QUESTION: In patients having major elective surgery, can a risk assessment system based on preoperative factors predict postoperative delirium risk?

**Design**
A cohort study for validation of a previously developed Brigham and Women's Hospital Delirium (BWD) risk assessment system.

**Setting**
A clinic in Cleveland, Ohio, USA.

**Patients**
500 consecutive patients ≥50 years of age (mean age 67 y, 61% women) having major elective surgery with an expected hospital stay ≥2 days. Patients were excluded if they could not speak English, met the DSM-IV diagnostic criteria for delirium, or had an abnormal screening assessment for delirium.

**Description of prediction guide**
Patients were evaluated on preoperative medication use; medical history including chronic or acute illness, smoking habits, alcohol use, psychological or neurological disease, and history of delirium; laboratory tests; functional and cognitive status using the Specific Activity Scale and the Telephone Interview for Cognitive Status (TICS); and comorbid conditions. The expected delirium risk was calculated using the BWD scoring system (score range 0–8).

**Main outcome measure**
Delirium during postoperative days 1–4 was considered present if DSM-IV criteria were met and a ≥3 point reduction in the postoperative TICS score was seen relative to the preoperative TICS score. Postoperative measurements were made by clinical interviewers who were blinded to the preoperative results.

**Main results**
57 patients (11%) experienced delirium in the first 4 postoperative days. Postoperative delirium was seen in 6% of patients who had a BWD score of 0.8% who had a BWD score of 1.27% who had a BWD score of 2, and 35% who had a BWD score of ≥3. The area under the receiver operating characteristics curve for the validation cohort (Cleveland Clinic population) (0.69, standard error [SE] 0.04) differed from that reported for the validation cohort (Brigham and Women’s Hospital population) (0.81, SE 0.02) (p=0.007). Using a BWD score ≥2, the sensitivity in predicting postoperative delirium risk was 47% in the validation cohort and 62% in the derivation cohort. The table displays test characteristics for having a BWD score ≥2.

**Conclusion**
In patients having major elective surgery, a risk assessment system based on preoperative factors had fairly good specificity but variable sensitivity for predicting the risk of postoperative delirium.

**Test characteristics for having a score of ≥2 on the Brigham and Women’s Hospital Delirium assessment system for predicting postoperative delirium risk in patients having major elective surgery**

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (CI)</th>
<th>+LR</th>
<th>-LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derivation (Brigham and Women’s Hospital)</td>
<td>62% (50 to 73)</td>
<td>83% (80 to 86)</td>
<td>3.7</td>
<td>0.46</td>
</tr>
<tr>
<td>Validation (Cleveland Clinic)</td>
<td>47% (34 to 61)</td>
<td>85% (81 to 88)</td>
<td>3.1</td>
<td>0.62</td>
</tr>
</tbody>
</table>

**COMMENTARY**
Delirium, an acute confused state, is a postoperative complication that can occur among elderly patients. However, the rates of delirium in studies of postoperative patients show great variation. Delirium is associated with several adverse outcomes, including longer hospital stays, greater need for institutional care, greater medical costs, and higher morbidity and mortality rates. Rising numbers of elderly patients exist in hospitals and so the incidence of delirium can be expected to increase.

The findings of this study by Litaker et al have practical implications for surgeons, internists, and geriatricians involved in the management of elderly patients who undergo major elective surgery. The authors suggest that delirium may be avoidable even among elderly people who are more vulnerable to this complication. Using a relatively easy presurgical risk assessment system can help to identify patients with a higher risk of developing postoperative delirium. However, caution must be used when applying this risk assessment system in clinical practice because, although it has high specificity (ie, it is quite good at identifying persons who are not affected by delirium), it has low sensitivity (ie, it may miss detecting persons who are affected by delirium).

Finally, although conclusions from this study are valuable for clinical practice, we should not forget that intra and postoperative factors also play a role in the development of postoperative delirium. What is needed now are more studies that evaluate pre, intra, and post surgical risk factors for delirium. Such studies would help in the development of interventions that might minimise the occurrence of delirium in patients who are elderly and require surgery.

A risk assessment system based on preoperative factors was fairly specific in predicting postoperative delirium risk in patients having major elective surgery

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