Brief Methodological Report

Validation of Two Pain Assessment Tools Using a Standardized Nociceptive Stimulation in Critically Ill Adults

Check for updates

Cristini Klein, PhD, Wolnei Caumo, PhD, Céline Gélinas, PhD, Valéria Patines, RN, Tatiana Pilger, RN, Alexandra Lopes, RN, Fabiane Neiva Backes, MD, Débora Feijó Villas-Boas, PhD, and Silvia Regina Rios Vieira, PhD

Department of Intensive Care Medicine (C.K., V.P., T.P., A.L., F.N.B., D.F.V.-B., S.R.R.V.), Clinicas Hospital from Porto Alegre (HCPA), Porto Alegre, Brazil; Post Graduate Program in Medical Sciences (C.K., W.C., F.N.B., S.R.R.V.), Federal University of Rio Grande do Sul (UFRGS), Porto Alegre; Laboratory of Pain & Neuromodulation (C.K., W.C.), HCPA/UFRGS, Porto Alegre; Ingram School of Nursing (C.G.), McGill University, Montreal, Quebec, Canada; and School of Nursing (D.F.V.-B.), Federal University of Rio Grande do Sul, Porto Alegre, Brazil

Abstract

Context. The Behavioral Pain Scale (BPS) or the Critical-Care Pain Observation Tool (CPOT) are recommended in practice guidelines for pain assessment in critically ill adults unable to self-report. However, their use in another language requires cultural adaptation and validation testing.

Objectives. Cross-cultural adaptation of the CPOT and BPS English versions into Brazilian Portuguese, and their validation by comparing behavioral scores during rest, standardized nociceptive stimulation by pressure algometry (SNSPA), and turning were completed. In addition, we explored clinical variables that could predict the CPOT and BPS scores.

Methods. A prospective cohort study was conducted with 168 medical-surgical critically ill adults unable to self-report in the intensive care unit. Two nurses were trained to use the CPOT and BPS Brazilian Portuguese versions at the following assessments: 1) baseline at rest, 2) after SNSPA with a pressure of 14 kgf/cm^2, 3) during turning, and 4) 15 minutes after turning.

Results. Inter-rater reliability of nurses' CPOT and BPS scores was supported by high weighted kappa >0.7. Discriminative validation was supported with higher CPOT and BPS scores during SNSPA or turning in comparison to baseline ($P < 0.001$). The Glasgow Coma Scale score was the only variable that predicted CPOT and BPS scores with explained variance of 44.5% and 55.2%, respectively.

Conclusion. The use of the Brazilian CPOT and BPS versions showed good reliability and validity in critically ill adults unable to self-report. A standardized procedure, the SNSPA, was used for the first time in the validation process of these tools and helped us improve the validation process. J Pain Symptom Manage 2018;56:594−601. © 2018 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

Key Words
Pain, critical care, pain measurement, validation study, adult, nociception

Introduction

The use of the Behavioral Pain Scale (BPS) or the Critical-Care Pain Observation Tool (CPOT) is recommended in practice guidelines for pain assessment in critically ill adults unable to self-report.[1] However, their use in another language requires cultural adaptation and validation testing.

This study aimed to translate the English versions of the BPS and CPOT into Brazilian Portuguese, to validate their use in Brazilian adult intensive care unit (ICU) settings and to identify demographic

and clinical variables that influenced the CPOT and BPS scores. In previous validation studies of the BPS and CPOT, standard of care procedures performed in the ICU, such as turning, endotracheal suction, mobilization, and others as nociceptive stimuli,[2−10] were mainly used. These care procedures are not standardized, are performed by different clinicians, and may influence the patients' behavioral responses. For the first time in this study, a standardized nociception stimulation called the pain algometry pressure test was also used[11−14] to enhance the validation process, that is, using the strategy of discriminative validation between painful and nonpainful conditions.

Methods

This prospective cohort study was conducted in a medical-surgical ICU from a University Hospital in the South of Brazil. From April to December 2014, research staff screened all patients for eligibility on weekdays from 8.00 AM to 2.00 PM. Patients older than eight years, unable to self-report verbally, conscious or unconscious were included. Patients with no physical response to a painful stimulus, that is, those who were quadriplegic, received neuromuscular blocking agents, or had a

Glasgow Coma Scale (GCS) score of less than four on the item motor response[15] were excluded. Also, patients receiving continuous intravenous (IV) infusions of analgesic or sedative agents, with an injury to the face or both upper limbs, were excluded.

CPOT and BPS

Both the CPOT[3] and BPS[3,4] were developed to assess pain in ICU patients unable to self-report. The CPOT consists of four behavioral items: 1) facial expressions, 2) body movements, 3) compliance with the ventilator (intubated patients) or vocalization (nonintubated patients), and 4) muscle tension. Each behavioral item is scored on a scale from 0 to 2. BPS is composed of three behavioral items: 1) facial expression, 2) movements of upper limbs, and 3) compliance with the ventilator. Each behavioral item is scored on a scale from 1 to 4.

Translation and Cultural Adaption

The translation into Brazilian Portuguese and cross-cultural adaptation of the original English versions of the CPOT[2] and BPS[3,4] was performed based on established guidelines.[16] The recommended steps were performed and included the translation, translation
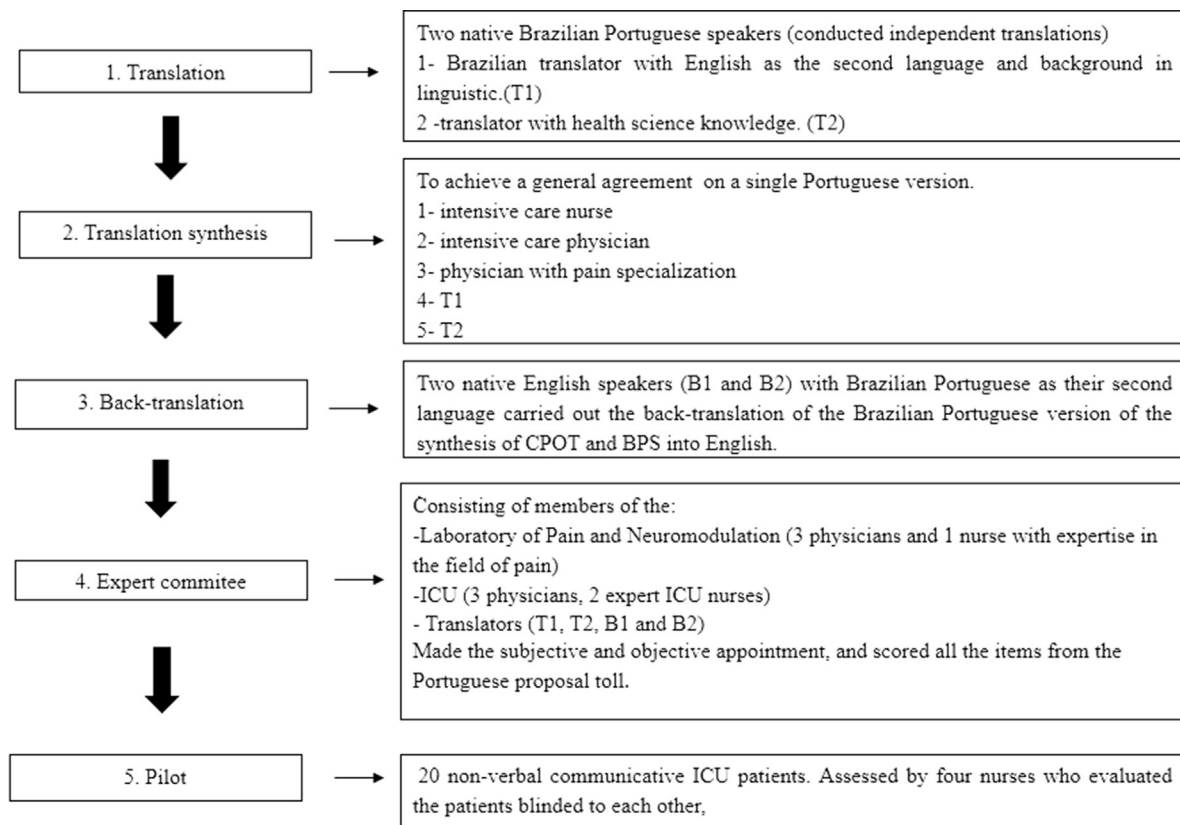

Fig. 1. Flow of the translation and cultural adaptation. CPOT = Critical-Care Pain Observation Tool; BPS = Behavioral Pain Scale; ICU = intensive care unit.