Research Proposal

The endotracheal tube and endotracheal suction

An exploration of Adult Cardiac Surgical Intensive Care patients' experience

Investigators

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Background

It has long been recognised that patients in the intensive care unit (ICU) experience pain and distress that can have a debilitating effect upon their recovery (1-3) Pain has been ranked in the top three stressors in the ICU setting (2) and is frequently underestimated as an issue for patients by the nurses caring for them (2,4) .

The most common causes of pain in ICU are repositioning patients, endotracheal suction (ETS) and procedural pain (5). Endotracheal Suction (ETS) is a routine procedure in any ICU and is performed to maintain pulmonary hygiene when a patient has an endotracheal tube (ETT) (artificial airway) in place. Both the ETT, and ETS are frequently described by patients as painful and uncomfortable, the skill of the nurse providing ETS affects the patient experience (1,6) .

The Cardiothoracic and Vascular Intensive Care Unit (CVICU) has approximately 1200 planned cardiac surgical patients a year admitted following cardiac surgery. Each of these patients will be ventilated and experience both an ETT and ETS during their admission. A patient who has an uncomplicated, planned admission will be ventilated for 3-12 hours. There is currently minimal evidence about the need for ETS in this group of patients. A planned randomised controlled trial (RCT) of avoiding ETS in this group of patients is to be conducted in the CVICU. This single centre, non-inferiority, randomised controlled trial will assess the safety and efficacy of avoiding endotracheal suction in patients having planned cardiac surgery and who are ventilated for less than 12 hours.

The RCT will recruit 200 patients who are expected to have uncomplicated cardiac surgery. Participants will be randomised to receive standard care that includes ETS as routine, or standard care, without ETS. For safety reasons there is the option to provide ETS is the non-suction group, these are

- Oxygen saturation <90%
- Deterioration of ABGs (PaO_2 below 8Kpa)
- Reduced air entry on auscultation
- On medical request/advice.

The study has the full support of the senior medical team in CVICU. Part of the RCT includes a brief, scripted interview with the patient, prior to discharge about their experience of both the ETT and ETS. This will be an opportunity for the patients to provide feedback to the nursing staff about the experience of ETS.

Prior to commencing the RCT, there is the opportunity to explore the patient experience of the ETT and ETS within the CVICU in greater detail. To ensure that this qualitative study aligns with the planned RCT inclusion and exclusion criteria will be the broadly the same as the RCT and the patients will provide prior consent, however this will be obtained following cardiac surgery to prevent the patients having any preconceived ideas about the experience of the ETT and ETS. It will provide an opportunity to test the questions that will be used in

the RCT for ease of use and appropriateness. This qualitative study will explore both the patient's perception of pain and the experience of the ETT and ETS.

Inclusion criteria

- ≥16 years old,
- Patients who have had cardiac surgery with cardiopulmonary bypass (CPB),
- Extubation ≤12 hours of admission to CVICU.

Exclusion criteria

- Ventilated for over 12 hours.
- Non-English speaking
- Documented chronic pain

Pain Assessment

Patient's self-reported pain is the gold standard for pain assessment (7) . However, frequently the ICU patient is sedated and unable to report their pain. The International Association for the Study of Pain states, "the inability to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment" (8) . More recently, studies on ICU-discharged but still-hospitalized patients showed that 82% (*n* = 75) remembered pain or discomfort associated with the endotracheal tube and 77% (*n* = 93) remembered experiencing moderate to severe pain during their ICU stay. One week after discharge from the ICU, 82% (*n* = 120) of cardiac surgery patients reported pain as the most common traumatic memory of their ICU stay; 6 months later, 38% still recalled pain as their most traumatic ICU memory (9) . Cardiac surgical patients frequently describe pain as a factor, this may be increased in this population due to the surgial incusion (10) .

There are a variety of pain assessment tools available, for use with the unconscious ventilated patient, conscious ventilated patient and the conscious non-ventilated patient. For the unconscious ventilated patient the most widely validated tools are the Behavioural Pain Score (BPS) and the Critical Care Pain Observation Tool (CPOT) (Appendix 1). The CPOT has been well validated in the cardiac surgical population (11-13) and includes the ability for use with the non-ventilated patient. The American Society of Pain Management Nursing recommends the use of behavioural pain assessment in critically ill unconscious patients, including the CPOT and the NRS. Other scales include visual analogue scales (VAS), numerical rating scales (NRS) and verbal rating scales (VRS). All of the scales are validated and the NRS consistently appears to be the most discriminative (14,15) . The NRS has been adapted to a visually enlarged scale (NRS-V) (Appendix 2) and this has been shown to be a feasible tool that allows the conscious ventilated patients to self-report pain by pointing to their pain score (14) . These tools have been evaluated in both the ICU setting (13) and using cold presser trials to compare different pain scales for validity (12) . The CPOT tool was evaluated by comparing the results of the CPOT reported pain and the patients self reported pain at rest, following a nociceptive procedure (in this study turning) and 20 minutes following the procedure (11) . This study population were post-operative cardiac surgical patients and the CPOT was found to have good specificity across all domains, it was less sensitivity at when the patient was at rest and following the procedure. It demonstrated

good sensitivity during the nociceptive procedure. It is recognised that the use of behavioural pain assessment scales needs further investigation, however the CPOT appears to be a valid tool and has acceptable validity, sensitivity and specify.

Current practice on CVICU is to assess patients pain when they are awake, however there is no attempt to use a behavioural assessment tool to assess pain in the unconscious patient. This study will provide such an opportunity as the nursing staff will assess the patients' pain prior to an ETS procedure. The CPOT and NRS-V will be used to assess patients pain when they are awake. A CPOT score of >2 indicates moderate pain, requiring intervention (11) .

Aims and Objectives

The aim of the study is to explore the patient's perception of pain and the experience of the ETT and ETS.

1. The study will pilot the use of validated behavioural pain assessment tools not currently in use in CVICU.
2. Compare the pain score results between patients and nurses. There is frequently a significant difference between these scores.
3. To describe the patient experience of the ETT and the ETS.
4. There is a planned RCT to follow this study and this study provides an opportunity to test the questions for use in the RCT. This study will explore in detail the patient experience. The questions allow us to see if a brief interview is feasible and if the questions are appropriate to elicit the patient's perception of the ETT and the experience of ETS.

Study design and Methods

Consent.

This will be a prospective, descriptive study, using a semi-structured interview technique. Following ethics and institutional approvals, written informed consent will be obtained. The patients will be screened and approached by the CVICU research nurses pre operatively. Current standard practice is to assess the patient's pain when they are awake, therefore the consent process will include permission to use the data collected as part of routine care. The consent process will also request permission to use the CPOT pain assessment data collected while the patient was unconscious. A member of the CVICU research team and not the principle investigator (P.I.) will seek consent, this will ensure that the patient has an opportunity to decline participation in the study without the P.I. influencing their decision. To provide consistency in the interviews, all interviews will be conducted by the P.I. The study will recruit 10 patients using convenience sampling.

Study procedures

Pain assessments

In addition to the standard care that includes ETS as required and a pain assessment when the patient is awake, the patients will have 2 study pain assessments performed during their ICU stay. These will be at the following times

1. While the patient is unconscious, ventilated and sedated, using the CPOT
    a. Time 1 = prior to ETS
    b. Time 2 = during after ETS
    c. Time 3 = 10 minutes after ETS
2. When the patient is awake and intubated, using the CPOT and NRS-V
    a. Time 1 = prior to ETS
    b. Time 2 = immediately after ETS
    c. Time 3 = 10 minutes after ETS

In addition to these 2 documented pain scores, the CVICU research nurse will conduct a pain assessment at the same time. This will allow an independent pain assessment and act as a comparison of the pain assessment by the bedside nurses and an independent observer. The CVICU nurses will be trained in the use of the CPOT to ensure continuity of data. CPOT evaluations will be conducted before the NRS-V to reduce the risk of the patients self reported score affecting the CPOT evaluation.

Interviews

In addition to these assessments, the patients will have an interview prior to discharge. This will be conducted in private, on the ward at day 4-6 after surgery. It is anticipated that the interview will last 10- 30 minutes. The interview will be conducted in hospital, prior to discharge to try and maximise the patient recall of ETT and ETS. There is also the opportunity to address any clinical concerns that the patient may identify prior to the patient being discharged. The interview will be recorded and transcribed. This will be an opportunity to test the process for the RCT. The questions will be open ended, non leading questions. The interviewer will guide and prompt the interviewee but allow the patient to describe their experience.

The questions will be

1. Tell me about your experience of the breathing tube?
2. Tell me about your experience of having suction through the breathing tube?
3. Can you describe how it feels to breathe through the tube?

Clarifying questions will be used as required and will include

1. Were you awake during suction and can you describe what happened?
2. Can you describe how much control you thought you had while in intensive care?
3. Tell me how comfortable you were while in intensive care?
4. How would you describe your experience of the breathing tube?
5. How would describe the feeling of the breathing tube?
6. How much information were you given about the breathing tube?
7. How would you describe your experience of having suction?
8. How much information were you given about being suctioned?
9. How would you describe the feeling of having suction?
10. What could have been done differently?

These questions have been developed based upon work from previous studies that identified patients feeling isolated or lonely, not being able to communicate, receiving little information and have poor pain control (16) .

The interviews will be conducted by the principal investigator (EG) to ensure consistency and continuity. They will be transcribed using a transcription service who has signed a confidentiality clause. The patients will be allocated a unique study number so there are no identifiers for the individuals.

Analysis

The data will be analysed following transcription, using thematic analysis. Thematic analysis aims to offer insights into the experience of individuals. Thematic analysis has been considered to be a foundational skill within qualitative research (17) .

The data will be read and re-read by EG and emergent themes identified and coded. The analysis will be conducted using both the written transcripts and audio recordings. The initial findings will be reviewed by the co-investigators and discussion about emerging themes will be reviewed.

Further refinement will be conducted by EG and once saturation has been achieved the findings will be written up for dissemination. Nvivo software will be used to aid data analysis. This is an established software programme that helps streamline the analysis of qualitative data.

Dissemination

The themes that emerge from the interviews will be written up and the findings will be presented back to the CVICU nursing and medical staff. This can underpin any change in practice, e.g. implementing the use of behavioural pain assessment in CVICU. There will be both local and international presentations and the results will be written up for publication in an appropriate peer reviewed journal.

Discussion

This study will be the first time that a qualitative research study has been conducted within the CVICU research. It will allow patients an opportunity to provide feedback about the experience of ETT and ETS, one of the routine procedures performed by ICU nurses. It will add to the body of knowledge about the experience of the ETT and ETS in those patients who are ventilated for less than 12 hours. It has the potential to inform practice in this patient group both in CVICU and in other cardiac centres throughout New Zealand.

This study will form part of a programme of research that is evaluating the use and attitudes and planned avoidance of ETS in CVICU. It will be followed by an RCT that plans to avoid ETS in patients ventilated for 12 hours or less. If the RCT demonstrates that it is safe to avoid ETS in this patient group, and this study demonstrates that the experience is painful and distressing for patients this has the potential to support a change in practice, both within CVICU and for all uncomplicated post operative cardiac patients with New Zealand and internationally. This will help to improve patient care for postoperative cardiac patients.

It is argued that pain should be considered to be the “fifth vital sign”, and be measured and documented as carefully and regularly as heart rate, blood pressure, respiratory rate and temperature. This study will help us identify how we can improve our assessment and management of patients experince of the ETT and ETS.

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