Pain research in critical care

Easing the pain of critically ill patients in ICU has long been a passion for Dr Céline Gélinas. Here, she discusses how her early encounters as a nurse have forged her career in improving pain assessment tools.

Kathleen Puntillo’s research work related to pain in critically ill patients has been a unique source of inspiration during my doctoral studies and early career path. I am also fortunate to be supported and mentored by Dr Manon Choinière. Her scientific rigor and vision has been key to the development of my research programme. Both women are generous and exceptional mentors as well as internationally renowned pain researchers. My colleague Jane Topolovec-Vranic has also been another unique source of motivation and support in pursuing research efforts for this vulnerable patient population.

You currently hold appointments as a nurse scientist, project director and assistant professor at McGill University, among others. How do you effectively balance your time and multifarious responsibilities?

As the proud mother of three young children, this is a daily challenge! I am very fortunate to count on a reliable research coordinator and strong graduate students who also work for me as research assistants. I also have the invaluable support of the experienced staff of the Centre for Nursing Research at the Jewish General Hospital.

Have you encountered any limitations during your investigations?

Performing research in ICU is challenging. One of the major difficulties is obtaining research consent, as most of the time ICU patients are unable to give consent themselves. Therefore, the family member or close relative responsible for consenting for the patient’s care and treatment has to be contacted to obtain consent on their behalf.

Another major challenge is planning data collection with ICU standard care. Many critically ill patients are unstable, and their clinical condition may require last minute tests or procedures if they deteriorate. I always tell my research staff: ‘You never know in advance what is going to happen in ICU, so be flexible and prepared for any situation’. My research team has to perform pain assessments using technology, in addition to ICU equipment in small rooms where nursing staff need ample space to provide care to their patients. We are very lucky to work with supportive ICU teams.

Are there any moral implications associated with recruiting patients for studies of this kind?

Studies to validate pain assessment tools are usually low-risk for ICU patients. In the situation of sudden incapability, it may sometimes be difficult for the surrogate to make such a decision for the patient. We have had some refusals from the surrogate based on the discomfort of making a decision for research purposes on behalf of someone else. In addition to surrogate consent, it is also our responsibility to try to obtain consent from the patient after ICU discharge wherever possible. However, in several situations, the patient may remain unable to consent for him- or herself due to cognitive deficits, or may be transferred to another institution.

What are your plans for the next five to 10 years?

I wish to pursue research efforts in this important area by developing innovative implementation strategies of an integrated systematic pain assessment approach in ICU to optimise the uptake by nurses and clinicians and to support them in their decision-making process for pain management. We also need more evidence to evaluate the impact of such an approach on quality indicators in relation to care, patient outcomes and sustainability over time. My wish is for pain assessment to become a standard of care in every ICU and for all patients, including those who are unable to self-report, so that they all benefit from adequate pain management.

Can you begin by explaining what drew you to critical care nursing, pain assessment and measurement, pain management and nonverbal adult pain?

During the five years I worked as an intensive care unit (ICU) nurse I had to face many situations in which I thought my patients were experiencing pain but were unable to self-report. We had no pain assessment tools for these patients at that time, and it was very difficult to adequately manage their pain. One night I called the physician to get some medication for a nonverbal patient’s pain relief and he responded: ‘This patient cannot have pain, he is unconscious’. This is only one example of the situations that motivated me to pursue graduate education in nursing to help improve pain assessment and management of these vulnerable patients.

Who and what have been your main inspirations along your career path?

Since becoming a bedside nurse, ICU patients have always been my main inspiration. Dr
Between the lines

For critically ill patients who lack the ability to communicate, existing methods of pain assessment may not suffice. A new generation of assessment tools is urgently needed for effective pain management for this vulnerable group; a gap being explored by an international team of researchers.

SINCE THE FIRST paper was published on the subject in 1997, the effectiveness of pain assessment tools for critically ill patients in intensive care units (ICUs) has been a highly discussed issue, particularly with regard to patients who are incapable of self-reporting. As no objective tests exist to measure the pain experience of a patient, nurses in charge of pain management are faced with difficult challenges when dealing with nonverbal patients. Whether it is their critical condition requiring mechanical ventilation, use of sedative agents or an altered level of consciousness (LOC) that prohibits them, it is vital to understand how critically ill patients are feeling.

For those admitted to ICU, studies have revealed that the experience of moderate to severe pain during their stay is not uncommon, and undertreated acute pain is known to be an important risk factor for chronic pain. Proper management of pain not only vastly improves the patient’s experience in ICU but could help to reduce the length of their stay, prevent complications further down the line and help avoid adverse side-effects associated with excessive use of analgesic and sedative agents.

TOOLS OF THE TRADE

There are currently eight existing pain assessment tools for these purposes: the Behavioral Pain Scale (BPS); BPS-NonIntubated (BPS-NI); Critical-Care Pain Observation Tool (CPOT); Face, Legs, Activity, Cry, and Consolability (FLACC); Nonverbal Pain Assessment Tool (NPAT); Non-Verbal Pain Scale (NVPS); Pain Assessment and Intervention Notation (PAIN) algorithm; and the Pain Behavioral Assessment Tool (PBAT). With varying degrees of success, even the best among these tools may not be adequate for evaluating the pain felt by the large percentage of brain-injured ICU patients with altered LOC.

Following her experience as a critical care nurse, Dr Céline Gélinas has embarked on a research career dedicated to improving the ways in which pain is managed for patients who cannot self-report. She maintains several posts at present: Assistant Professor (tenure-track) at McGill University’s Ingram School of Nursing, Researcher at the Jewish General Hospital’s (JGH) Centre for Nursing Research and Project Director at JGH’s Lady Davis Institute in Montreal, Canada. Having

Easy to use and a positive influence on ICU nursing practice, the current CPOT design is ideal for adaptation to the needs of severely brain-injured patients with altered LOC.

CPOT FACIAL EXPRESSIONS © GÉLINAS, 2013
developed CPOT for monitoring facial expressions, body movements, muscle tension and compliance with the ventilator for intubated patients or vocalisation for non-intubated patients, Gélinas is now seeking to adapt the tool for use in brain-injured ICU patients with altered LOC. Joining this pursuit in adapting and validating CPOT for critically ill adults with brain injury is the project’s co-PI, Dr Jane Topolovec-Vranic of St Michael’s Hospital and University of Toronto, as well as additional researchers, including Dr Puntillo (University of California, San Francisco) and Dr Choinière (Université de Montréal), along with others from Canada and Europe.

OPTIMAL ASSESSMENT

First introduced to the wider world in 2006, CPOT is specifically designed for detecting the pain of critically ill patients who cannot self-report. Its use has since spread considerably within North America and elsewhere, and it is currently available in six languages, with further translations being undertaken. In a 2013 paper reviewing 32 articles, which describes the reliability and validity of the eight pain assessment tools used today, CPOT is shown to be among the very best of these methods. Evaluations are far from simple, as concepts of reliability and validity are psychometric properties that are context specific. In addition to being valid for use in many ICU clients, CPOT was found to be quick to use, simple to understand and easy to complete following its implementation into practice. A majority of ICU nurses were satisfied with its use, and acknowledged that CPOT had influenced their practice. However, communication of pain assessment findings with the medical ICU team was found to be an area for improvement. Innovative implementation strategies are needed to ensure optimal uptake of pain assessment tools by the ICU team, and to impact on their decision-making process for pain management.

BODY LANGUAGE

In assessing the presence of pain in the uncommunicative and critically ill, CPOT’s best weapons of evaluation are facial expression and muscle tension. There is a tendency to associate physiologic indicators with the presence of pain, whereby mean arterial pressure, heart rate, respiratory rate and transcutaneous oxygen saturation are often taken as signs of discomfort. Gélinas and other researchers have found, however, that vital signs are influenced by factors besides pain and should only be used with careful consideration. Looking at 144 conscious and 113 unconscious subjects, critically ill patients from various ICUs with a range of diagnoses were observed at rest, during a procedure known to cause pain, and once again 20 minutes following the procedure. It was found that vital signs paled in comparison to behavioural signs, as Gélinas relates: “CPOT scores were positively related to the gold standard measure of pain: the patient’s self-report”. Indeed, only CPOT could actually predict the presence and absence of pain.

Easy to use and a positive influence on ICU nursing practice, the current CPOT design is ideal for adaptation to the needs of severely brain-injured patients with altered LOC. In the very few available studies, differences in behaviours expressed by critically ill adults with a brain injury highlight the need to make revisions to existing pain assessment tools. Taking 190 brain-injured ICU patients, Gélinas and her team observed various behaviours at rest, both during and 15 minutes after different painful and non-painful procedures. Unsurprisingly, the majority of pain behaviours were observed during painful procedures. As opposed to brain-injured conscious ICU patients in whom the original CPOT appears to be valid for use, atypical behavioral responses including sudden eye opening, eye weeping, mouth opening and limb movements were found in those with reduced LOC. Very few displayed the classic signs of pain; less than 20 per cent showed grimacing and muscle tension, which is promising news for Gélinas’ project. “These findings are exciting because they support the need to adapt the content of CPOT,” she explains.

SYSTEM UPGRADE

As part of a three-phase CPOT research study, these results represent the completion of its first phase. The next steps for Gélinas will be to validate the content of CPOT adaptation with expert clinicians and researchers to include the atypical behaviours displayed by brain-injured patients and finally, validating the resulting adapted CPOT at the ICU bedside. Once these last two phases are completed, critical care nurses could use the adapted version alongside the original CPOT to develop pain management strategies specific to ICU patients’ needs.

Future applications of CPOT could help improve pain management, informing more applicable doses of analgesics, optimise patient outcomes in the short and long term, such as reducing complications in the acute phase. Ultimately, this could help to alleviate incidence of chronic pain experienced by many postoperative and traumatic brain injury patients today.

INTELLIGENCE

ADAPTATION AND VALIDATION OF THE CRITICAL-CARE PAIN OBSERVATION TOOL IN CRITICALLY ILL ADULTS WITH BRAIN INJURY

OBJECTIVES

To revise and adapt the content of the CPOT for brain-injured ICU patients with altered LOC, and validate its use at the bedside.

To develop innovative implementation strategies to optimise uptake of pain assessment tools by ICU clinicians, particularly the CPOT, and evaluate their impact on pain management practices and patient outcomes at short and long-terms.

KEY COLLABORATORS

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DR CÉLINE GÉLINAS completed a doctorate in Nursing and Measurement (2004) at Université Laval in Quebec City, and postdoctoral training (2006) in Nursing at McGill University. In addition to her Faculty position at McGill University-Ingram School of Nursing, she is a researcher at the Centre for Nursing Research and Project Director at the Lady Davis Institute of the Jewish General Hospital. Gélinas has developed and validated pain assessment tools, eg. CPOT and FPT. She and her team are now adapting CPOT for brain-injured patients and validating its use at the ICU bedside. Gélinas has published many research articles in nursing and multidisciplinary journals, and has given presentations nationally and internationally. She was a member of the 2013 pain, agitation and delirium (PAD) guidelines of the Society of Critical Care Medicine, and is now the leader of the pain section for the guideline revision. She is also the recipient of the 2014 Early Career Award of the Canadian Pain Society (CPS).