

Medellín

Diagnosing [nosocomial meningitis](#) (NM) in neurosurgical patients is difficult. The standard CSF test is not optimal and when it is obtained, CSF cultures are negative in as many as 70% of cases. The goal of this study was to develop a diagnostic prediction rule for postoperative meningitis using a combination of clinical, laboratory, and CSF variables, as well as risk factors (RFs) for CNS infection.

A [cross-sectional study](#) was performed in 4 [intensive care units](#) in [Medellín, Colombia](#). Patients with a history of neurosurgical [procedures](#) were selected at the onset of febrile symptoms and/or after an increase in acute-phase reactants. Their CSF was studied for suspicion of infection and a bivariate analysis was performed between the dependent variable (confirmed/probable NM) and the identified independent variables. Those variables with a p value ≤ 0.2 were fitted in a multiple logistic regression analysis with the same dependent variable. After determining the best model according to its discrimination and calibration, the β coefficient for each selected dichotomized variable obtained from the logistic regression model was used to construct the score for the prediction rule.

Among 320 patients recruited for the study, 154 had confirmed or probable NM. Using bivariate analysis, 15 variables had statistical associations with the outcome: aneurysmal subarachnoid hemorrhage (aSAH), traumatic brain injury, CSF leak, positioning of external ventricular drains (EVDs), daily CSF draining via EVDs, intraventricular hemorrhage, neurological deterioration, age ≥ 50 years, surgical duration ≥ 220 minutes, blood loss during surgery ≥ 200 ml, C-reactive protein (CRP) ≥ 6 mg/dl, CSF/serum glucose ratio ≤ 0.4 mmol/L, CSF lactate ≥ 4 mmol/L, CSF leukocytes ≥ 250 cells, and CSF polymorphonuclear (PMN) neutrophils $\geq 50\%$. The multivariate analysis fitted a final model with 6 variables for the prediction rule (aSAH diagnosis: 1 point; CRP ≥ 6 mg/dl: 1 point; CSF/serum glucose ratio ≤ 0.4 mmol/L: 1 point; CSF leak: 1.5 points; CSF PMN neutrophils $\geq 50\%$: 1.5 points; and CSF lactate ≥ 4 mmol/L: 4 points) with good calibration (Hosmer-Lemeshow goodness of fit = 0.71) and discrimination (area under the receiver operating characteristic curve = 0.94).

The prediction rule for diagnosing NM improves the diagnostic accuracy in neurosurgical patients with suspicion of infection. A score ≥ 6 points suggests a high probability of neuroinfection, for which antibiotic treatment should be considered. An independent validation of the rule in a different group of patients is warranted ¹⁾.

¹⁾

Hernández Ortiz OH, García García HI, Muñoz Ramírez F, Cardona Flórez JS, Gil Valencia BA, Medina Mantilla SE, Moreno Ochoa MJ, Sará Ochoa JE, Jaimes F. Development of a prediction rule for diagnosing postoperative meningitis: a cross-sectional study. J Neurosurg. 2018 Jan;128(1):262-271. doi: 10.3171/2016.10.JNS16379. Epub 2017 Mar 10. PubMed PMID: 28298047.

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