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Research article

Delirium during the first evaluation of children aged five to 14 years admitted to a paediatric critical care unit

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ABSTRACT

Objectives: To describe the prevalence and characteristics of delirium during the initial evaluation of critically ill patients aged 5–14 years.
Method/design: This is a cross-sectional descriptive study in a critical care unit. For six months, all patients were evaluated within the first 24–72 hours or when sedation permitted the use of the paediatric confusion assessment method for the intensive care unit (PCAM-ICU) and the Delirium Rating Scale-Revised-98 items #7 and #8 to determine motor type. We report the characteristics of PCAM-ICU delirium (at least three of the required items scored positive) and of subthreshold score cases (two positive items).
Results: Of 77 admissions, 15 (19.5%) had delirium, and 11 (14.2%) were subthreshold. A total of 53.3% of delirium and 45.5% of subthreshold cases were hypoactive. The prevalence of delirium and subthreshold PCAM-ICU was 83.3% and 16.7% in mechanically ventilated children. The most frequent combination of PCAM-ICU alterations in subthreshold cases was acute onset-fluctuation with altered alertness. The main nursing diagnoses were related to reduced cellular respiration.
Conclusions: Delirium is common in critically ill children. It is necessary to assess whether certain nursing diagnoses imply an increase in delirium. Longitudinal studies of subthreshold PCAM-ICU cases are needed to understand their importance better.

Implications for Clinical Practice

- Implementation of interdisciplinary teams could be useful for the routine detection of delirium.
- Particular attention should be paid to potential hypoactive cases and patients on mechanical ventilation.
- Many patients with delirium may have nursing diagnoses related to altered ventilation or tissue perfusion.
- Subthreshold PCAM-ICU score cases are similar to delirious ones and deserve clinical attention.

Introduction

Delirium is an acute impairment of consciousness that is characterised by alterations in three core domains: cognitive, higher-level thinking and circadian rhythm (Franco et al., 2013). The two main types are hyperactive and hypoactive. Hypoactive cases are characterised by reduced activity, decreased speed of movements and a decrease in the quantity and speed of speech. Increased movements and loss of control over movement and ambulation characterise hyperactive cases. Mixed cases feature combinations of hypoactive and hyperactive symptoms. Although delirium assessment should occur as part of the overall consciousness evaluation, delirium tends to be underdiagnosed, especially in its hypoactive form (Meagher et al., 2014).

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The syndrome of delirium may be a result of one or several alterations in health. It has been more widely studied in adults than in children in intensive care, its reported prevalence is approximately 80% among adults on mechanical ventilation (Cavallazzi et al., 2012). According to the systematic review by Daoud et al. (2014), the prevalence in critically ill paediatric patients varies from 5% to 28% between studies. However, the external validity of some available studies is hampered due to differences in diagnostic methods, which include a clinical suspicion index with limited sensitivity to delirium and different index tests (such as the Paediatric Anaesthesia Emergence Delirium Scale, which has low sensitivity to hypoactive delirium), and to the high number of patients not assessed for the disorder (Daoud et al., 2014; Traube et al., 2017b). The disorder appears to be more common in children with severe illness or intellectual disability (Hatherill and Flisher, 2010).

Delirium in critically ill children increases mortality, length of hospital stay and the costs associated with care (Smeets et al., 2010; Traube et al., 2017a). Added to this is the suffering of patients and parents and additional stress for staff (Colville et al., 2009; Colville and Pierce, 2012). Reports on critically ill adults have linked hyperactive cases to safety hazards such as line removal or self-extubation (Ely et al., 2001).

A standardised diagnostic method for delirium detection in critically ill paediatric patients has yet to be routinely included in practice, which hinders the opportune diagnosis and treatment of this population (Daoud et al., 2014; Kudchadkar et al., 2014). The paediatric confusion assessment method for the intensive care unit (PCAM-ICU) is an algorithm that physicians or nurses can use to evaluate delirium in critically ill children aged ≥5 years, regardless of whether they are receiving mechanical ventilation. For a delirium diagnosis, the patient must meet at least three of four criteria (Smith et al., 2011a).

In adults, patients with a subthreshold score (i.e., meeting at least two of four criteria) on the corresponding version of the algorithm (i.e., the CAM) have been defined *a priori* as having subsyndromal delirium, despite the algorithm not having been validated for that. According to a systematic review about the subject, adults with a subthreshold score on the CAM or another diagnostic tool have increased morbidity and mortality in a way similar to full-syndrome delirium (Martinez Velilla and Franco, 2013). Along the same lines, the last version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) includes within the other specified delirium category an option for diagnosis of attenuated forms defined as cases in which the severity of cognitive impairment falls short of that required for the diagnosis, or in which some but not all diagnostic criteria for delirium are met (American Psychiatric Association, 2013). Unfortunately, the DSM-5 does not include operative criteria for these cases, and the chair of its task force for neurocognitive disorders acknowledges that more research is needed in the field (Blazer and van Nieuwenhuizen, 2012).

Our aim was to describe the prevalence of delirium and subthreshold PCAM-ICU cases during a cross-sectional evaluation within the first to third admission days of critically ill paediatric patients aged five–14 years, with a further description and comparison of relevant clinical and phenotypic characteristics of patients with PCAM-ICU delirium or with a subthreshold PCAM-ICU score.

Methods

Design and patients

This is a descriptive, observational, cross-sectional study. Fieldwork was conducted in the critical care unit of the Hospital Pablo Tobón Uribe (Medellín, Colombia), over a period of six months. The unit had 20 beds and served patients aged newborn to 14 years. Patients 15 or 16 years of age were occasionally admitted. A routine assessment of delirium was performed within the first 24–72 hours after admission to the unit for all patients aged five to 14 years. If, according to the standardised protocol of the unit, a patient was pharmacologically sedated and could not be evaluated during the stipulated period, he or she was checked daily until sedation was reduced to a point that allowed an evaluation for delirium. Those positive for delirium or with a subthreshold PCAM-ICU score were included. The exclusion criteria were stupor, coma, or serious difficulties in communication from any cause.

The sample consisted of all patients with delirium or a subthreshold PCAM-ICU score, as defined in the following sections.

Ethical approval

The study protocol was approved by the Health Research Committee of the Hospital Pablo Tobón Uribe and by the Research and Ethics Committee of the Escuela de Ciencias de la Salud, Universidad Pontificia Bolivariana (approval number 12-2013). Written informed consent was signed by proxy (parents, or if not available, first-degree relatives or a legal representative). In addition, all patients who were capable gave their written agreement to participate.

Instruments

In addition to an instrument for collecting sociodemographic and clinical data, the following tools were used:

Paediatric confusion assessment method for the intensive care unit

This instrument is an algorithm with excellent reliability (Kappa index = 0.96) and validity for delirium according to the DSM-IV-TR criteria (sensitivity 83%, specificity 99%); PCAM-ICU was developed by the ICU Delirium and Cognitive Impairment Study Group and can be found on the web at www.icudelirium.org/paediatric.html (Smith et al., 2011a). It includes a sedation scale (explained in the next subheading) to assess alertness before evaluation of its specific items; a limitation of the PCAM-ICU is the inability to use it in children younger than five years of age. PCAM-ICU evaluates four characteristics of the disorder in children ≥5 years: (1) Course: Acute change from baseline and/or fluctuation of the mental state; (2) Attention: Evaluable verbally or nonverbally by one of two standardised tests chosen according to the patient's condition (recognition of the letter "A" said five times in a series of 10 letters or a series of five figures shown to the patient, who should recognise them in a subsequently presented series of 10); a score ≤7 implies inattention; (3) Degree of awareness according to the RASS (described below); (4) Disorganisation of thought: Evaluated with five reasoning questions; a score ≤3 indicates alterations of thought.

The PCAM-ICU is positive for delirium when the patient has alterations of the first and second characteristics and either of the other two. Even though the tool has not been validated for situations when patients do have alterations in fewer than these three specified items, similar to the strategy followed in adult research (Martinez Velilla and Franco, 2013), this study also included cases that were defined *a priori* as positive for at least two of the four characteristics (defined as subthreshold PCAM-ICU cases). Further, we describe the characteristics of this group and compare them with those of the PCAM-ICU delirium group.

For this work, the appropriate Spanish version of the PCAM-ICU was used (Franco et al., 2012).

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