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Trajectory of sedation assessment and sedative use in intubated and ventilated patients in intensive care: A clinical audit

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KEYWORDS

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Summary

Background: Sedation is crucial for the recovery of patients in intensive care units (ICUs). Maintaining comfort and safety promotes optimal care for critically ill patients.

Purpose: To examine sedation assessment and management undertaken by health professionals for mechanically ventilated patients in one Australian ICU.

Methods: A retrospective clinical audit was undertaken of medical records of all eligible, mechanically ventilated patients admitted to an ICU of an Australian metropolitan, teaching hospital over a 12-month period. A Sedation Audit Tool was used to collect data from the day of intubation to 5 days after intubation.

Findings: Data were extracted from medical records of 150 patients. The Riker Sedation-Agitation Scale (SAS) was the scoring system used. Patients were unarousable or very sedated between 57% and 81% at some point during the study period, while between 5% and 11% were agitated, very agitated or extremely agitated across this time. Patients' sedation scores were not documented in between 3.3% and 23.3% of patients. Medications commonly used were propofol, midazolam, morphine, and fentanyl. There were 135 situations of adverse events, which related to patients pulling endotracheal tubes leading to malpositioning, patients biting endotracheal tubes causing desaturation, patient experiencing excessive agitation requiring restraint use, patients experiencing increased intracranial pressure above desired limits, patients self-extubating, and patients experiencing over-drowsiness leading to delays in extubation.

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Conclusions: Many patients were either very sedated or agitated at some point during the study period, and some patients experienced adverse outcomes associated with sedation practices. The findings inform future quality initiatives to improve sedation practices.
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1. Introduction and background

Adequate sedation is crucial for the recovery of patients in intensive care units (ICUs). In essence, sedation is the process of depressing the patients' awareness of the environment and reducing their response to external stimulation. It has a wide spectrum of symptom control that varies between patients, and among patients throughout the course of their illness (Rowe & Fletcher, 2008). The main goals of sedation are that patients are calm, co-operative and comfortable. These goals can be achieved in diverse ways through non-pharmacological means and with medications. Maintaining comfort and safety may promote optimal recovery for critically ill patients.

Relatively extensive work has been conducted in Australia describing sedation practices in ICUs using survey approaches (Knowles, Rolls, Elliot, Hardy, & Middleton, 2009; O'Connor, Bucknall, & Manias, 2010; Shehabi et al., 2008). O'Connor, Bucknall, and Manias (2010) undertook a cross-sectional internet-based survey in 2006 and 2007 with members of the Australian College of Critical Care Nurses (ACCCN) and Australian and New Zealand Intensive Care Society (ANZICS) ($N=2146$, 11.5% response rate). Sedation assessment was utilised by 72% of respondents, with the most commonly used scales being the Riker Sedation-Agitation Scale and the Richmond Agitation Sedation Scale. Morphine, midazolam and propofol were the most common medications used. Knowles et al. (2009) conducted a telephone survey with nurses employed in 41 ICUs and high dependency settings. They found ICUs with a clinical nurse consultant were more likely to have formal sedation guidelines to manage sedation while those without a clinical nurse consultant adhered to informal processes. Only 18 (45%) nurses were satisfied with how sedation practices were managed in their unit. Between 2005 and 2006, Shehabi et al. (2008) conducted an online survey with ANZICS members, seeking out their experiences about sedation practices based on patient snapshot data for a particular ICU day. Members from 23 metropolitan ICUs participated. The investigators showed that 70% of units routinely used a sedation scale and in 60% of units and written sedation protocols were 'seldom' or 'never' used. Over-sedation was a problem for 46% of patients, and midazolam and propofol by continuous intravenous infusion were frequently used. The main concern with survey designs is that they rely on health professionals' perceptions of practice, which may not necessarily reflect actual care. It is also difficult to determine trends over time accurately when relying on health professionals' perceptions.

Research has also been conducted using point prevalence approaches (Elliott et al., 2013; Hewson-Conroy et al., 2011). Hewson-Conroy et al. (2011) carried out a point prevalence study in 50 ICUs with 662 patients across Australia and New Zealand. One of three designated days

from May to June 2009 was selected for data collection. The study showed 87% of patients had individualised titrated dosages for sedation and 1% were over-sedated. In the point prevalence study conducted by Elliott et al. (2013), data were collected from 41 ICUs across 4h of a single day between 2009 and 2010. A sedation scale was used in 63% of intubated and ventilated patients. Of the assessed patients, 38% were alert and calm, or drowsy and rousable, 22% were lightly to moderately sedated, 31% were deeply sedated and 9% were agitated. In all, 66% of the patients who were deeply sedated had a documented indication. Commonly administered medications during the 4h were propofol, fentanyl, midazolam and morphine, either by infusion or by bolus doses. Medications were titrated to a target level in 42% of patients. While these point prevalence studies provide important information, data were collected over five years ago, at only one snapshot of time on a single day.

Observational cohort studies have also been conducted to examine sedation practices over time (Jarman, Duke, Reade, & Casamento, 2013; Shehabi et al., 2012). A multicentre, prospective, longitudinal cohort study was undertaken over a three-month period in 2010 within 25 Australian and New Zealand ICUs ($N=251$ patients) (Shehabi et al., 2012). Early deep sedation was apparent in 191 (76%) patients within 4h of commencing ventilation. Midazolam and propofol were more commonly used in the first 48h following ventilation whilst fentanyl was used more commonly after 48h of ventilation. Jarman et al. (2013) conducted a retrospective, observational single-centre study involving 5651 patients. A reduction in mechanical ventilation duration was associated with a decline in midazolam use and an increase in propofol use. Use of the Sedation-Agitation Scale varied from 42% in 2006 to 38% in 2009. With the wide variety of sedative preparations that are currently available for use in ICUs (Barr et al., 2013), it is of concern that much of the Australian research using observational cohort designs is now relatively old.

In an attempt to redress gaps in past Australian work, the intent of this clinical audit study was to track patients' trajectory of sedation assessment and management from the day of intubation to five days following intubation. In essence, we sought to consider sedation assessment and management across the whole 24-h period for each study day. It was therefore possible to determine how sedation intensity and sedation management of patients varied within a particular day and for a number of days following intubation. Subsequently, we could comprehensively map out how trends varied across time.

The aims of this study were: to examine sedation assessment and management undertaken by health professionals for mechanically ventilated patients in one Australian ICU; to identify the frequency with which health professionals documented sedation scores for patients; to identify the types of sedation assessment tools used by

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