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Editorial

Procedural pain in intensive care: translating awareness into practice

Patients are admitted to intensive care units (ICUs) for the diagnosis and treatment of potentially life-threatening illnesses and injuries, with the goal being resolution of their medical problems. In order to reach a diagnosis and provide necessary interventions, the performance of myriad medical and nursing procedures is required. The goal of performing these procedures is laudable. However, a question to be asked is, what is the cost to patients needing these procedures, in the form of pain and distress? Answers to that question have been derived from research on procedural pain.

For more than 25 years, critical care researchers have explored iatrogenically-induced (procedural) pain: its prevalence, descriptors, correlates, risk factors, and outcomes. In this issue, Ayasrah presents a prospective, descriptive study of six common care-related procedures performed in medical–surgical ICUs in a military hospital in Jordan¹. The study design is a familiar paradigm: pain is measured prior to a procedure; patients undergo two types of procedures, those believed to be non-noxious (i.e., not expected to cause pain) and those believed to be noxious (painful); pain is measured again during or shortly after the procedure; pain comparisons are made^{2–8}. The purpose of this paradigm has been to document that certain procedures are painful and to differentiate the severity of pain according to the specific procedure. From these studies, one thing is clear: procedural pain is ubiquitous, as noted by the vast number of care-related procedures that cause pain^{6,7,9}. Also known is that there is a hierarchy of painful procedures. That is, some procedures stand out as being more painful than others. For example Ayasrah reconfirmed that repositioning (i.e., turning) the patient in bed can be quite painful^{4,6,10}, as can endotracheal (ET) suctioning^{7,11}. Other procedures high on the list of painfulness include chest tube removal^{7,12}, drain removal¹¹, and arterial blood gas puncture^{9,13}.

A patient undergoing a procedure has also served as a focus for testing the validity and reliability of various methods of assessing pain. Findings about ‘painfulness’ are predicated on the objectification of a subjective symptom (i.e., pain) through use of pain assessment methods. Patient self-report methods such as a 0–10 numeric rating scale are used when a patient is able to communicate a number. Indeed, patient self-reports are considered to be the gold standard for pain assessment since pain is considered to be whatever and how intense the patient says it is¹⁴. However, when patients are unable to provide a self-report, it is important for clinicians

to have behaviour observation scales available for pain assessment. For clinicians and researchers to have confidence that pain behaviours are valid indicators of a patient’s subjective experience, research confirmation is required. Considerable research has been conducted with ICU patients to confirm the validity of painful behaviours, often during the development or refinement of behavioural scales, or tools. Ayasrah used one of the two pain behaviour scales considered to be the most valid and reliable for monitoring pain in adult medical, postoperative, or trauma patients (with the exception of patients with brain injury¹⁵), Payen and colleagues’ Behavioural Pain Scale (BPS)⁸. The second recommended scale is the Critical Care Pain Observation Tool (CPOT)². Psychometric testing of these as well as other pain behaviour scales has often used the same paradigm presented earlier. Since pain is often known by the company it keeps, you first measure pain when the patient is at rest. You expect to see fewer pain behaviours than when you then measure it during a procedure, especially when the patient is undergoing a procedure that is anticipated to be painful. Specifically, you expect to see an increase in the number and intensity of reflexive behaviours indicative of pain such as grimacing and muscle tension. Based on previous research, Ayasrah selected three procedures believed to be non-painful: eye care, mouth care, and dressing changes. The previously documented painful procedures selected for study were repositioning⁷, ET suctioning¹⁶, and vascular puncture¹⁷. There was an expected increase in BPS scores during the procedures selected a priori to be painful, fulfilling the objective of Ayasrah’s study: to describe care-related pain associated with nociceptive procedures. Interestingly, mouth care and dressing changes were also seen to increase pain behaviour scores, although they had been selected to represent non-noxious procedures. As Ayasrah suggests, patients might undergo more procedural pain than we assume, during everyday care¹⁷, and the pain goes unnoticed if we neglect to do pain assessments. Using pain behaviour scales provides clinicians the means to determine their patients’ pain during procedures and to prevent or minimise the procedural pain. Continued research could yield more information about the validity, reliability, and feasibility of pain behaviour tools.

Ayasrah’s study is also noteworthy in that it reconfirms the lack of sensitivity and specificity of vital signs when used as proxy measures of pain. In brief, while mean procedural systolic blood pressure, diastolic blood pressure and heart

rate increased significantly from pre-procedure to procedure during repositioning and ET suctioning, these vital signs decreased during vascular punctures, the third 'painful' procedure. As noted by Ayasrah, these findings verify that vital signs lack specificity for pain. Indeed, Pain, Agitation, and Delirium Guidelines published in 2013 recommend that vital signs not be used to assess pain in adult ICU patients¹⁵. Rather, they can be used as cues for further assessment of pain. Therefore, the use of the same research paradigm used by Ayasrah and others⁴ to continue to explore vital signs as pain measures seems to be a practice that has timed out.

One over-riding conclusion from procedural pain studies to date is that procedural pain may be severe. An ethics-based practice would be guided by findings from this and previous research to treat pain pre-emptively through use of pharmacologic and/or non-pharmacologic analgesic interventions. While there are fewer interventional than descriptive studies of procedural pain, we have some research guidance on pre-emptively treating procedural pain. Robleda and colleagues found that intravenous (IV) fentanyl prior to turning mechanically ventilated ICU patients reduced the incidence of pain during the turn¹⁰. In a small sample of 74 cardiac surgery patients, Puntillo and Ley determined that 4 mg of IV morphine or 30 mg of IV ketorolac were equally effective in reducing pain associated with chest tube removal, compared to a placebo¹⁸. Casey demonstrated that pain intensity scores were significantly lower in patients who received IV remifentanyl versus normal saline placebo prior to chest tube removal⁵. They also determined that a remifentanyl dose of 0.5 µg/kg was safer than a dose of 1 µg/kg IV, and equally effective. Research support for use of non-pharmacologic interventions for procedural pain is limited; however, there is some evidence that a non-pharmacologic (slow, deep breathing) and pharmacologic (morphine-equivalent opioid analgesia) intervention in combination can be effective for chest tube removal¹⁹.

Many of these procedural pain studies used control groups for comparison of the intervention to standard practice, with standard practice often being no pre-emptive analgesic intervention. While continued research is warranted to determine the best ways to alleviate patients' procedural pain, the continued use of control groups that receive no active analgesic is highly debatable given our large body of knowledge concerning procedural pain.

In conclusion, studies including the present study by Ayasrah have contributed greatly to the understanding that procedures performed on ICU patients, while necessary, are not benign events. Increasing the awareness of clinicians to this reality is a necessary and important first step. Using behavioural pain scales that have been validated through research allows clinicians to evaluate the effect of procedures on patients in regard to pain. Transferring findings related to research-based analgesic interventions shown to be effective

in reducing procedure-related pain will support clinicians in providing comfort for their patients. In the meantime, two important questions regarding procedural pain remain. First, how much more research is necessary to convince clinicians that procedural pain is a frequent source of patient distress that requires our attention? Second, can we design an alternate research paradigm that would minimise the distress of patient-subjects while adding to the body of knowledge necessary for alleviating procedural pain in future critically ill patients?

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