Does this patient have delirium: value of bedside instruments

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CRD summary
This review concluded that the choice of instrument to diagnose delirium may depend on time available and the experience of the diagnosing professional. The evidence supported use of the Confusion Assessment Method. The authors' conclusions reflected the evidence presented, but the limited search strategy and reporting of quality suggest that the conclusions should be interpreted with some caution.

Authors' objectives
To assess the accuracy of bedside instruments in diagnosing delirium in adult patients.

Searching
MEDLINE (from 1950) and EMBASE (from 1980) were searched to May 2010 for articles published in English. Search terms were reported. Reference lists of retrieved articles were searched manually.

Study selection
Prospective studies that compared the accuracy of an appropriate reference standard (Diagnostic and Statistical Manual of Mental Disorders, DSM III, DSM-III-R or DSM-IV) in all patients versus at least one index test (delirium bedside diagnostic test) in most patients (>80%) were eligible for inclusion. Eligible patients were hospitalised adults not in the intensive care unit with or without delirium. Studies that involved mostly alcohol-related delirium were excluded. Reference and index tests were required to be carried out by different individuals: the reference index had to be performed by a specialist physician (geriatrician, neurologist, or psychiatrist) and the index test could be performed by a non-expert.

Where reported, included studies were conducted in Canada, Brazil, Europe, Taiwan, Hong Kong and Japan, mostly in university hospitals. Some patients had comorbidities and these included mental health issues. Delirium was present in between 9% and 63% of patients. Eleven different bedside instruments were used.

Two reviewers independently screened studies for inclusion. Disagreements were resolved through discussion or referral to a third reviewer.

Assessment of study quality
Study quality was assessed based on study size (threshold of 100 patients), recruitment method, participant characteristics, application of index and reference tests and independence of tests, blinding and attrition rates.

The authors did not state how many reviewers performed the validity assessment.

Data extraction
Two reviewers independently extracted outcome data into a 2x2 table and used a form designed by Standards for Reporting of Diagnostic Accuracy (STARD) to calculate sensitivity, specificity and positive and negative likelihood ratios (LRs) with 95% confidence intervals (CIs). Where any cell in the 2x2 table contained a zero, 0.5 was added to all counts. Primary authors were contacted for additional data where necessary. Disagreements were resolved through referral to a third reviewer.

Methods of synthesis
Sensitivity, specificity and likelihood ratios with their 95% CIs were pooled using a random-effects model.

Statistical heterogeneity was assessed using the $I^2$ statistic. Sensitivity analyses were performed by exclusion of the most heterogeneous studies or by inclusion of only subgroups of studies that assessed instruments that could be completed in five minutes or less and studies that included only physicians performing the index test.
Results of the review

Twenty-five studies (n=3,027, range 26 to 791) were included. All studies provided details on participant recruitment (nine enrolled patients consecutively). Eighteen studies were blinded and used independent assessment of the reference and index tests. Seven studies included 100 or more patients. Attrition rates were not reported.

Global Attentiveness Rating (GAR) (one study), Memorial Delirium Assessment Scale (MDAS) (three studies), Confusion Assessment Method (CAM) (10 studies), Delirium Rating Scale Revised-98 (DRS-R-98) (two studies), Clinical Assessment of Confusion (CAC) (one study) and Delirium Observation Screening Scale (DOSS) (two studies) scales all had positive likelihood ratios greater than 5.0, which suggested a greater likelihood of disease. The corresponding negative likelihood ratios for GAR, MDAS, CAM, DRS-R-98, and DOSS were less than 0.2, which suggested a lesser likelihood of disease. Delirium Rating Scale (DRS) (four studies), Mini-Mental State Examination (MMSE) (one study), Nursing Delirium Screening Scale (NDSS) (one study) and Vigilance "A" Test (one study) showed negative likelihood ratios less than 0.2. The CAC study showed a negative likelihood ratio above 0.2 (LR 0.67, 95% CI 0.56 to 0.81).

MMSE was identified as the least useful for identification of patients with delirium (one study). Subgroup analyses showed that the CAM was the most useful scale that could be completed in five minutes or less by a nurse (positive LR 7.3, 95% CI 1.9 to 27 and negative LR 0.08, 95% CI 0.03 to 0.21) or physician (positive LR 19, 95% CI 6.7 to 51 and negative LR 0.19, 95% CI 0.13 to 0.27).

There was evidence of statistical heterogeneity for CAM (positive and negative LR \( I^2=65\% \) and 85\%), DOSS (\( I^2=65\% \) and 0\%), DRS-R-98 (\( I^2=73\% \) and 0\%) and MDAS (\( I^2=85\% \) and 69\%). Analyses that included only studies in which the index test was performed by a physician resolved statistical heterogeneity for the negative likelihood ratio using CAM, but the positive likelihood ratio remained statistically significant. The authors reported that subanalysis by language or DSM version resolved statistical heterogeneity, but no other data were provided.

Authors' conclusions

The choice of bedside instrument to diagnose delirium may be dependent on the time available and the experience of the diagnosing professional. The evidence supported use of the Confusion Assessment Method, which takes five minutes to complete.

CRD commentary

The review question was clear and was supported by appropriate inclusion criteria. The literature search was limited to two electronic databases and was restricted to published articles in English, so potentially relevant papers may have been missed. The authors acknowledged that some studies may have been missed given the limited search terms included in the literature search. The authors stated that they could not assess publication bias. Study quality was assessed, but attrition rates were not reported. The authors undertook study selection and data extraction in duplicate, but as the process was not stated for the quality assessment, reviewer error and bias could not be ruled out. There was some evidence of statistical heterogeneity and the authors acknowledged significant differences among studies in terms of quality, experience level of the individual who performed the index test and different versions of the reference test used. There appeared to be heterogeneity among the patients and settings, so it may not have been appropriate to pool the results. Some comparisons included a small number of studies with small sample sizes and confidence intervals were wide for some results, which questioned the robustness of the findings. The authors' conclusions reflected the evidence presented, but the limited search strategy meant that some relevant studies may have been missed and the quality assessment results were not fully reported, which suggested that the conclusions should be interpreted with some degree of caution.

Implications of the review for practice and research

Practice: The authors stated that the findings may not be generalisable to other clinical settings.

Research: the authors stated that further research should focus on assessing educational interventions to improve the ability of healthcare professionals to identify delirium using the available instruments, correlating instrument findings with clinical outcomes and validating the instruments in settings other than hospitals.
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