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Research paper

Trends in nurse-administered procedural sedation and analgesia across cardiac catheterisation laboratories in Australia and New Zealand: Results of an electronic survey

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ABSTRACT

Background: Knowledge of current trends in nurse-administered procedural sedation and analgesia (PSA) in the cardiac catheterisation laboratory (CCL) may provide important insights into how to improve safety and effectiveness of this practice.
Objective: To characterise current practice as well as education and competency standards regarding nurse-administered PSA in Australian and New Zealand CCLs.
Design: A quantitative, cross-sectional, descriptive survey design was used.
Methods: Data were collected using a web-based questionnaire on practice, educational standards and protocols related to nurse-administered PSA. Descriptive statistics were used to analyse data.
Results: A sample of 62 nurses, each from a different CCL, completed a questionnaire that focused on PSA practice. Over half of the estimated total number of CCLs in Australia and New Zealand was represented. Nurse-administered PSA was used in 94% ($n = 58$) of respondents CCLs. All respondents indicated that benzodiazepines, opioids or a combination of both is used for PSA ($n = 58$). One respondent indicated that propofol was also used. 20% ($n = 12$) indicated that deep sedation is purposefully induced for defibrillation threshold testing and cardioversion without a second medical practitioner present. Sedation monitoring practices vary considerably between institutions. 31% ($n = 18$) indicated that comprehensive education about PSA is provided. 45% ($n = 26$) indicated that nurses who administer PSA should undergo competency assessment.
Conclusion: By characterising nurse-administered PSA in Australian and New Zealand CCLs, a baseline for future studies has been established. Areas of particular importance to improve include protocols for patient monitoring and comprehensive PSA education for CCL nurses in Australia and New Zealand.

Introduction

Procedural sedation and analgesia (PSA) is a technique used during medical procedures in which a combination of sedative and analgesic medication are administered to suppress patients' awareness of pain and discomfort, reduce feelings of anxiety and induce amnesia.[1] Procedures performed in the cardiac catheterisation laboratory (CCL) elicit pain and discomfort even though they are minimally invasive and relatively short in duration. As such, administration of PSA is often required.

As PSA is more commonly used than a general anaesthetic, an anaesthetist is not routinely assigned to the CCL. Instead, to manage pain, discomfort and anxiety during the procedure, nurses administer a combination of sedative and analgesic medications according

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to direction from the cardiologist performing the procedure. This practice is referred to as nurse-administered PSA. It is important to note, though, that the medications used for PSA depress the patient's level of consciousness, and, in turn, their cardiac and respiratory function, particularly as the level of sedation increases to that of 'deep sedation'.[2] Therefore, in addition to administering the sedative and analgesic medications, nurses are also responsible for on-going assessment and monitoring of the patient's condition throughout the procedure and in the period immediately following the procedure until the patient is transferred to either the ward or a recovery unit.[3] This involves monitoring their level of consciousness, pulmonary ventilation, oxygenation and haemodynamics as well as applying various therapies, such as oxygen supplementation or airway adjuncts, to support or restore cardiac and respiratory function.[4]

The weight of currently available evidence suggests that nurse-administered PSA is safe when it is performed in a setting with adequately trained practitioners and clear protocols for patient monitoring. However, the research conducted on nurse-administered PSA in the CCL is limited by the fact that it has mainly consisted of single-centre, consecutive cohort studies, which have evaluated this practice by ascertaining the incidence of sedation-related cardiopulmonary complications requiring intervention.[5–7] In each of these observational studies, the authors stated that strict hospital policies or protocols for the administration and monitoring of PSA were followed. Also, the nurses who administered PSA were not only trained in PSA techniques but also underwent a credentialing process organised by the anaesthetic department. Adverse events such as hypotension and decreased oxygen saturation occurred in 2.4–9.4% of patients, with 0.1% of a cohort ($n = 9558$) experiencing a serious adverse event, classified as either death or severe clinical instability during the procedure.[5–7] The authors of these observational studies argued that the use of nurse-administered PSA in the CCL is safe because sedation-related complications such as hypoxaemia and hypotension are infrequent and reversible with simple interventions. Early detection of complications can lead to timely management reducing the likelihood of serious adverse events, such as the need for tracheal intubation and mechanical ventilation.

Clinical practice is also likely to be influenced by guidelines that have been published on the administration and monitoring of PSA without an anaesthetist present.[4,8] These guidelines were developed to assist in the establishment and implementation of institutional policies and procedures for PSA that is administered without an anaesthetist present. In Australia and New Zealand specifically, the Australia and New Zealand College of Anaesthetists provide recommendations for the type of patients and the sedative and analgesic medications that are suitable, as well as training standards for non-anaesthetist medical practitioners, staffing and patient monitoring requirements for PSA.[8] The guidelines are meant to apply whenever PSA is administered without an anaesthetist present, regardless of the practice setting.

To date, there is limited research into current real-world practice which has examined: the degree to which current practice is consistent with recommendations in existing guidelines; the extent of education and training for nurses who administer PSA in the CCL; and the degree to which local hospital policy or protocols are utilised. The only review of real-world practice surveyed cardiac electrophysiology laboratories in the United States.[9] Considerable variability in the depth of induced sedation, medications administered, the amount of direction and medical supervision for medication titration, and the application of airway interventions by nurses during nurse-administered PSA was found between institutions.

As previous research in the northern hemisphere has identified considerable practice variation, and no review has been undertaken in other regions, a study of contemporary nurse-administered PSA practice in Australian and New Zealand CCLs was indicated. Furthermore, it was hoped that establishing current trends would provide important insights into how to improve practice. Therefore, this study was undertaken to characterise current nurse-administered PSA practice, education and competency/credentialing standards in Australian and New Zealand CCLs.

Methods

Research design

A quantitative, descriptive survey design was used for this cross-sectional study. The survey was undertaken as one phase within a programme of research aimed at establishing educational standards, competencies and clinical practice guidelines for both nurse-administered PSA specifically, and more broadly, for nursing practice within Australian and New Zealand CCLs. For this reason, in addition to examining PSA practices, the survey also explored unit characteristics, workforce characteristics, clinical leadership, educational and research characteristics, educational standards and competencies. While only the results of the sections of the survey that focused on sedation will be reported in this paper, to facilitate transparency, specific details and findings of the broader study will be reported elsewhere.

Population, sampling and data collection

One nurse from each CCL in Australia and New Zealand was sought to complete the survey in order to describe practice at their institution. Currently there is no readily accessible register or database containing the number and location of CCLs in Australia and New Zealand. Industry sources indicate that there are currently 101 CCLs operating in Australia and 14 CCLs operating in New Zealand. For this reason, a snowball sampling strategy was used. Snowball sampling is an effective type of convenience sampling method that can be used when probability sampling is unrealistic.[10]

An email invitation to participate in the survey was sent by the chair of the Australia and New Zealand Interventional Nurses' Council, which is a nursing body representing CCL nurses in Australia and New Zealand, to CCL contacts. Recipients of this email were asked to forward the link to their own personal contacts to increase the number of nurses invited to participate in the survey. Three follow-up reminders were sent by the chair of the nursing body to the group of initial contacts via email to enhance the response rate. Postcodes and IP addresses were used to ensure there was only one survey completed from a particular CCL.

Survey instrument

A questionnaire was purposefully developed for this study to survey Australian and New Zealand CCLs. Three sections of the questionnaire specifically focused on PSA practice. The development of the questions contained within these sections was informed by the literature and published guidelines on sedation.[4,8] A total of 33 items was used to determine:

- which procedures nurses are required to administer PSA;
- the activities nurses perform to manage PSA in the CCL; and
- the hospital policies that are available to direct nursing practices related to PSA in the CCL regarding (i) knowledge or skill-base requirements, and (ii) level of education provided.

The majority of the items ($n = 31$) were either fixed-choice options (e.g. yes/no) or were multiple choice with an option for free