

Have The ASA Guidelines For Sedation And Analgesia Affected The Practice Of Non Anesthesiologists?

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Citation

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Abstract

Background: In 1996, ASA published Guidelines for Sedation and Analgesia by Non Anesthesiologists which include specific recommendations designed to improve patient safety. The goal of this study was to determine if sedation practices of non anesthesiologists have changed since the publication of the Guidelines. **Methods:** With IRB approval we mailed surveys (and a copy of the Guidelines) to 280 practitioners of specialties other than anesthesiology where sedation is commonly administered. We chose these individuals at random from directories of medical specialists, sending equal numbers to private and academic practitioners. We asked: (1) If the individuals were previously aware of the Guidelines; (2) Which of 21 Guideline recommendations they followed before their publication in 1996; and (3) Which of these 21 recommendations they follow now. We analyzed the data using one way ANOVA with post hoc binomial tests for proportions when overall significance was detected. $P < 0.05$ indicated significance. **Results:** We received 34 evaluable responses. From 1996 to 2001, the mean number of recommendations followed increased from 16.6 ± 3.4 to 18.2 ± 2.8 , $\pm SD$, $P < 0.05$). Fifty six percent of respondents were previously aware of the guidelines; this fraction did not differ between academic and private practitioners. Those who were aware of the guidelines had a slightly greater increase in the number of recommendations followed than those who were not (1.8 vs 1.1 , $P = NS$). Overall, obtaining a pre procedure history and physical, contemporaneous recording of monitored parameters, use of pulse oximetry, and immediate availability of a defibrillator were significantly more common in 2001 than before the guidelines were published in 1996. **Conclusions:** Although the number of recommendations being followed has increased, we were unable to demonstrate that this was related to previous familiarity with the guidelines. It is particularly encouraging that the use of pulse oximetry has become almost universal, and that the availability of defibrillators has increased to over 90%.

INTRODUCTION

In 1996, the American Society of Anesthesiologists published "Guidelines for Sedation and Analgesia by Non-Anesthesiologists" (1) (the Guidelines). These were designed to help both anesthesiologists and non-anesthesiologists to develop uniform institutional policies for the practice of sedation and analgesia ("conscious sedation") as recommended by the Joint Commission for Accreditation of Healthcare Organizations. Like the other practice parameters adopted by the A.S.A., these guidelines were developed using evidence-based methodology as recommended by the Agency for Healthcare Policy and Research (2). However, in contrast to all of the other ASA practice parameters which relate to the practice of anesthesiology, these guidelines specifically apply to the practice of non-anesthesiologists. While non-anesthesiologists were involved in their development, both as members of the Task Force and as Expert Consultants, there was no way to predict how the

guidelines would be received by those larger community of practitioners whose clinical practices would be directly affected. The goal of the present survey was to determine whether the Guidelines have influenced the practice of sedation and analgesia by non-anesthesiologists.

MATERIALS AND METHODS

With IRB approval, surveys were sent to 280 non-anesthesiologist practitioners of specialties where sedation and analgesia (conscious sedation) are commonly administered for diagnostic or therapeutic procedures (Table 1). Practitioners were selected at random (by a dice-roll procedure) from the ABMS directory of board certified medical specialists (3) and the American Dental Directory. (4) For each specialty we selected 20 practitioners, half from private practice and the remainder from academic practice. In addition to the survey, each mailing contained a copy of the A.S.A. Guidelines for Sedation and Analgesia by Non-

Anesthesiologists (the Guidelines) and a stamped, pre-addressed return envelope.

Figure 1

Table 1: Demographics of surveyed non-anesthesiologist practitioners of sedation and analgesia (“conscious sedation”). Individuals who indicated that they do not administer sedation to patients are excluded

Specialty	Number of Respondents	
	Private Practice	Academic
Dermatology	0	0
Emergency Medicine	0	4
Gastroenterology	3	1
General Surgery	1	2
Interventional Cardiology	0	1
Interventional Radiology	1	1
Oral & Maxillofacial Surgery	2	1
Pediatric Dentistry	2	5
Pediatric Radiology	0	1
Pulmonary Medicine	0	1
Radiation Oncology	0	2
Surgical Critical Care	0	3
Urology	1	2
Total	10	24

To establish the demographic characteristics of our respondents, we asked each individual to identify his specialty, practice type (private vs. academic) and the number of patients to whom he/she administers sedation on an annual basis. To determine whether changes in practice were directly related to familiarity with the guidelines, we specifically asked whether respondents were aware of the guidelines before receiving the questionnaire. We then asked a series of yes / no questions relating to the individual recommendations made by the Guidelines. Respondents were asked whether they had followed each recommendation before the Guidelines were published in 1996, and whether they currently follow them (January, 2001). We also asked which medications they had used for sedation before the guidelines were published (1996), and which ones they use at the present time. Finally, we asked about the costs involved in implementing any changes in practice required by the Guidelines.

STATISTICAL ANALYSIS

For each respondent, we determined the total number of practice recommendations which were followed both before publication of the Guidelines and during current practice.

Repeated-measures ANOVA determined whether there was a significant change in the number of recommendations followed, as well as whether this change was related to an individual's previous familiarity with the guidelines. If overall significance was present, post-hoc binomial tests of proportions determined the significance of changes in the frequency with which individual recommendations were followed. For contingency tables, we used chi-squared tests. P<0.05 indicated significance.

RESULTS

A total of 280 surveys were mailed; 40 were returned by the practitioners and an additional 14 were returned as undeliverable by the post office. Six of the returned surveys were excluded because the practitioner does not administer sedation, leaving us evaluable data from 34 respondents. Twenty four of these were in academic practice, while the remainder were private practitioners. The median number of patients sedated by each respondent was 100 per year (interquartile range 50-950). Fifty six percent of the respondents were aware of the guidelines before they received the survey; this fraction did not differ between academic and private practitioners.

Prior to the publication of the A.S.A. Guidelines for Sedation and Analgesia by Non-Anesthesiologists (the Guidelines) in 1996, respondents followed 16.6±3.4 (±S.D.) of the 21 recommendations enumerated in Table 2. At the time of the survey in 2001, this had increased to 18.2±2.8 recommendations (P=0.003). Among individuals in private practice the number of recommendations followed increased by 2.8 (from 15.2±4.5 to 18.0±4.0) while among academic practitioners, the increase was only 1.0 (from 17.3±2.8 to 18.3±2.2, P=0.09 vs. private practice). The number of recommendations followed increased by 1.8±3.5 in individuals who were previously aware of the guidelines and 1.1±1.6 in individuals who were previously unaware of the guidelines (P=0.48). Post-hoc testing revealed that these changes were related to significant increases in the proportion of respondents who followed five of the Guideline recommendations (Table 2). For those individuals who monitored blood pressures during sedation, the median interval between blood pressure measurements was 5 min (interquartile range 3 - 5 min) which did not differ between 1996 and 2001.

Figure 2

Table 2: Percentage of respondents following practices recommended by the A.S.A. Guidelines for Sedation and Analgesia by Non-Anesthesiologists before their publication (1996) and at the time of the survey (2001). Questions are quoted directly from the survey.

Practice Recommendation	1996	2001	P
Do you routinely perform a pre-procedure history prior to administering conscious sedation?	88	100	0.02
Do you routinely perform a focused physical examination prior to administering conscious sedation?	76	91	0.05
Do you routinely monitor a patient's level of consciousness during a procedure?	100	100	NS
Do you routinely monitor a patient's oxygenation with pulse oximetry during a procedure?	91	100	0.04
Do you routinely monitor a patient's breathing by means other than pulse oximetry (e.g., auscultation, observation of chest movement, capnography) during a procedure?	74	85	NS
Do you monitor a patient's blood pressure at regular intervals during a procedure?	71	76	NS
Do you monitor the electrocardiogram (ECG) during conscious sedation for all patients?	44	58	NS
Do you monitor the electrocardiogram (ECG) during conscious sedation for patients with cardiovascular disease?	85	92	NS
Do you contemporaneously record a patient's ventilatory, oxygenation, and hemodynamic status during a procedure?	67	85	0.04
Is a designated individual, other than the practitioner performing the procedure, present to monitor the patient throughout the procedure?	85	91	NS
Is an individual capable of establishing a patent airway and positive pressure ventilation present in the procedure room during conscious sedation?	88	91	NS
Is an individual with advanced life support skills (ACLS) immediately available (within 5 minutes) during the procedure?	91	94	NS
Is appropriately sized equipment for establishing a patent airway (e.g., laryngoscope, endotracheal tubes, oral / nasopharyngeal airways, mask) present during administration of sedation / analgesia?	82	91	NS
Is equipment for positive pressure ventilation with supplemental oxygen present during administration of conscious sedation?	79	85	NS
Is a defibrillator immediately available within the facility where you perform conscious sedation?	79	94	0.04
Do you routinely provide supplemental oxygen during administration of conscious sedation?	70	71	NS
Do you routinely titrate intravenous sedative and analgesic drugs to obtain the desired effect?	87	93	NS
For patients receiving intravenous medications, is vascular access maintained throughout the procedure and until the patient is no longer at risk for cardiorespiratory depression?	100	100	NS

Figure 3

Are pharmacologic antagonists (e.g., naloxone, flumazenil) available when conscious sedation is administered?	100	100	NS
Following sedation, do you routinely monitor patients until their return to a pre-sedation state?	91	97	NS
For potentially difficult cases, is an anesthesiologist consulted prior to the procedure?	74	78	NS

The survey revealed that midazolam is the agent most commonly used for "conscious sedation." The proportion of respondents who used each of the tabulated medications did not change significantly between 1996 and 2001 (Table 3). Of the individuals reporting the use of propofol in 2001, two were oral-maxillofacial surgeons, three were intensivists, and one was a general surgeon. Of the individuals who used ketamine three were emergency physicians, one was an oral-maxillofacial surgeon, one was a general surgeon, and one

was a gastroenterologist. Chloral hydrate was primarily used by interventional and pediatric radiologists, pediatric dentists, and radiation oncologists.

Figure 4

Table 3: Percentage of respondents using the indicated medications during sedation and analgesia before publication of the guidelines (1996) and at time of survey (2001)

Specialty	Midazolam		Diazepam		Propofol		Chloral Hydrate	
	1996	2001	1996	2001	1996	2001	1996	2001
Emerg Med	100	100	75	50	0	0	0	0
Gastroenterology	100	100	0	0	0	0	0	0
General Surgery	67	100	67	0	0	33	33	0
Intervent Cardiol	100	100	0	0	0	0	0	0
Intervent Radiol	100	100	100	100	0	0	100	100
Oral & Maxil Surgery	100	100	33	33	67	67	0	0
Pediatric Dentistry	71	71	43	57	0	0	43	29
Pediatric Radiol	100	100	100	100	0	0	100	100
Pulm Med	100	100	0	0	100	100	0	0
Radiat Oncol	50	100	100	50	0	0	50	50
Surgical Critical Case	100	100	33	33	33	67	0	0
Urology	100	100	67	67	0	0	0	33
Overall	88	94	50	41	12	18	24	21

Figure 5

Specialty	Ketamine		Meperidine		Fentanyl		Morphine		Pentobarbital	
	1996	2001	1996	2001	1996	2001	1996	2001	1996	2001
Emerg Med	75	75	25	25	100	100	50	50	0	0
Gastroenterology	0	25	100	100	25	25	0	0	0	0
General Surgery	33	33	67	67	0	33	0	0	0	0
Intervent Cardiol	0	0	100	100	0	0	100	100	0	0
Intervent Radiol	0	0	100	100	100	100	0	0	50	50
Oral & Maxil Surgery	33	33	33	33	100	100	0	0	0	0
Pediatric Dentistry	0	0	71	71	0	0	0	0	0	0
Pediatric Radiol	0	0	0	0	100	100	0	0	100	100
Pulm Med	0	0	100	100	0	0	100	100	0	0
Radiat Oncol	0	0	0	0	50	50	0	0	0	0
Surgical Critical Case	0	0	100	100	67	67	67	67	0	0
Urology	0	0	67	67	33	33	33	33	0	0
Overall	15	18	65	65	44	47	21	21	6	6

Of the 26 individuals who responded to the portion of the questionnaire related to the cost of guideline implementation, 15% purchased new equipment, supplies, or pharmaceuticals in order to implement the Guidelines. The median acquisition cost for capital equipment was estimated at \$5000. The median estimated increase in costs attributed to continuing to follow the Guidelines was \$3000 per year.

DISCUSSION

Although the American Society of Anesthesiologists has adopted 11 practice parameters (guidelines and advisories) over the last decade, there are no previous data to indicate whether they have altered clinical practice or patient outcomes. The guideline development process is rather expensive: From inception through completion, a typical guideline costs ASA between \$150,000 and \$200,000. (5) Although the practice parameters have been widely accepted both by ASA members and outside organizations (such as JCAHO), there has been no evidence that the guidelines and advisories have made a significant impact on patient outcomes.

Part of the problem lies in the relatively low incidence of sedation and anesthesia-related complications. A randomized study involving at least 37,000 subjects per group would be required to demonstrate a 50% reduction in the likelihood of a complication whose initial incidence was 1:1000 ($\alpha=0.05$, $1-\beta=0.8$). This estimate assumes, of course, that the practices recommended in the guidelines would not have been used if the guidelines had not been developed. On the other hand, if the guidelines merely restate common practice, it becomes even more difficult to demonstrate a guideline-related improvement in patient outcomes.

The ASA Guidelines for Sedation and Analgesia by Non-Anesthesiologists are unique in that they are the only ASA practice parameter which were developed to solely affect the practice of non-anesthesiologists. They were developed using a series of testable linkages, relating patient care interventions to patient outcomes. When there were sufficient data in the literature, linkages were tested by meta-analysis; in the absence of sufficient literature, they were tested based upon the opinion of a panel of expert consultants. Our questionnaire was based upon the linkages originally used for developing the Guidelines. We were able to demonstrate an overall increase in the average number of guideline recommendations being followed between 1996 (before the guidelines were published) and 2001 (the time of the survey). However, we were unable to establish that this increase was greater for practitioners who were previously familiar with the guidelines than for those who had not seen them before receiving the survey. There are several possible explanations for this discrepancy:

- A disappointingly small fraction of our surveys were returned by individuals who administer sedation and analgesia (12%). Power analysis

reveals that we would need a minimum of 254 surveys from each group (previously aware vs. previously unaware of guidelines) to demonstrate a significant difference in the increase in number of recommendations being followed ($\alpha=0.05$, $1-\beta=0.8$). Assuming a comparable rate of return, we would have to mail at least 4,200 surveys!

- Practitioners who were personally unaware of the guidelines may have been affected by them indirectly. Hospital and departmental policies may have been changed based on the Guidelines (6) and subsequent mandates by accrediting organizations such as the JCAHO.
- Monitoring equipment may have become less expensive and more universally available between 1996 and 2001.
- Practices may have been changed based on guidelines or standards promulgated by other professional organizations.

CONCLUSION

In summary, the number of Guideline recommendations being followed by non-anesthesiologist practitioners of moderate ("conscious") sedation increased significantly between 1996 and 2001. It is particularly encouraging to note that the use of pulse oximetry, immediate availability of a defibrillator, and contemporaneous recording of monitored parameters (vital signs, SaO₂, level of consciousness). While these changes may not have been a direct result of the Guidelines, the fact that over half of our respondents were previously aware of the Guidelines suggests that they have had a significant impact among non-anesthesiologists.

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References

1. Gross JB, Bailey PL, Caplan RA et al: Practice guidelines for sedation and analgesia by non-anesthesiologists. A report by the American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. *Anesthesiology* 84:459-71, 1996
2. Woolf SH: AHCPR Interim Manual for Clinical Practice Guideline Development, ACHPR Pub No. 91-0018. Washington. U.S Department of Health and Human

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Services, 1991, pp 1-45.

3. The Official ABMS Directory of Board Certified Medical Specialists, 33rd Ed. New Providence, NJ. Marquis Who's Who, 2001, Vol 1-4.

4. American Dental Directory. Chicago. American Dental Association, 2000.

5. Arens JF: ASA Practice Parameters: An Update.

American Society of Anesthesiologists

Newsletter 1997;61(6).

(http://www.asahq.org/NEWSLETTERS/1997/06_97/Pract_Param_update.html)

6. Nicol MF: A risk management audit: are we complying with the national guidelines for sedation by non anaesthetists? J Accid Emerg Med. 1999; 16:120 2.

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