

Frequency of Pathogens Isolated from Cerebrospinal Fluid in Brazilian Public Hospitals

Jussimara Monteiro¹, Fernanda M. Inoue¹, Ana Paula Lobo¹, Maria de Fatima Pini Marufo¹, Debora Ramadan¹, Sergio Tufik¹, Soraya Sagambatti de Andrade

¹Associação Fundo de Incentivo a Pesquisa (AFIP), São Paulo, Brazil

Background: Bacterial and fungal meningitis represent central nervous system infections that can be community or hospital-acquired. Regardless of the source of infection, the rapid and accurate identification of an infectious agent is an emergency situation and the suspected individuals require fast evaluation and treatment. The purpose of this study was described the frequency of the main pathogens found in the cerebrospinal fluid (CSF) samples and determines the antimicrobial resistance profiles among inpatients at Brazilian public hospitals. **Methods:** We analyzed 5451 CSF samples processed by the clinical microbiology section of AFIP Laboratory during November 2018 to November 2019. The samples were submitted to gram staining, antigen detection by latex agglutination test and microbial culture. An aliquot of CSF sample was used to prepare a Gram staining, as well as to inoculate on blood, chocolate and MacConkey agar plates. After inoculation, these agar plates were incubated in aerobic atmosphere for 24-48h. The bacteria identification was performed by MALDI-TOF mass spectrometry (Vitek-MS) and the minimal inhibitory concentrations of antibiotics were determined using the Vitek[®]2 system, according to the manufacture's recommendations. The MIC value was reclassified as susceptible, intermediated and resistant, according to Clinical and Laboratory Standard Institute (CLSI, 2019) clinical breakpoints. Only one positive CSF sample per patient was considered for descriptive analysis. **Results:** Out of 5451 CSF samples processed, 122 (2.2%) samples showed positive culture for the presence of microorganisms. Out of which, 72 (59 %) were Gram-negative Bacilli (GNB), 41 (33.6%) were Gram-positive Cocci (GPC) and 9 (7.4%) were yeasts. The order of prevalence (top ten) of CSF isolates was *Streptococcus pneumoniae* [24/122 (19.7%)], *Klebsiella pneumoniae* [11/122 (9%)], *Pseudomonas aeruginosa*, *Enterobacter cloacae* complex and *Acinetobacter baumannii* [9/122 (7.4%)] each one, *Cryptococcus neoformans* [7/122 (5.7%)], *Staphylococcus epidermidis* and *Escherichia coli* [6/122 (4.9%)] each, *Neisseria meningitidis* and *Haemophilus influenza* [5/122 (4.1%)] each. Based solely on pathogen identification, 36/122 (29.5%) cases were classified as community-acquired meningitis and 86/122 (70.5%) were classified as hospital-acquired meningitis. 100% of the *Streptococcus pneumoniae* was susceptible to penicillin, six of them showed the following serogroup: 6C (n=3), 12F (n=1), 15B (n=1) and 16F (n=1). Extended spectrum beta-lactamase (ES β L) rates for *E. coli* and *K. pneumoniae* were 66.7% (4/6) and 90.9% (10/11), respectively. The resistance to carbapenems was observed mainly in 44.4% of the

Pseudomonas aeruginosa, 77.8% of the *Acinetobacter spp.* and 36.4% of the *K. pneumoniae*. Between the GPC the resistance to oxacillin was observed in 50% of the *S. aureus* and 71.4% of the Coagulase Negative *Staphylococcus*. **Conclusions:** Although, *S. pneumoniae* still remains the main cause of community-acquired bacterial meningitis. It is important to highlight the increase of meningitis cases associated to hospital-acquired pathogens. The microbiologic surveillance is critical to guide appropriate antibiotic therapy through the identification of local resistance profiles.