Journal of Critical Care 30 (2015) 436.e1–436.e6

Contents lists available at ScienceDirect

Journal of Critical Care

journal homepage: www.jccjournal.org

Electronic Articles

A web-based survey of United Kingdom sedation practice in the intensive care unit☆,☆☆

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ARTICLE INFO

Keywords:
Sedation
Midazolam
Propofol
Intensive care
Morphine
Delirium

ABSTRACT

Purpose: The purpose of this work was to obtain a detailed perspective of sedation practice. Sedation included sedative and opioid choice, presence of local guidelines, and use of scoring systems.
Methods: A Web-based survey was designed. The aim was to gain sufficient detail of UK sedation while also being succinct enough to complete in 15 minutes. It was composed of relevant demographics, policy, sedative choice, and analgesia. The survey was piloted before launch. The investigators selected the intensive care unit (ICU) pharmacist as the respondent.
Results: One hundred fifty-seven ICUs responded. Eighty-nine (59%) reported use of sedation guidelines, 78% undertook sedation holds, and 87% use sedation scores. Only 42% used a daily sedation target. Seventy (43%) assess for delirium; 27 of those use a validated tool.
Propofol (89%) use was common, followed by midazolam (49%). Morphine (49%), fentanyl (34%), and alfentanil (34%) were the most frequently used opioids.
Conclusion: This survey confirmed expected variation in UK sedation practice. Recognized strategies such as target sedation score and sedation policy are underused. A 43% uptake in delirium screening suggests that larger engagement is required to meet national standards.

1. Introduction

Sedation is required for invasively ventilated patients [1]. A combination of sedatives and opioids is commonly used. Opioids are used as analgesics or antitussives and to aid ventilator synchrony [2]. Hypnotics, commonly either propofol or a benzodiazepine, are for amnesia, anxiolysis, and somnolence [2]. The choice of both opioid and sedative remains controversial, and more recently, there has been publication questioning the need for a hypnotic or "comfort" agent in its entirety [3]. There is consensus over sedative selection in specific situations, such as short-acting agents in neurologic assessment [4]. However, there remains equipoise in overall sedation prescribing practice within the intensive care unit (ICU) [5].

Evidence in sedation has grown over the last 2 to 3 decades. There is now sufficient evidence to suggest that certain agents (hypnotics and opioids) may be harmful in specific patient groups. One of the earliest reports of opioid accumulation occurred in 1984 when Gordon [6] reported accumulation of morphine glucuronide metabolites and prolonged effect in renal failure. The benzodiazepines, lorazepam, and midazolam (MDZ) are also reported to be associated with harm. Evidence suggests that MDZ's complex pharmacokinetic profile may predispose specific patient groups to oversedation [7,8]. This includes those with renal failure and the elderly with or without compromised cardiac function [7]. This resulted in the recommendation to use lorazepam in the United States [1]. Lorazepam remained widely used, particularly in the United States, until Pandharipande et al [9] in 2006 reported it as the highest independent risk factor for development of critical care delirium. In addition, there were reports of metabolic acidosis after prolonged infusions of lorazepam [10].

With continuing emergence of new therapies and specific interventions such as sedation holds [11], there is a need to maintain a perspective of UK wide sedation prescribing. In 2005, a piece of work undertaken by the investigators reported that more than 90% of ICUs still use morphine and MDZ first line for sedation in ventilated patients [7]. This was despite evidence that both agents have active glucuronide metabolites that accumulate in renal failure [7,8].

☆ This work was undertaken from a grant awarded from Guys and St Thomas' Charity.
☆☆ The research was also supported by the National Institute for Health Research Biomedical Research Centre based at Guy's and St Thomas' National Health Service Foundation Trust and King's College London. The views expressed are those of the author (s) and not necessarily those of the National Health Service, the National Institute for Health Research, or the Department of Health.

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http://dx.doi.org/10.1016/j.jcrc.2014.11.006
0883-9441/

Surveys are useful tools to describe sedation practice and to monitor changes in practice over time. In the UK in 2008, Reschreiter et al [5] published a postal survey of sedation practice. The investigators described a wide variation in practice but noted an increase in uptake of sedation scoring systems from a previous survey in 2000 [5]. Use of validated sedation scales has also increased in America, up to 88% in 2007 [12], and in Germany, use of a scale doubled between 2002 and 2006 [13]. The German survey also showed a reduction in use of MDZ for short-term sedation from 46% to 36% [13]. Changes in practice, however, are known to lag behind both evidence and national guidelines [14].

Most of these surveys were paper-based, postal surveys. They involved contact with the medical consultant lead of the ICU who would either complete the survey on behalf of the ICU [5,15] or delegate to a colleague. One of the advances in the ICU over the last 10 years has been the establishment of the intensive care pharmacist [16,17]. Pharmacists are often involved in the development of medicines related guidelines and could be considered to observe overall unit practice. This and the fact that the UK national group, the United Kingdom Clinical Pharmacy Critical Care Group (UKCPA CCG), has strong links with the investigating team were influential in the decision to select the critical care pharmacist as the survey respondent.

1.1. Aim and objectives

The primary aim of this sedation survey was to gain a detailed perspective of UK sedation practice.

Objectives were as follows:

To establish national trends in prescribing and review applications or techniques to assist in safe prescribing

To describe the pharmacy intensive care workforce and demographics in the context of the pharmacist's ability to report prescribing practice in the ICU and wider critical care environment.

2. Materials and methods

The survey protocol was submitted to the local research ethics committee at St Thomas' Hospital. Approval was granted on chairman's action, and the survey could proceed without the requirement for a full ethics application. The study was registered with and approved by Guys and St Thomas' NHS Foundation Trust Research and Development (RJ110/N194).

2.1. Survey design

The survey was designed using a Web-based provider, www.zoomerang.com. The questionnaire aimed to cover as much sedation practice as possible while being sufficiently brief to complete in 15 minutes. The questionnaire included a wide selection of questions that were deemed essential to gain a picture of sedation practice over the UK. Flexibility was allowed for more than 1 reply per trust to allow for practice within specialist critical care areas to be described separately.

The survey questionnaire was split into 4 sections:

1. **Workforce and demographics:** This section was composed of detail regarding the hospital and its critical care unit(s), including number of level 3/2 beds and patient mix. There was also a subsection on pharmacist workforce, including length of time spent on the ICU, band/grade, and whether they worked in isolation or as part of a team.[1]
2. **Policy:** Most questions in this section were derived from evidence-based recommendations on sedation practice. These included whether the ICU had a formal sedation policy; undertook sedation holds; what type of sedation scoring system was in place; whether sedation was titrated to a score daily; and whether units regularly assessed patients for delirium; and, if so, which (if any) delirium assessment method was used.
3. **Sedative choice:** This comprised detailed questions on the selection of sedatives in most common clinical scenarios encountered within ICU. This included most commonly used agents, sedative selection for short-term sedation, selection for multiple organ failure, agents for status epilepticus, drug withdrawal or dependence, weaning agents, and raised intracranial pressure. More than 1 answer was allowed per question, for example, sedatives used in the majority of patients.
4. **Analgesia:** This primarily concerned opioids. Questions included first-line agents, short-term agents, agents when increased pain is anticipated, therapeutic hypothermia, analgesia-based sedation, enhanced respiratory depression agents, and antipyretics in the ICU.

2.2. Mandatory and nonmandatory questions

A number of the questions were considered essential to gain an overall perspective of sedation practice. These included questions on whether the ICU had sedation/analgesia guideline. These questions were designated as "mandatory," which meant the respondent could not proceed unless they were completed.

2.3. Survey prelaunch pilot

To ensure that the survey was robust, sensitive, and reliable, it was piloted on a number of professional groups. At the design phase, it was presented to the critical care research group, including intensivists, nurses, physiotherapists, and pharmacists. This group commented extensively on survey content. It was reviewed by 5 senior pharmacists who agreed the overall design of each question. After this review, the survey was considered ready. To test the validity of the survey immediately before launch, a pilot version was emailed to 2 consultant pharmacists for final comment.

2.4. Survey site

After design and piloting, the survey was posted via the UKCPA CCG Web site (www.ukcpa.org.uk). To ensure maximum response: the Web link was also posted on the infection, cardiology, and general discussion message boards. Accompanying the survey link was a cover letter, which informed the respondent of the detail required for completion.

2.5. Response rate

To maximize response, the investigators compared the list of responding hospitals against those using the Intensive Care National Audit and Research Council case mix program [5]. Where there was a gap in response, the investigators contacted the pharmacist firstly by email and then telephone to request survey completion. A follow-up call was made if the survey was not completed within 7 days.

3. Results

3.1. Response rate

A total of 178 pharmacists responded from 157 hospitals from within the UK. This represents approximately 60% of UK ICUs and 70% of those with a clinical pharmacy service. Where an ICU did not complete a survey, telephone follow-up call was made to confirm if there was a

[1] Pharmacists in the UK are banded according to "Agenda for Change." The band ranges from band 5 (preregistration pharmacist) to band 9, which would typically be a chief pharmacist in a tertiary referral institution. Band 8 rages from a to d; band 8a is considered a senior level and would normally be a pharmacist who has completed their foundation clinical training.