

Sedation by Surgeons: Is patient safety being compromised by non-anaesthetists?

Priyan R Landham, Umer Butt, Aabid Sanaullah, Hester C Taekema and Ahmed Shawky Eid

Introduction: Sedation is frequently administered by non-anaesthetic doctors in the emergency department whilst minor procedures are carried out. Guidelines and protocols exist but are non-anaesthetic doctors familiar with them?

Methods: A questionnaire survey of 53 orthopaedic surgeons (registrars) in bristol and cardiff was carried out to ascertain their current clinical practice, knowledge, and training with regards to sedation.

Results: Sedation had been administered by all the orthopaedic doctors surveyed at some stage in their careers to facilitate fracture or joint reduction or to apply traction in settings outside the operating room. Forty-five percent of respondents had read the sedation protocol for their hospital but fewer respondents ensured monitoring data forms were completed during and after the procedure (21% and 23% respectively). Morphine and other opioids were the most commonly used sedative medication. The pharmacology section of the questionnaire revealed a reasonable knowledge base for most trainees with a mean score of 4.29 out of 7. Whilst the majority of respondents had undergone advanced life support training (89%), only 30% of respondents had undergone formal training regarding sedation techniques.

Conclusion: Sedation for minor procedures is widely performed by orthopaedic doctors. There is the potential for significant morbidity and mortality, so doctors need to be aware of and follow sedation guidelines. Adequate training needs to be incorporated into postgraduate training speciality programmes to ensure safe sedation practices.

Introduction

Sedation is frequently administered outside of the operating theatre by non-anaesthetic doctors to facilitate minor procedures. This can be in both primary care including dental surgeries as well as in hospital departments such as radiology, endoscopy and the emergency department. Clinical practice including medication and monitoring equipment available and the personnel involved, varies not only between hospitals and regions but also between departments.

In the emergency department sedation is often performed in a busy clinical setting by junior doctors. This enables minor procedures to be carried out with subsequent discharge home reducing admission rates and the requirement for general anaesthesia. Other advantages include less workload pressure on the anaesthetic team and a significant improvement in the patient experience. Sedation is not without risk and significant morbidity and mortality is still associated with its use, particularly in the elderly and in combination with other medication^{1,2}. Guidelines and protocols do exist to ensure safe practice but often it is only anaesthetic doctors who are aware of them³⁻⁷. A recent study by Fanning highlighted discrepancies in practice, skills and knowledge of doctors of various specialities and grades who administered sedation⁸. Anecdotal reports from orthopaedic colleagues suggested the variability in competence of doctors with clear implications for patient safety. We therefore sought to ascertain the current clinical practice, knowledge and prior training in sedation techniques of specialist registrars in orthopaedic and trauma surgery in our region.

Materials and Methods

A questionnaire based survey of 53 specialist registrars in orthopaedic and trauma surgery in the neighbouring Severn and South Wales regions was carried out. The questionnaire was modified from that developed by Fanning⁸ and circulated for completion at regional teaching sessions in Swansea and Bristol (Appendix 1). Each respondent had 15 minutes to complete the questionnaire based on their own experience, practice and knowledge. Respondents were not allowed to confer and full confidentiality was assured. The questionnaire was split into several sections that ascertained the respondents' clinical practice including the procedures that sedation was used for, prior training, awareness of protocols and safety issues. Knowledge of the basic pharmacology of commonly used sedative agents was also tested. The final section asked respondents whether they had ever encountered any adverse events, the nature of the adverse event and whether assistance was required from the anaesthetic department.

Results

Orthopaedic specialist registrars (post basic surgical training) who were in higher surgical training completed 53 questionnaires. Sedation was performed in the emergency department by all respondents for manipulating fractures, reducing dislocated joints and for applying traction. Twenty-four respondents (45%) had read the sedation protocol for their hospital/emergency department. Thirteen respondents (25%) completed pre-sedation assessment forms, whilst only eleven (21%) completed the during-procedure monitoring data forms

and twelve (23%) filled the after-procedure forms (Figure 1). Twenty-eight (53%) respondents ensured that either they or an assistant provided the patient with discharge advice.

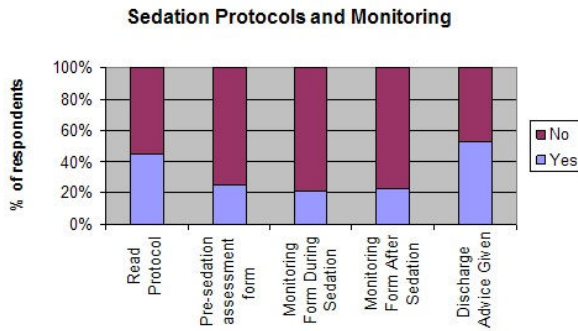


Figure 1 The percentage of respondents who had read the departmental protocol, completed monitoring forms and given advice prior to discharge.

Table 1: Sedative agents used.

Medication/Sedative Agent	No of Respondents
Diazepam	31
Pethidine	1
Midazolam	35
Propofol	15
Fentanyl	3
Morphine	44
Opiates with BDZs	12
Local anaesthesia with sedation	17

Almost all (98%) respondents administered sedation in the presence of an assistant. Forty-seven (89%) checked their medication with another healthcare professional. All fifty-three respondents supplied patients with concurrent oxygen whilst fifty-two ensured that resuscitation equipment was available nearby. In terms of specific training, forty-seven (89%) registrars had undergone Advanced Life Support training (ALS) but this qualification was only valid (within three years) for thirty-six (68%). Sixteen registrars (30%) stated they had undergone formal training or teaching regarding sedation (Figure 2). With regards to monitoring of patients, thirty-six (68%) respondents used pulse oximetry, fourteen (26%) used electrocardiogram (ECG) monitoring and twenty-eight (53%) measured blood pressure.

Morphine and other opioids were the most commonly used sedative medication (44 responses), followed by midazolam (35 responses), diazepam (31 responses) and propofol (15 responses). Twelve respondents combined opiates and benzodiazepines, whilst seventeen combined local anaesthesia with sedation (Table 1).

Have you received training in administering sedation?

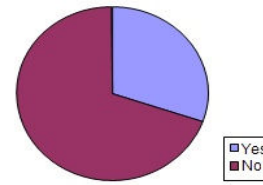


Figure 2 The proportion of respondents who had received training in administering sedation

Two-thirds of respondents (35 out of 53, 66%) administered sedation in boluses rather than calculating the correct dose per kilogram. The pharmacology questions devised by Fanning⁸ tested knowledge of metabolic pathways, duration of action and side effects. Overall, each question was answered correctly by over 50% of respondents (Figure 3). The mean score was 4.29 out of 7.

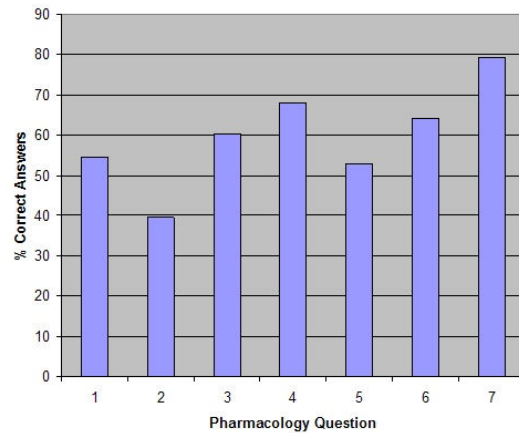


Figure 3 The percentage of correct answers for each of the seven pharmacology questions.

Eighty percent of surveyed orthopaedic doctors (43 respondents) reported an adverse event after administering sedation. Twenty-nine respondents had at some stage contacted the anaesthetic department for assistance in managing a patient following sedation (Table 2).

Table 2: Adverse Events reported.

Adverse Effects	No of Respondents
Hypoxia	20
Respiratory Depression	13
Loss of consciousness	7
Hypotension	14
Prolonged Sedation	13
Nausea and Vomiting	14

Discussion

Non-anaesthetic doctors are permitted and often required to administer sedation to perform procedures in settings outside of the operating theatre. There are various published guidelines that detail the level of care and monitoring that should be provided when sedation is given³⁻⁷. It has been recommended that the same standards of monitoring apply to procedures under sedation or local anaesthesia as to procedures under general anaesthesia, and are irrespective of the location of the procedure³.

The report by an intercollegiate working party led by the Royal College of Anaesthetists summarised the key aspects of administering sedation based on existing guidelines⁶. Patients should be first assessed before the procedure by attendant staff, risk factors noted and further examination or investigations performed as necessary. Drug administration technique should be “one defined by a relevant specialty organisation”⁶ and doses adjusted to individual patient requirements. Combinations of drugs should be “employed with particular caution” especially sedatives and opioids. The opioids should be administered first and given time to be maximally effective before any sedative is given. The patient should be monitored during the procedure by a suitably trained individual recording pulse oximetry, blood pressure and electrocardiography. High flow oxygen should also be available. Doctors administering sedation should be able to control an airway using basic manoeuvres or airway adjuncts.

There is significant morbidity and mortality associated with sedation^{1,2}. It is difficult to know the true incidence of cardio-respiratory complications after sedation, as this is often related to the procedure and patient factors. An audit of 14,000 endoscopic procedures reported a 30-day mortality of 1 in 2000⁹ and there are several anecdotal reports of death following sedation^{10,11}.

It is apparent that not all doctors are aware of or follow sedation guidelines. In the study by Fanning⁸, 42% of respondents completed a pre-procedure assessment form and 70% completed monitoring data sheets. In this study, whilst 45% of respondents had read departmental protocols, only 25% completed a dedicated pre-assessment of the patient and an equally low number recorded monitoring data forms during (21%) and after the procedure (25%). These low numbers are of potential concern. Time and resource constraints may play a part, particularly in a busy emergency department. Also, as junior doctors frequently rotate between hospitals, they may not be aware of departmental policies in each unit. It is understandably impractical to perform a procedure and concurrently complete a data monitoring form. This role should be delegated to an assistant.

Knowledge of basic pharmacology amongst respondents seemed reasonable and indeed better scores were achieved than in Fanning's original paper. It would appear that a large number

of respondents (n=29) have contacted anaesthetic colleagues for help following adverse events. This may simply reflect an acknowledgement of limited anaesthetic capabilities amongst respondents and a pre-emptive call for assistance rather than an anaesthetic “bail out” after cardio-respiratory compromise.

Whilst the questionnaire used is neither a formal assessment tool of clinical competence nor an accurate log of experience, it serves to highlight the potential limitations of current training. A clear issue is the low number of respondents who claim to have received formal teaching or training with regards to sedation. This may be due to the fact that little or no postgraduate training is provided in hospital specialities that require sedation. This is an area that needs to be addressed. The issues raised by this study are not new. In fact, a similar survey by Hewitt and Hartley in 1994 had similar findings and suggested that “sedation techniques should be included in induction teaching for A&E and orthopaedic juniors” and that all doctors administering sedation should have the “opportunity of resuscitation refresher courses”¹².

Conclusion

Sedation is widely administered by non-anaesthetic doctors including orthopaedic surgeons in order to perform basic procedures outside of the operating theatres, mainly in the Accident and Emergency department. Whilst this study only involves 53 doctors in one speciality across two regions, it does give an insight into the self-reported clinical practice, knowledge and experience of a group of surgical doctors who are often required to administer sedation. Significantly, the majority of doctors surveyed reported they had not received any formal training. It is also apparent that departmental guidelines are not always known or followed. Due to the inherent risks of sedation, it is important that doctors are aware of and follow available guidelines. It is crucial that adequate training should be given to non-anaesthetic doctors to ensure they have the knowledge and skills to safely administer sedation. Otherwise a medical doctor, perhaps a registrar level from the Accident and Emergency department, should be present for patient assessment and management of airway compromise or any arising complication.

Competing Interests

None declared

Author Details

Priyan R Landham MBBS, MRCS Registrar Trauma & Orthopaedics, Royal United Hospital, Bath, UK Umer Burt MBBS, MRCS Registrar Trauma & Orthopaedics, Yeovil General Hospital, Yeovil, UK Aabid Sanaullah MBBS, MRCS Registrar Trauma & Orthopaedics, Frenchay Hospital, Bristol, UK Hester C Taekema MBBS Registrar Anaesthesiastics, Royal United Hospital, Bath, UK Ahmed Shawky Eid MBBCh, MRCS Trust fellow Trauma & Orthopaedics, Yeovil General Hospital, Yeovil, UK
CORRESPONDENCE: Priyan R Landham MBBS, MRCS Registrar Trauma & Orthopaedics, Royal United Hospital, Bath, UK
Email: priyanlandham@doctors.org.uk

APPENDIX: QUESTIONNAIRE**Procedures**

What procedure do you use sedation for?

Protocols and Practice

1. Have you read the sedation protocol available in your hospital/department?
2. Do you complete a pre-sedation assessment form prior to administering sedation?
3. Do you or an assistant complete a monitoring data form:
 - a) during the procedure?
 - b) after the procedure?
4. Do you or an assistant advise the patient on discharge care?

Safety and Training

1. What monitoring do you use during sedation?
2. Do you have an assistant during sedation? (Nurse/doctor/healthcare professional)
3. Do you check your drugs with someone?
4. Do you give your patient oxygen?
5. Do you have resuscitation equipment available?
6. Have you completed Adult Life Support (ALS) training?
7. Is your Adult Life Support (ALS) still valid?
8. Have you received formal teaching prior to using sedation?

Medications (Please circle medications you use)

Diazepam/Pethidine/Midazolam/Propofol/Fentanyl/Morphine
Opiates in conjunction with benzodiazepines
Local anaesthesia in conjunction with sedation

Pharmacology

1. When administering medications, do you tend to administer the medication in boluses or as dose per kilogram?
2. Midazolam affects neuromuscular transmission:
Yes or No
3. Diazepam has greater amnesic effects than midazolam:
Yes or No
4. Fentanyl-induced respiratory depression is dose-dependent:
Yes or No
5. Morphine does not possess active metabolites:
Yes or No
6. Pethidine is metabolised mainly in the kidney:
Yes or No
7. Opiates increase biliary pressure:
Yes or No
8. Midazolam has a longer duration of action than diazepam:
Yes or No

Adverse effects

Has a patient of yours experienced an adverse event? (Please Circle)

- * Hypoxia
- * Respiratory depression
- * Loss of consciousness
- * Hypotension
- * Prolonged sedation
- * Nausea/vomiting
- * Cardiovascular collapse/arrest

If your patient suffered an adverse effect, did you contact the anaesthetic department?

Yes or No

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