

## CLINICAL INVESTIGATIONS

**Patient satisfaction after anaesthesia and surgery: results of a prospective survey of 10 811 patients†****P. S. Myles\*, D. L. Williams, M. Hendrata, H. Anderson and A. M. Weeks***Department of Anaesthesia and Pain Management, Alfred Hospital, PO Box 315, Prahran, Melbourne, Victoria 3181, Australia**\*Corresponding author*

Patient satisfaction after anaesthesia is an important outcome of hospital care. We analysed our anaesthetic database to identify potentially modifiable factors associated with dissatisfaction. At the time of analysis, our database contained information on 10 811 in-patients interviewed on the first day after operation. The major subjective outcome measure was patient satisfaction. We also measured other predetermined outcomes, such as nausea, vomiting, pain and complications. The overall level of satisfaction was high (96.8%); 246 (2.3%) patients were 'somewhat dissatisfied' and 97 (0.9%) were 'dissatisfied' with their anaesthetic care. After adjustment for patient and surgical factors, there was a strong relation between patient dissatisfaction and: (i) intraoperative awareness (odds ratio (OR) 54.9, 95% confidence intervals (CI) 15.7–191); (ii) moderate or severe postoperative pain (OR 3.94, 95% CI 3.16–4.91); (iii) severe nausea and vomiting (OR 4.09, 95% CI 3.18–5.25); and (iv) any other postoperative complications (OR 2.04, 95% CI 1.61–2.56). Several factors associated with dissatisfaction may be preventable or better treated.

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Quality of health care has been defined as the degree to which health services increase the likelihood of desired health outcome consistent with current professional knowledge.<sup>1,2</sup> Quality of life is relevant in this context and can be measured after anaesthesia and surgery by (i) objective dimensions (desired treatment outcome, functional status) and/or (ii) subjective dimensions, such as assessments of well being (affective component) and patient satisfaction (cognitive component).<sup>3,4</sup> Patient satisfaction is an important measure of quality of care that can contribute to a balanced evaluation of the structure, process and outcome of services.<sup>2,5</sup>

Many factors contribute to patient satisfaction, including accessibility and convenience of services, institutional structure, interpersonal relationships, competence of health professionals and a patient's own expectations and preferences.<sup>6–8</sup> Most patients (85%) expect uneventful anaesthesia.<sup>9</sup> Nevertheless, recovery from anaesthesia and surgery is sometimes complicated by residual sedation, pain, nausea, vomiting and a variety of other major and minor complaints.<sup>10–13</sup>

Satisfaction with health care is usually very high (>85%).<sup>8,14</sup> Consequently, it is difficult to identify a representative sample of patients dissatisfied with care without studying a large population. There are few studies in anaesthesia that have assessed patient satisfaction, and most are restricted to day-case surgical patients.<sup>15–19</sup> We established a postoperative survey of patients on the day after surgery as a quality assurance (QA) activity several years ago to measure patient outcome and our performance.

**Methods**

Our institution is a 400-bed, adult tertiary care hospital with most types of specialized surgical services, excluding obstetrics and paediatrics. As part of an ongoing quality improvement programme established in 1993 by the Department of Anaesthesia and Pain Management, surgical in-patients are interviewed within 24 h of surgery and

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anaesthesia. Our QA coordinator and/or anaesthetic registrar conducts this formal postoperative review. Patients who receive anaesthesia but recover in locations outside the operating theatre suite (such as angiography, endoscopy or electroconvulsive therapy) do not receive formal postoperative review. Day-case surgical patients are reviewed in the recovery room, but not on the day after surgery (and so are not asked to rate their satisfaction level).

Data collection included patient characteristics, comorbidities, previous anaesthetic complications, comprehensive anaesthetic details, type of surgery, intraoperative critical events and several predetermined postoperative outcomes. Duration of anaesthesia included preparation, surgery, emergence and transfer to the recovery room. Satisfaction with anaesthesia was included as a subjective outcome. Patients were asked to rate if they were 'satisfied', 'somewhat dissatisfied' or 'dissatisfied' with the anaesthetic service they received. Reasons for patient dissatisfaction were explored at the interview (and, where possible, explanation and/or treatment was provided), but this information was not recorded. Patients who were dissatisfied or somewhat dissatisfied were categorized as dissatisfied for further analysis. Pain control was rated on an ordinal scale and then dichotomized as 1=excellent/good control or 0=adequate/fair-poor control. Nausea and vomiting were rated on an ordinal scale and then dichotomized as 1=severe nausea/vomiting or 0=no nausea/mild nausea. Other postoperative complications included sore throat, headache, soft tissue injury, muscle pain, back pain, urinary retention, confusion, neurological deficit, myocardial infarction, hepatitis and renal failure. These data were entered onto a computer database for future audit. We obtained Ethics Committee approval to access this database for research purposes.

### Statistical analysis

Descriptive statistics were derived for the study population and are expressed as number (%) or mean (SD). Associations of categorical variables with patient dissatisfaction were assessed using chi-square tests, and the significance of continuous variables was assessed with *t* tests. Univariate odds ratios (OR) and 95% confidence intervals (CI) were used as estimates of risk for categorical variables. Significant ( $P<0.05$ ) variables were then entered into separate multivariate logistic regression models to calculate adjusted OR. Each model included patient age, sex, ASA status, use of neuromuscular blocking agents and duration of anaesthesia, as it was considered that these factors were clinically significant covariates (patient smoking history and emergency surgery were not statistically significant in the multivariate analysis). Two-way interactions were not explored. All analyses were performed using SPSS v8.0 for Windows. A two-sided *P* value of  $<0.01$  was used for statistical significance.

**Table 1** Patient, anaesthetic and surgical characteristics of the study population ( $n=10\ 811$ ). COAD=Chronic obstructive airways disease; ENT=ear, nose and throat

Variable	Number	%
Age group		
<25 yr	1004	9.3
25-34 yr	1319	12.2
35-44 yr	1282	11.9
45-54 yr	1452	13.4
55-64 yr	1757	16.3
65-74 yr	2219	20.5
>75 yr	1778	16.4
Male sex	6399	59.2
ASA status		
I	2092	19.4
II	3715	34.4
III	3805	35.2
IV	1180	10.9
V	19	0.2
Non-elective	1566	14.5
Past medical history		
None	781	7.2
Angina	1938	17.9
Myocardial infarction	1145	10.6
Cardiac failure	900	8.3
Hypertension	2785	25.8
Asthma/COAD	1605	14.8
Diabetes	1089	10.1
Psychiatric	501	4.6
Smoking status		
Nil	6963	64.4
Ex-smoker	2112	19.5
Current smoker	1736	16.1
Neuromuscular blockers	6658	61.6
Laryngeal mask airway	1859	17.2
Intraoperative antiemetic	678	6.3
Epidural-spinal anaesthetic	864	8.0
Type of surgery		
General	2777	25.7
Orthopaedic	2046	18.9
Cardiothoracic	1336	12.4
Neurosurgical	820	7.6
Vascular	784	7.3
Urological	755	7.0
ENT/faciomaxillary	691	6.4
Plastic	578	5.3
Burns	198	1.8
Ophthalmological	135	1.2
Gynaecological	115	1.1
Other	576	5.3

## Results

Perioperative data for 17 106 patients were entered onto our QA database, of which 10 811 patients had been reviewed the day after surgery to rate their satisfaction with care (most of the remainder were discharged on the day of surgery, some in-patients were heavily sedated (usually in the ICU) or too confused to participate). The characteristics of the study population are presented in Table 1. Mean duration of anaesthesia was 2.42 (SD 2.2) h. Overall, 85% of operations were elective and neuromuscular blocking agents were used on 62% of occasions. There were 12 (0.11%) episodes of awareness reported after operation.

The overall level of satisfaction was 96.8%; 246 (2.3%) patients were 'somewhat dissatisfied' and 97 (0.9%) were 'dissatisfied' with their anaesthesia care. Patients who were

**Table 2** Factors associated with patient dissatisfaction and anaesthesia care ( $n=10\ 811$ ). The overall level of dissatisfaction was 3.2%. AMI=Acute myocardial infarction; COAD=chronic obstructive airways disease. \*Complications included sore throat, headache, soft tissue injury, muscle pain, back pain, urinary retention, confusion, neurological deficit, myocardial infarction and renal failure (pain, nausea and vomiting have been excluded)

Variable	Incidence (%)	Dissatisfaction rate (%)	Univariate OR (95% CI)	P
Age $\geq 65$ yr	37	2.0	0.50 (0.39–0.65)	<0.0005
Female sex	40	4.3	1.78 (1.43–2.21)	<0.0005
ASA status III, IV or V	46	2.6	0.70 (0.56–0.87)	0.001
Non-elective	15	2.4	0.71 (0.50–1.0)	0.048
Past medical history				
None	7.2	4.6	0.70 (0.44–1.14)	0.15
Angina	18	1.6	0.45 (0.31–0.65)	<0.0005
AMI	11	1.5	0.43 (0.26–0.71)	<0.0005
Cardiac failure	8.3	1.4	0.43 (0.24–0.74)	<0.0005
Hypertension	26	2.7	0.79 (0.61–1.02)	0.072
Asthma/COAD	15	3.3	1.05 (0.78–1.41)	0.75
Diabetes	10	1.8	0.54 (0.35–0.86)	0.008
Psychiatric	4.6	4.0	1.29 (0.81–2.04)	0.28
Ex- or current smoker	36	2.7	0.79 (0.63–1.0)	0.05
Neuromuscular blocker	62	2.8	0.74 (0.60–0.92)	0.006
Intraoperative antiemetic	6.3	3.8	1.24 (0.82–1.86)	0.31
Epidural–spinal	8.0	3.2	1.02 (0.69–1.52)	0.91
Any intraoperative adverse event	31	2.5	0.72 (0.57–0.93)	0.011
Recovery room				
Any adverse event	70	3.7	1.79 (1.37–2.33)	<0.0005
Moderate or severe pain	3.8	16.2	7.08 (5.30–9.45)	<0.0005
Severe nausea or vomiting	0.5	10.0	3.43 (1.35–8.69)	0.006
Postoperative review (day after surgery)				
Moderate or severe pain	24	7.3	4.16 (3.34–5.18)	<0.0005
Severe nausea or vomiting	9.7	10.0	4.44 (3.50–5.64)	<0.0005
Awareness	0.11	58.3	43.6 (13.8–138)	<0.0005
Any complication*	39	4.6	2.08 (1.67–2.56)	<0.0005
2 or more complications	10	6.8	2.57 (1.97–3.36)	<0.0005
3 or more complications	2.0	14.6	5.66 (3.82–8.37)	<0.0005
4 or more complications	0.2	17.4	6.49 (2.20–19.2)	<0.0005

**Table 3** Factors associated with patient dissatisfaction and anaesthesia, after adjustment for patient age, sex, ASA status, use of neuromuscular blocking agents and duration of anaesthesia. \*Complications included sore throat, headache, soft tissue injury, muscle pain, back pain, urinary retention, confusion, neurological deficit, myocardial infarction and renal failure (pain, nausea and vomiting have been excluded)

Variable	Incidence (%)	Adjusted OR (95% CI)	P
Any intraoperative adverse event	31	1.12 (0.86–1.46)	0.63
Recovery room			
Any adverse event	70	1.92 (1.47–2.56)	<0.0005
Moderate or severe pain	3.8	6.95 (5.18–9.33)	<0.0005
Severe nausea or vomiting	0.5	2.85 (1.11–7.34)	0.022
Postoperative review (day after surgery)			
Moderate or severe pain	24	3.94 (3.16–4.91)	<0.0005
Severe nausea or vomiting	9.7	4.09 (3.18–5.25)	<0.0005
Awareness	0.1	54.9 (1507–191)	<0.0005
Any complication*	39	2.04 (1.64–2.56)	<0.00005
2 or more complications	10	2.41 (1.83–3.16)	<0.00005
3 or more complications	2.0	5.01 (3.36–7.47)	<0.0005
4 or more complications	0.2	6.25 (2.07–18.9)	0.001

dissatisfied were generally younger (48.5 (19) yr vs 54.2 (20) yr) ( $P<0.0005$ ). They also underwent a shorter duration of anaesthesia (2.18 (1.9) h vs 2.43 (2.2) h) ( $P=0.018$ ). Factors associated with patient dissatisfaction are presented in Table 2. After adjustment for patient and surgical factors, there was a strong relation between patient dissatisfaction and postoperative pain, nausea and vomiting, and other complications (Table 3). Patient medical conditions were

no longer associated with patient dissatisfaction after adjustment for perioperative risk (using ASA status).

## Discussion

We found a high rate of patient satisfaction with anaesthesia care in patients interviewed on the first day after surgery. Factors most strongly associated with satisfaction included older patient age, male sex and measures of increased perioperative risk (presence of several co-existing medical conditions and ASA status  $\geq$ III).

The rate of dissatisfaction was low (3.2%). However, it is recognized that patient responses may be modified to please staff,<sup>2 20</sup> and hence this may be an under-representation of the true level of dissatisfaction. Other hospital satisfaction surveys have reported dissatisfaction rates of less than 15%.<sup>8 14 15</sup> It has been suggested previously that patients do not know what to expect during their hospitalization to allow them to rate their satisfaction appropriately,<sup>8</sup> or only rate selected aspects of their care.<sup>7</sup> We asked patients to rate their satisfaction with anaesthesia care only, at a time when the outcomes from our service were known to them and were fresh in their minds. We did not ask them to rate the entire hospitalization episode for which a variety of other factors may be important.<sup>5–8 14 15 18</sup> Of interest, dissatisfaction with anaesthesia has been reported to be associated with a 12-fold risk of global

dissatisfaction with day-case surgery.<sup>15</sup> We did not obtain patient satisfaction data for day-case surgical patients or those unable to cooperate with our survey; our results apply only to patients admitted overnight (at least) after surgery. It is possible that our results were affected by reporting or detection bias in that patients unable to cooperate may have lower satisfaction rates. We believe this is unlikely as these patients were generally older and sicker, and were recovering from more extensive surgery: these factors were associated with improved satisfaction rates in our study. Our survey was performed prospectively using predetermined criteria and asked patients to rate their level of satisfaction, pain control and emesis on graded scales. Our large study population enabled us to identify several important risk factors associated with patient dissatisfaction.

Shorter duration of anaesthesia (a surrogate marker for lesser surgery) and the presence of adverse events in the recovery room and on postoperative review were significantly associated with patient dissatisfaction. These adverse events included moderate or severe pain and severe nausea or vomiting. The risk of dissatisfaction increased as the number of postoperative complications increased. Not surprisingly, we found that awareness, although rare, was strongly associated with patient dissatisfaction. With the exception of awareness, adverse intraoperative events were not related to patient dissatisfaction. This is not surprising given that patients are oblivious to most intraoperative events that do not result in adverse postoperative outcome. Traditionally, the perceived role of the anaesthetist has been restricted to the immediate preoperative and intraoperative periods,<sup>21</sup> whereas anaesthetists are now considered to have greater involvement in preoperative preparation and postoperative care.<sup>22 23</sup> This should allow earlier detection and treatment of postoperative complications.

Patient confidence in the anaesthetist has been reported to be high.<sup>24</sup> Fears of anaesthesia include postoperative nausea and vomiting,<sup>10</sup> prolonged drowsiness<sup>10</sup> and awareness (or not waking up).<sup>25</sup> There has always been a strong focus on anaesthetic morbidity and mortality.<sup>11–13 26 27</sup> These remain important outcomes, yet with improved safety and greater expectations after anaesthesia and surgery, further emphasis should now be placed on other features of postoperative recovery.<sup>23</sup> Quality of recovery<sup>28</sup> and patient satisfaction are two such indices. Methods used to measure patient satisfaction have not been validated extensively in the postoperative population.<sup>6 23</sup> Lee and Lum cautioned against the use of patient satisfaction as a good measure of postoperative outcome.<sup>23</sup> In contrast, Donabedian argued that despite its strengths and limitations, information on patient satisfaction should be indispensable in the assessment of quality in health care.<sup>2</sup> Dexter, Aker and Wright recently developed a valid and reliable measure of patient satisfaction in 86 patients after minor surgical procedures;<sup>29</sup> they also found that unrelieved pain was associated with lower patient satisfaction.

Minor postoperative complications are important to

patients and represent an area for potential improvement in anaesthetic, surgical and nursing care. Our study suggests that this may be associated with improved patient satisfaction. It is recognized that women have a greater risk of 'minor' postoperative complications, such as nausea and vomiting, headache and backache,<sup>12 13</sup> and recover less well after operation.<sup>28</sup> Our study confirms these findings and supports greater efforts at preventing or treating such complications (in all patients). Other factors related to improved postoperative recovery and patient satisfaction include individualized preoperative education, adequate communication and interpersonal skills of hospital staff.<sup>7 8 15 25 28</sup> These influences may have changed the patient's overall satisfaction with their hospital stay but were not the subject of this study. It is likely that a patient's participation in a QA survey and the opportunity for anaesthetists to demonstrate their concern for their postoperative well-being adds to patient satisfaction.

Quality in health care is multifaceted.<sup>2 3 30</sup> Its assessment requires multiple measures of process combined with measures of outcome, including patient satisfaction.<sup>2</sup> These aspects should be achievable, despite the current era of cost containment.<sup>31</sup> To our knowledge, this is the largest satisfaction survey of surgical patients published. Our study found that patient satisfaction with anaesthesia was very high and identified several factors associated with dissatisfaction that may be preventable or better treated.

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