Predicting a difficult central neuraxial block - an exercise of limited clinical value?

A cohort study of 73,579 patients from the Danish Anaesthesia Database

Line Sendlie, MD, Lars H. Lundstrøm, MD, PhD, Charlotte V. Rosenstock, MD, PhD
Department of Anaesthesiology, Nordsjællands Hospital - Hillerød - a part of University of Copenhagen, Capital Region of Denmark

Introduction
The ability to anticipate a difficult central neuraxial block (DCNB) may allow anaesthetists to take precautions to reduce potential complications and discomfort for the patient.

The aims were to
1) estimate the prevalence of DCNB
2) assess patient related and organizational factors associated with DCNB and
3) evaluate the diagnostic accuracy of individual stand-alone tests and an accumulated risk score for predicting DCNB.

Methods
A consecutive cohort of 73,579 patients was retrieved from the Danish Anaesthesia Database.

A predefined DCNB-score and information on patient related and organizational factors were included in the analyses.

The DCNB-score was based on the number of attempts, central neuraxial block (CNB) performed by primary or secondary anaesthetist or CNB abandoned. Logistic regression analysis was performed.

We evaluated the diagnostic accuracy of the individual patient related risk factors and an accumulated risk score for the prediction of DCNB.

Results
The prevalence of DCNB was 11.7% (11.5 – 11.9%, 95% CI). 14.8% (14.3 – 15.4%, 95% CI) epidural-, 10.8% (10.5 – 11.0%, 95% CI) spinal- and 17.6% (16.2 – 19.3%, 95% CI) combined epidural-spinal-CNB’s were difficult. 0.2% (0.16 – 0.22%, 95% CI) was abandoned CNB’s. In our logistic regression analysis none of the adjusted odds ratios exceeded a value of 1.8 (Table 1).

The diagnostic accuracy of six patients related covariates as dichotomous stand-alone tests was assessed. Positive predictive values ranged from 13 to 16% and the positive likelihood ratios were maximally 1.46. We calculated the diagnostic estimates for the corresponding cut-off values of accumulated risk varying from one to five risk factors. The maximal positive likelihood ratio was 1.6 and the odds ratio of a DCNB was 2.14 (1.14 - 3.99, 95% CI) in patients with accumulated five risk factors (Table 2).

Discussion
In the literature there is no uniform definition of DCNB impeding comparison of our results with previous studies. Confounding by indication is a limitation. Furthermore, in our explorative assessment the best cut-off values of the diagnostic tests were not predefined. It may result in circular arguments when a diagnostic test is both developed and validated in the same population.

Conclusion
Despite statistical strong association with low p-values and narrow confidence intervals, the low odds ratios and estimates of the diagnostic tests indicate that the clinical impact of our findings may be limited. Thus, the prediction of DCNB may be of restricted value.

References