three groups. Levels before surgery were achieved by the 4-h discharge assessment in the halothane, isoflurane and propofol groups; this target was reached by the enflurane-treated patients at 4 h only for delay bin 4, requiring 24 h for the three shorter delay bins.

State—anxiety and trait—anxiety
The changes in trait—anxiety and state—anxiety are summarized in tables II and III, respectively. Highly significant decreases ($P < 0.001$) in state occurred over the study period, indicating high levels of anxiety before operation which decreased rapidly, particularly during the 4 h spent recuperating on the day ward. There were no statistically significant differences between the four groups.

Mood stress and mood arousal
Changes in mood stress and mood arousal over the study period are summarized in tables IV and V. Highly significant reductions ($P < 0.001$) were observed in both measures. Stress was high before surgery and dissipated rapidly during the immediate period after surgery. Arousal decreased also while patients were in the day ward, but tended to increase again in the subsequent 48 h. There were no significant differences between the four groups.

Maddox—Wing
There was a significant change in the first 1 h after surgery, but this had returned to levels before operation by discharge at 4 h (table VI). There were no significant differences between the four groups.

DISCUSSION
Patients undergoing minor surgical procedures on a day-stay basis need a general anaesthetic technique which is associated with rapid recovery, minimum postoperative morbidity and a rapid return to “street fitness”. Several drugs used in anaesthesia, in particular the benzodiazepines, barbiturates and many other general anaesthetic agents, depress psychomotor function [18]. Psychomotor function has been shown to recover earlier after anaesthesia with propofol compared with methohexitone and thiopentone [3, 4, 19].

The usual induction dose of propofol has been reported as 1–2.5 mg kg$^{-1}$ [4, 20, 21]. The dose used in this study (4 mg kg$^{-1}$) was selected after a short pilot study. Our patients were young and healthy, unpremedicated and they did not receive opioids or other adjuncts at induction. Propofol provided adequate duration of anaesthesia for tracheal intubation and allowed positioning of the patient before the maintenance agent was commenced.

The principal aim of this study was to consider the choice of agent for maintenance of anaesthesia. There were no significant differences in the measures
of anxiety state, trait or mood arousal and stress before operation. Patients were encouraged to stay for a minimum of 4 h after tracheal extubation, but the subjective opinion of the nursing staff was that all patients were ready to go home approximately 1 h before this.

The trait–anxiety questionnaire was designed to investigate individual differences in anxiety susceptibility related to personality and was administered only once on arrival in the ward. The trait–anxiety score range was comparable with data for working adults under normal conditions [12].

The mean state–anxiety score range of the groups on arrival compared well with normal state–anxiety data reported for general medical and surgical patients [12]. At 4 h after operation, when still in the ward, the state–anxiety scores had decreased to a range more comparable with reported state–anxiety scores for working adults under normal conditions [12]. The scores had reduced further by 48 h. It might be inferred from this that the patients were returned to a state enabling them to complete everyday tasks. The effect of stress on state–anxiety scores has been reported for college students under normal and simulated examination conditions [12] and for males. The changes in score from preoperative levels to 48 h after operation are comparable with these.

Eysenck concluded that high anxiety is detrimental to performance and the implication is that it may be more so as task difficulty increases. In addition, there is a closer relation between state–anxiety scores and performance than trait–anxiety scores and performance [22]. In the present study, state–anxiety and mood stress scores were high in the preoperative period, as might be expected in patients undergoing surgery, and declined rapidly after surgery. Performances in the five-choice serial reaction time and Maddox–Wing tests did not follow this pattern however, but were similar at the assessment before operation when anxiety levels were high and at 48 h after operation, when anxiety levels were low. It might be concluded, therefore, that the anxiety component affecting task performance was outweighed greatly by that resulting from surgery and anaesthesia.

The Maddox–Wing test is a measure of ocular divergence which has been shown to be a sensitive measure of recovery [14]. It was interesting to note that it was only able to detect residual sedation up to 1 h after operation.

When the overall results of the choice reaction time tests were considered, the total number of responses recorded was reduced by approximately 40 % in all groups. When the whole 4-min choice reaction time test was divided into two 2-min periods however, an interesting difference was seen. After 4 h patients from all four groups had returned to preanaesthetic levels with respect to the first 2-min period. When the second 2-min period was examined separately, most measurements had not returned to baseline by 4 h in any of the groups. As the tests progressed, therefore, the ability to maintain performance speed declined. This was more marked with halothane and isoflurane and might suggest that propofol and enflurane had less longstanding effects than did halothane or isoflurane on the ability to maintain performance speed after anaesthesia.

From blood–gas solubilities, it might be anticipated that recovery from isoflurane would be more rapid than after enflurane, which in turn would be more rapid than halothane. However, previous evidence on recovery times is conflicting. Little difference has been found between halothane, enflurane or isoflurane [6, 8], although Korttila [9] reported that awakening was more rapid after isoflurane anaesthesia when the duration of surgery exceeded 90 min.

Nightingale and Lewis found that recovery after propofol was more rapid than after isoflurane [20] and Sear and colleagues found that it was faster than after halothane anaesthesia [23]. However, no difference between propofol and either isoflurane [24] or enflurane [25] has been reported. These studies are not immediately comparable as thiopentone was used for induction in three and some patients received alfentanil or fentanyl. In addition, it is difficult to compare potency between an i.v. and an inhalation agent.

The anaesthetist was allowed to vary the concentration of volatile agent at will, according to the patient’s perceived needs, although each change in the concentration was logged. With respect to the propofol group, the propofol infusion regimen was standardized but the anaesthetist was free to administer additional bolus doses. Comparisons between the inhalation groups may be made by calculating the average dose per unit time received by the patient and relating this to the MAC for that agent. The doses of isoflurane and enflurane were broadly similar. The halothane group, however, received a considerably greater overall dose, for which there is no simple explanation. However, despite these differences, patients in the halothane group were no more impaired. The enflurane group received the smallest total mean dose and recovery was noted to be slightly better.

Comparing the volatile agents with propofol is difficult. The overall mean infusion rate for propofol in this study was 19.2 mg kg\(^{-1}\) h\(^{-1}\), which is greater than values reported previously which ranged from 3 mg kg\(^{-1}\) h\(^{-1}\) (with morphine 10 mg) [26] to 9 mg kg\(^{-1}\) h\(^{-1}\) (without opioids) [23]. The propofol infusion regimen used in this study was, however, reached after a preliminary pilot study and probably reflects the fact that patients did not receive other analgesic or sedative agents during operation. Most patients underwent dental extractions and all patients were given analgesia on request in the recovery room with either ibuprofen or paracetamol, or both. There were no cases of prolonged recovery.

Psychomotor function at 24 h after operation did not differ from the preoperative baseline level. There was, however, a further smaller improvement in function between 24 and 48 h, an observation which has been made previously [11]. It would appear, therefore, that patients may not be recovered fully 24 h after anaesthesia. It is possible that the standard advice not to undertake hazardous tasks, such as driving a car, for 24 h should be extended to 48 h.
One of the principal aims of this study was to attempt to identify the best anaesthetic agent for maintenance of anaesthesia for day-care patients. Although differences were noted between groups in the early postoperative period, these were no longer present after 4 h (when the patient was discharged), although improvement in psychomotor function was continuing. The clinical significance, if any, of this subtle but enduring change in performance between the four anaesthetic groups remains to be determined. It seems likely that all of these four techniques of anaesthesia are suitable for use in day-case patients. Furthermore, the introduction of new anaesthetic agents and techniques has not allowed us to relax the 24-h rule.

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REFERENCES