I am Ok, You are Okay
Nurse administered Procedural Sedation and Analgesia in Cardiac Catheter Laboratory

Background
Procedural sedation and analgesia (PSA) is primary used to lessen patient discomfort and anxiety, thereby improving procedural tolerance and patient satisfaction.1

Westmead Cardiac Catheter Laboratory (CCL) is a center with a caseload favoring electrophysiology (EP) procedures. Nurse-administered PSA in CCL originated in 1991 based on the departmental research.2 Patients under 16 years or with severe chronic obstructive airways disease (peak expiratory flow rate <50% of predicted) were excluded.

Training and credentialing: The Clinical Nurse Specialist involved in the research became the trainer. Registered Nurses needed proven competency of advanced life support and airway management prior to undertaking training as a sedation nurse.

The Problem
Issues of medication and patient safety were identified through incidences reported in the Incident Information Management System (IIMS) when EP procedures became lengthy and complex due to the introduction of 3D mapping systems, advance technology and patients co-morbidities.

Analysis of the causes
A risk assessment was led by the nurse unit manager in 2010. Primary nursing concerns related to PSA administration include:
- Inappropriate patient selection for PSA1
- Potential for inadvertent administration of deep sedation requiring external airway management3
- Delayed patient recovery time due to prolonged sedation administration and/or development of deep sedation4
- Nurse/patient ratio in ward is insufficient to ensure patient safety5
- Absence of nursing guidelines and standardised scope of practice for nurses' administering PSA6
- Inaccurate proceduralist and patient expectation on PSA

Intervention and strategy for changes
A framework for safe PSA administration was initiated:
- Development of pre-procedural PSA screening to identify patients unsuitable for PSA administration
- Implementation of a quality project to review the effect of pre-procedural PSA screening
- Development of a hospital endorsed post intravenous sedation transfer policy
- Development of a hospital endorsed PSA learning package and competency based assessment tool in accordance with Australian and New Zealand College of Anaesthetists (ANZCA) PS9
- Implementing PSA nurse training and a credentialing process in accordance with ANZCA PS9
- Nurse initiated sedation and documentation regarding PSA effects to gain their consent, cooperation and compliance for PSA administration
- Liaise with the head of Cardiology and Anaesthesiatics to create patient selection criteria for PSA administration
- Development of a hospital endorsed PSA nursing practice procedure
- PSA Screening
  - Respiratory assessment using Berlin Questionnaire for obstructive sleep apnoea (OSA) during pre-procedure clinic interview
  - Identification of neuromuscular disorders, respiratory conditions and/or co-morbidities contra-indicated for PSA
  - Nursing escalation of identified issues to proceduralist and nursing administration so that patients are referred to an anaesthetist

Quality project aim
The aim of the project was to review and evaluate the patient safety outcomes and effects of a pre-procedure patient sedation risk assessments between 2007 and 2012.

Method
Retrospective retrieval from a procedural database of patients undergoing an EP procedure (n=3080) under PSA or general anaesthesia (GA) from 2007-2012. Procedures were categorised by type and sedation method (PSA or GA). Major patient incidents were then analysed within each category.

Logistic regression analysis was used to compare procedure type and sedation method with R2 = 0.035.

Measurement of Improvement
From 2007 the procedure case distribution had altered with an overall increase in case complexity and length (figure 1). Since implementing the PSA screening tool, there was a trend towards GA resulting in significantly diminished PSA use over time (figure 2). In determining the safety of nurse-administered PSA, significant PSA complications were defined as hypoventilation secondary to airway obturation6, apnea requiring intervention2 and unplanned conversion from PSA to GA. The incidence of PSA-related complications fell from 1.3% in 2007 (n=4/360) to 0% (n=0/363) (figure 3).

Effects of Changes
Patient selection criteria for PSA administration (table 1) and nurse-administered PSA procedure are endorsed by head of Cardiology and Anaesthetics.

The benefits of change:4
- Appropriate patient selection can reduce events or morbidity related to PSA administration
- Patients at high risk of PSA related complications can be referred to an anaesthetist and avoid late referral or cancellations on the day of procedure.
- Enhanced nurse education and credential process for PSA administration will safeguard medication safety and provide high quality patient care.
- It reflects the legitimacy of the nursing practice and empowers nurses to promote patient-centred safe practice.

Next Steps
Share the experience within the hospital:
Participate in the procedural sedation committee to collaboratively monitor and evaluate implementation of facility wide initiatives and provide recommendations for fine tuning of education and practice issues in accordance with safe procedural sedation.

Share the experience with other CCLs:
The hospital endorsed procedure of nurse-administered PSA in CCL is the first of its kind within the Local Health District (LHD). The experience is to be shared with CCLs from other LHDs.

References
5. Patients under 16 years or with severe chronic obstructive airways disease (peak expiratory flow rate <50% of predicted) were excluded. JAMA Internal Medicine. 2012;172(13):1227-1235
6. The incidence of PSA-related complications fell from 1.3% in 2007 (n=4/360) to 0% (n=0/363) (figure 3).

Table 1. Patient selection criteria for PSA

<table>
<thead>
<tr>
<th>Exclusion criteria</th>
<th>Contraindication</th>
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<tbody>
<tr>
<td>• Age &lt;16 or &gt;80 years</td>
<td>• Contraindicate to Midazolam/Fentanyl administration</td>
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<tr>
<td>• eGFR &lt;15 mL/min/1.73 m²</td>
<td>• Significant hepatic impairment</td>
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<td>• Potential for inadvertent administration of deep sedation requiring external airway management</td>
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<tr>
<td>• Significant respiratory obstruction associated with sleep apnoea</td>
<td>• GA is preferred</td>
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<tr>
<td>• Age &gt;80 years</td>
<td>• Significant sedative effect</td>
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<tr>
<td>• Current or prior history of sleep apnoea</td>
<td>• Significant sedative effect</td>
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<tr>
<td>• Excessive oral secretions</td>
<td>• Significant sedative effect</td>
</tr>
<tr>
<td>• Significant sedative effect</td>
<td>• Significant sedative effect</td>
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</tbody>
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Figure 1. Therapeutic and diagnostic procedure distribution by year

Figure 2. PSA administration per case over time

Figure 3. PSA-related respiratory complications

Conclusions
- The review supported the implementation of a sedation screening tool to identify patients at risk of a PSA-related complication.
- Data review identified a correlation between patient selection and the exclusion of high risk patients and/or procedures from PSA administration with an overall reduction in significant clinical incidents.

Authors: Wai Ching Ma (Clinical nurse educator), Annika Fingland (Nurse unit manager), Rae Porter (Former clinical nurse consultant)

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The Hospital endorsed procedure of nurse-administered PSA in CCL is the first of its kind within the Local Health District (LHD). The experience is to be shared with CCLs from other LHDs.
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