Reviewer's report

Title: A comparison of Child-Pugh, APACHE II and APACHE III scoring systems in predicting hospital mortality of patients with liver cirrhosis

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Version: 1 Date: 27 Oct 2002

Reviewer: Dr Markus Wehler

Level of interest: An exceptional paper that breaks new ground and has implications well beyond its field

Advice on publication: Unable to decide on acceptance or rejection until the authors have responded to the compulsory revisions

Major (compulsory) comments:
1. Clinically useful predictive models should demonstrate ease of use, accuracy, reproducibility, and acceptance by data collecting staff (Holt AW et al. Crit Care Med 1992, 20: 1688). The authors should address these criteria. APACHE scores are difficult to assess on a normal (non-ICU) ward, since many components needed to calculate predicted mortality rates are not routinely measured on the ward. Some variables (e.g. heart rate) also depend on continuous monitoring. It has been shown that the inter-observer variability is high when these scoring systems are not used on a regular basis (like on most non-ICU wards) thus affecting the accuracy and reproducibility of the data (Polderman KH, Lancet 1999, 353, 380). Feasibility might be affected by the considerable workload associated with data collection and the fact that the APACHE III system is only commercially available.

2. The presented APACHE II scores are astonishingly low, even for non-ICU patients. If all patients received 5 chronic health points (for histologically proven cirrhosis of the liver) the mean APACHE II score of non-survivors drops to around 10 points. In most studies a 50% hospital mortality rate is associated with an APACHE II score of over 25 points. Butt et al. (Am J Gastroenterology 1998, 93:2469) found much higher APACHE III points in their sample of cirrhotic non-ICU patients (survivors 58.9 points, non-survivors 87.4 points). Furthermore, Butt et al. reported a mortality of 26% in patients with an APACHE III score of 51 to 75 points on day 1. Can you comment?

3. According to the reported mean APACHE scores, I assume that the number of patients with a higher risk of death in the hospital (APACHE II >25 points, APACHE III >70 points) is rather low in the presented sample. Statistically derived prediction models like the APACHE systems are calibrated to the overall outcome prevalence in the development sample. When prognostic systems are tested in a sample of patients with a very different level of disease severity the calibration and discriminative ability
of the system is altered (Justice AC et al. Assessing the generalizability of prognostic information. Ann Intern Med. 1999, 130: 515). The authors should comment on this problem of spectrum transportability.

4. What are the consequences of a severity of disease assessment on day 1 in patients on a normal ward? Are they more helpful than clinical examination to identify patients in need of intensive care? Are they helpful in the decision to forgo life support?

Minor (discretionary) comments
1. Are the diagnoses stated on page 7, para 1, the reasons for admission to the ward? If not, the authors should state the reasons for hospital admission since the prognostic importance of the admitting diagnosis is well known (Knaus WA et al. Crit Care Med 1985, 13: 13:818)
2. Page 7, para 2: The percentages of the Child-Pugh class do not fit with the absolute numbers of patients in each class (for example 63 pts =31.5% not 21%, if n=200).
3. Has the manuscript been reviewed by a native English speaker?
   - Page 2, last para and page 12, para 3: not superior
   - Page 9, para 2: ... them with ...(2 words), next sentence: ..., the Child-Pugh score.
   - Page 9, para 2: prothrombin time
   - Page 11, para 3: cirrhotic ICU patients
   - Page 11, last sentence: achieved a higher...
   - Page 20, table 1.: A footnote should mention that data were recorded during the first 24 hours after admission to the ward.

**Competing interests:**

None declared.