

The search for the holy grail: diagnosing delirium in the intensive care unit

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No amount of experimentation can ever prove me right; a single experiment can prove me wrong.

— Albert Einstein

Although intensive care delirium is a 21st century phenomenon, delirium has been described in different forms since antiquity. The 19th-century description of delirium as a reversible, fluctuating cloudiness of consciousness and confusion¹ is not far from the modern definition in the *Diagnostic and statistical manual of mental disorders*, fourth edition, text revision (DSM-IV-TR).²

The diagnosis of intensive care delirium has been dominated by the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)³ and the Intensive Care Delirium Screening Checklist (ICDSC);⁴ these tools were modified from the DSM-IV-TR definition. Although the CAM-ICU is a single time-point assessment, in contrast with the longitudinal observation by the ICDSC, they seem to perform with comparable results at the bedside.⁵

In this issue of *Critical Care and Resuscitation*, Reade and colleagues examine delirium diagnosis in the context of the list of challenges facing busy intensive care clinicians and nurses.⁶ In a before-and-after CAM-ICU assessment education program involving 87% of nursing staff, longitudinal unstructured nurse assessment diagnosed significantly more delirium than the CAM-ICU among intubated and non-intubated patients. Reade et al's findings support a recently published multicentre trial that examined the utility of the CAM-ICU by bedside nurses.⁷ This trial showed that nurse-delivered CAM-ICU had poor sensitivity compared with delirium experts. It is worrying to note that nurse-delivered CAM-ICU assessments significantly under-diagnose delirium compared with the "expert" assessments.

The results of these two studies are indeed surprising, and raise many questions. They suggest that the CAM-ICU may not be a tool that can be widely applied by busy bedside nurses. In essence, CAM-ICU may not be a tool for routine application in the "real world", but rather for "dedicated investigator[s]" and experts. More importantly, it raises another key question: Who is right? The nurse at the bedside armed with intuition, experience and knowledge, or the research coordinator equipped with the CAM-ICU?

The field of pain assessment may help us in making a judgement. Numerical rating scale assessment of pain by bedside nurses has been shown to underestimate pain by

25%, and its reliability to be related to the experience of bedside assessor.⁸ These observations suggest significant interpersonal variability; but again, they do not tell us who is right. Nevertheless, objective assessment of pain using numerical or behavioural scales, despite known limitations, predicts pain far better than subjective assessment based on physiological responses. Pain, like delirium, is immensely difficult to assess. While pain assessment using validated scales has been used for many years, the CAM-ICU is a relatively new tool that is more involved to learn and administer than a simple pain scale. Intensive care units trust nursing staff to conduct and perform critical tasks, including pain assessment, sedative and vasopressor titration and, in the Australian context, ventilator weaning. Whether bedside nurses are ready to add delirium assessment, using the CAM-ICU, to the list of physical and physiological assessments to be conducted needs further consideration. Similar considerations should be given to other tools of delirium assessment, such as the ICDSC.⁴

Reade et al's report also highlights important issues in the "training the trainer" model for diagnosing delirium. What makes an expert trainer? What determines competency? What are the tools to be used to "train the masses"? Is CAM-ICU a tool that can be taught with high internal validity outside known delirium centres?

Reade and colleagues identified some critical limitations and weaknesses in their study. The tools used, unstructured and CAM-ICU assessments, were not performed concurrently on the same patients; rather, each was performed on a different group of patients, who were assessed 3 months apart. In addition, there was no comparison with a "gold-standard" diagnostic tool for delirium and no other assessment tool, such as the ICDSC, was used as a comparator.

Despite critical impact and prevalence, there is a worrying lack of consistency in definitions and categorisation of ICU delirium. Adding ambiguity to its diagnosis is likely to enforce many clinicians' view of delirium as an obscure phenomenon. This is partly driven by the varying nature of delirium itself, but more so by the heterogeneous patient characteristics and illness severity, the interposition of sedative drugs, and level of awareness of ICU patients. The time of the day, the tool used and who assesses delirium adds another layer of ambiguity to delirium diagnosis and categorisation. The proposed DSM-V, to be released in May 2013,⁹ underscores level of awareness as an important

factor in delirium diagnosis. Although it may bring us a step closer to achieving a consistent definition of delirium in general, there is an urgent need for a consensus of what constitutes a delirious ICU patient, at what level of awareness delirium should be assessed and, more importantly, who should do the assessment.

Finally, there is difficulty with assessing severity. While agitation can be visually diagnosed in most patients, the use of a validated sedation scale such as the Richmond Agitation Sedation Scale (RASS)¹⁰ may provide an objective assessment of an agitated patient. Severity of agitation can be seen as a higher level of RASS in the positive range. Bedside caregivers and ICU clinicians agree that a RASS of +3 is more agitated than RASS of +1, but whether this is equivalent to a severe form of agitation is not clear. Assessing delirium severity, on the other hand, is a much more difficult task. The CAM-ICU provides a yes/no answer; the ICDSC provides a cumulative score. Yet neither claims any relationship to severity. The absence of a reliable, easy-to-measure delirium biomarker makes severity assessment essentially impossible. Clinicians have so far assessed severity by surrogates such as "intensity" or duration of delirium. A major weakness in this approach is the failure of current tools to precisely define the time when a patient is delirious or emerges from a delirious episode.

Future research should focus on therapeutic categorisation of ICU delirium and its severity. For example, the separation of delirium into hypoactive (passive) and hyperactive (agitated)^{11,12} is not aligned with preventive measures or therapeutic interventions. Although there is some suggestion that both types of delirium are forms of acute brain dysfunction, clinicians are uncertain about their management implications.

While the controversy continues, there remains one undisputed fact: delirium is associated with very poor outcome. Unless we can more accurately define the presence of delirium, estimate its severity, assess the timing of onset and the timing of recovery (duration), and more astutely and thoroughly validate any definition and classification system, we will remain unable to advance our understanding of this syndrome and to develop effective interventions for it.

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References

- Berrios GE. Delirium and confusion in the 19th century: a conceptual history. *Brit J Psychiat* 1981; 139: 439-49.
- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed. Text revision. Arlington, Va: APA, 2000.
- Ely EW, Inouye SK, Bernard GR, et al. Delirium in mechanically ventilated patients: validity and reliability of the confusion assessment method for the intensive care unit (CAM-ICU). *JAMA* 2001; 286: 2703-10.
- Bergeron N, Dubois MJ, Dumont M, et al. Intensive Care Delirium Screening Checklist: evaluation of a new screening tool. *Intensive Care Med* 2001; 27: 859-64.
- Plaschke K, von Haken R, Scholz M, et al. Comparison of the confusion assessment method for the intensive care unit (CAM-ICU) with the Intensive Care Delirium Screening Checklist (ICDSC) for delirium in critical care patients gives high agreement rate(s). *Intensive Care Med* 2008; 34: 431-6.
- Reade MC, Eastwood GM, Peck L, et al. Routine use of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) by bedside nurses may underdiagnose delirium. *Crit Care Resusc* 2011; 4: 217-225.
- van Eijk MM, van den Boogaard M, van Marum RJ, et al. Routine use of the Confusion Assessment Method for the Intensive Care Unit: a multicenter study. *Am J Respir Crit Care Med* 2011; 184: 340-4.
- Shugarman LR, Goebel JR, Lanto A, et al. Nursing staff, patient, and environmental factors associated with accurate pain assessment. *J Pain Symptom Manage* 2010; 40: 723-33.
- American Psychiatric Association. Diagnostic DSM-5 development. Delirium. Proposed revision. <http://www.dsm5.org/ProposedRevision/Pages/proposedrevision.aspx?rid=32#> (accessed Sep 2011).
- Ely EW, Truman B, Shintani A, et al. Monitoring sedation status over time in ICU patients: reliability and validity of the Richmond Agitation-Sedation Scale (RASS). *JAMA* 2003; 289: 2983-91.
- Peterson JF, Pun BT, Dittus RS, et al. Delirium and its motoric subtypes: a study of 614 critically ill patients. *J Am Geriatr Soc* 2006; 54: 479-84.
- Pandharipande P, Cotton BA, Shintani A, et al. Motoric subtypes of delirium in mechanically ventilated surgical and trauma intensive care unit patients. *Intensive Care Med* 2007; 33: 1726-31. □



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