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ORIGINAL ARTICLE

Validation of the Greek version of confusion assessment method for the intensive care unit (CAM-ICU)

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Summary
Objectives: Delirium is associated with the most adverse outcomes in critically ill patients but it is often undiagnosed and untreated. The Confusion Assessment Method for Intensive Care Unit (CAM-ICU) is widely used for delirium assessment. This scale, however, has not been translated and validated into the Greek language. This paper is a report of the translation and validation of the CAM-ICU into Greek.
Research methodology: The applicability and validity of CAM-ICU was tested in two Greek general ICUs. Each patient was included in the study only once. Inter-rater reliability and concurrent validity of both raters compared to the gold standard (DSM-IV) was calculated.
Results: Study sample consisted of 71 patients. Based on psychiatric diagnosis the prevalence of delirium was 33.8%. Compared to the reference standard for diagnosing delirium, the two study

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raters who used the CAM-ICU had sensitivities of 87.5% and 79.0%, specificities of 91.0% and 87.0%, and good inter-rater reliability ($\kappa = 0.75$). Cronbach's alpha was 0.84 (95% CI 0.77—0.89). The mean CAM-ICU administration time was 6 minutes and 30 seconds.
Conclusion: CAM-ICU seems to be a valid and reliable instrument for delirium detection in Greek intensive care patients, which can be easily incorporated in every day clinical practice after appropriate training.

Implications for clinical practice

- Mechanically ventilated ICU patients are at high risk for developing delirium which is difficult to assess with the standardized scales that rate delirium in patients without communication problems.
- This study evaluates and validates a Greek version of CAM-ICU. Given the lack of any instrument to detect delirium in Greek ICUs this will have major impact in local level.
- A more important implication in International level is that the availability of a valid scale which is used widely allows the exchange of data, information, and compatible treatment guidelines among care providers in ICUs.

Introduction

Delirium has been defined as an etiologically nonspecific organic cerebral syndrome, characterised by concurrent disturbances of consciousness and attention, perception, thinking, memory, psychomotor behaviour, emotion and the sleep-wake schedule. It is a syndrome of acute onset, over hours to days, followed by a course of fluctuation in the level of consciousness, attention and cognition, and sometimes it is accompanied by delusions or hallucinations (APA, 1994). In intensive care units (ICUs), both prevalence and incidence of delirium are high and rise up to 80% in intubated patients (Ely et al., 2001a). ICU patients are at high risk for developing delirium due to multisystem acute illnesses, comorbidities, medications (Devlin et al., 2007; Ouimet et al., 2007), and other environmental and iatrogenic factors such as the absence of visible daylight, isolation, limited visiting hours and the use of physical restraints, feeding tubes and catheters (Devlin et al., 2007; Van Rompaey et al., 2009a). As in medical wards, critical care delirium is associated with high mortality (Ely et al., 2004; Pisani et al., 2009; Van Rompaey et al., 2009b), increased length of stay and health care costs which increase linearly with severity of delirium (Ely et al., 2001a; Milbrandt et al., 2004). Delirium is associated with lower quality of life in survivors (Van Rompaey et al., 2009b). Also, some of delirium clinical features are irreversible (Rudberg et al., 1997) and there is emerging evidence of its relationship with dementia and cognitive decline at least in older patients (Girard et al., 2010; Macdonald and Treloar, 1996).

Although delirium is associated with poor outcomes, it is frequently under-diagnosed (Girard et al., 2008). Without the use of a screening tool, around 65% of delirium patient-days in the ICU are missed (Spronk et al., 2009). The routine use of a validated tool for the presence of delirium has been recommended in critical care guidelines (Jacobi et al., 2002). Despite that, the use of assessment tools for detecting delirium in critical care is suboptimal. In a recent study (Mac Sweeney et al., 2010), it was found that delirium in critical care is routinely screened by only 25% of clinicians in the United Kingdom (UK), while only 14% of them use a validated tool. Similar findings are reported from intensive care settings in other countries as well (Ely et al., 2004; Mehta et al., 2006; Shehabi et al., 2008; Van Eijk et al., 2008).

About twenty-four different delirium scales are available for identifying delirium in non-ICU populations (Adamis et al., 2010), but their use in ICU is difficult. ICU patients are often intubated and unable to give answers to the components of the scales that require verbal responses. Also, because their level of consciousness is often reduced and their medical condition is unstable it is difficult for them to co-operate in lengthy and complex delirium scales. Around six screening tools have been adjusted and validated for use in the ICU (Devlin et al., 2007). Among them the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU), (Ely et al., 2001b) is widely accepted as the standard in intensive care delirium assessment. It is based on the Confusion Assessment Method (CAM), which was designed specifically for use by health care professionals without formal psychiatric training, and incorporates DSM-IV criteria for the diagnosis of delirium, by a yes or no answer to a four point algorithm (Inouye et al., 1990). The CAM-ICU is widely used by non-psychiatrists, for the evaluation of delirium. Since delirium is fluctuating, a one-time only assessment may fail to detect it. Thus bedside nurses are in a unique position to screen and diagnose delirium not only in the ICU but also in other settings, as they have contact with patients for an entire 8 or 12 hour shift (Insel and Badger, 2002; Pun et al., 2005). Critical care nurses using the CAM-ICU are able to complete delirium assessment in an average of 2 minutes with an accuracy of 98%, compared to a full DSM-IV assessment by a psychogeriatrician expert, who usually requires at least 30 minutes to complete the assessment (Ely et al., 2001b).