The Barrow Neurological Institute Grading Scale as a Predictor for Delayed Cerebral Ischemia and Outcome After Aneurysmal Subarachnoid Hemorrhage: Data From a Nationwide Patient Registry (Swiss SOS)

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BACKGROUND
The Barrow Neurological Institute (BNI) scale is a novel quantitative scale measuring maximal subarachnoid hemorrhage (SAH) thickness to predict delayed cerebral ischemia (DCI). This scale could replace the Fisher score, which was traditionally used for DCI prediction.

OBJECTIVE
To validate the BNI scale.

METHODS
All patient data were obtained from the prospective aneurysmal SAH multicenter registry. In 1321 patients, demographic data, BNI scale, DCI, and modified Rankin Scale (mRS) score up to the 1-yr follow-up (1FU) were available for descriptive and univariate statistics. Outcome was dichotomized in favorable (mRS 0-2) and unfavorable (mRS 3-6). Odds ratios (OR) for DCI of Fisher 3 patients (n = 1115, 84%) compared to a control cohort of Fisher grade 1, 2, and 4 patients (n = 206, 16%) were calculated for each BNI grade separately.

RESULTS
Overall, 409 patients (31%) developed DCI with a high DCI rate in the Fisher 3 cohort (34%). With regard to the BNI scale, DCI rates went up progressively from 26% (BNI 2) to 38% (BNI 5) and corresponding OR for DCI increased from 1.9 (1.0-3.5, 95% confidence interval) to 3.4 (2.1-5.3), respectively. BNI grade 5 patients had high rates of unfavorable outcome with 75% at discharge and 58% at 1FU. Likelihood for unfavorable outcome was high in BNI grade 5.
patients with OR 5.9 (3.9-8.9) at discharge and OR 6.6 (4.1-10.5) at 1FU.

CONCLUSION
This multicenter external validation analysis confirms that patients with a higher BNI grade show a significantly higher risk for DCI; high BNI grade was a predictor for unfavorable outcome at discharge and 1FU.

type journal paper/review (English)
date of publishing 17-01-2018
journal title Neurosurgery
ISSN electronic 1524-4040