# Nosocomial bacterial meningitis

- 'Omics technologies for the elucidation of the molecular mechanisms related to carbapenem-resistant and extended spectrum β-lactamase-producing Klebsiellapneumoniae
- Clinical Presentations and Nosocomial Infections of Neurolisteriosis
- Microbiology and long-term outcomes in community-acquired, nosocomial and post-neurosurgical meningitis with positive bacterial culture in Ontario, Canada: A population-based cohort study
- Postoperative Meningitis Caused by Multidrug-Resistant Pathogens: A Case Report
- Outbreaks of Elizabethkingia miricola Caused Fatal Meningitis-Like Disease in Cultured Bullfrogs
- Ten-year review of hospital-acquired neonatal meningitis in a tertiary-level NICU: the important role of acinetobacter species
- The causes and outcomes of nosocomial meningitis by pathogens for which new antibiotics are urgently needed
- Structural basis for spermidine recognition and modulation of Acinetobacter baumannii multidrug efflux regulator AmvR

## Risk Factors

Kurdyumova et al. found a higher risk of nosocomial bacterial meningitis in ICU patients with the following factors: external ventricular drainage, Cerebrospinal fluid fistula, redo surgery and surgery time.

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Nosocomial bacterial meningitis may result from invasive procedures (e.g., craniotomy, placement of internal or external ventricular catheters, lumbar puncture, intrathecal infusions of medications, or spinal anesthesia), complicated head trauma, or in rare cases, metastatic infection in patients with hospital-acquire

Nosocomial Ventriculostomy related infection is a significant cause of morbidity and mortality in critically ill neurological patients. Rapid diagnosis and prompt initiation of appropriate antimicrobial therapy is needed [1)].

The prevention and management of nosocomial bacterial meningitis pose a substantial challenge, especially with the emergence of disease caused by multidrug-resistant pathogens. Protocols must be developed to standardize surgical techniques in order to minimize the risk of infection. Clinical trials of simple interventions, such as changing the outer pairs of gloves before handling the catheter material during surgery, should be initiated. Early recognition and aggressive treatment may improve the outcome for patients with nosocomial bacterial meningitis [2)].

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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, Cerebrospinal fluid fistula, 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 ≥ 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; Cerebrospinal fluid fistula: 1.5 points; CSF PMN neutrophils ≥ 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 [3].

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3)
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