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Therapeutic Challenges of Streptococcus pneumoniae Meningitis: A Retrospective Study in Casablanca, Morocco

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Background

Pneumococcal meningitis, caused by the bacterium Streptococcus pneumoniae, is a medical emergency that accounts for 70% of bacterial meningitis cases. The management of this condition is complicated by the emergence of strains that show reduced sensitivity to penicillin, necessitating the use of third-generation cephalosporins and/or vancomycin for empirical treatment. There have been few studies conducted in Africa that explore the management challenges associated with pneumococcal meningitis in adults, particularly in Morocco.

Objective

Assessing treatment methods and mortality rates linked to pneumococcal meningitis in Casablanca.

Methods

A retrospective descriptive study was conducted to include adults admitted to the Infectious Diseases Department of Ibn Rochd University Hospital in Casablanca for Streptococcus pneumoniae meningitis between January 2021 and January 2024.

Resultats

The diagnosis of meningococcal meningitis was confirmed through cerebrospinal fluid (CSF) culture in 12 patients (75%) and by polymerase chain reaction (PCR) in 4 patients (25%). The S. pneumoniae strain isolated from the culture was found to be sensitive to penicillin, ceftriaxone, vancomycin, ciprofloxacin and clindamycin. The minimum inhibitory concentration (MIC) confirmed antibiotic susceptibility in the CSF culture.

Additionally, S. pneumoniae bacteremia was associated with meningitis in 7 patients. The main complication was hydrocephalus (1%). Ceftriaxone was the most commonly used antibiotic for empirical treatment and was frequently combined with dexamethasone before the availability of CSF culture sensitivity testing. Vancomycin was added to the initial treatment if the clinical condition did not improve after 48 hours of therapy. The overall mortality rate observed in this study was 25%.

Table 1: Antibiotic Susceptibility Profile of CSF 255 Culture Antibiograms

Antibiotic	Ceftriaxone	Vancomycine	Ciprofloxacine	Penicilline	Clindamycine
Profile	S	S	S	S	S

Legende : S: sensitive

Discussion

According to the guidelines from the Infectious Diseases Society of America (IDSA), the treatment for bacterial meningitis begins with empirical antibiotic therapy, which consists of a third-generation cephalosporin combined with vancomycin. The main determinant of the therapeutic efficacy of vancomycin is the ratio of the area under the curve to the minimum inhibitory concentration (AUC/MIC). Hence, there is a need for antibiotic dosing to ensure a drug level above the MIC during treatment, preferably 4 times the MIC of the target organism.

Conclusion

Although treatment of pneumococcal meningitis can follow guidelines recommended by infectious disease societies, the mortality rate is still 25%. In Africa, proper antibiotic dosing is essential in managing bacterial meningitis to ensure that time-dependent antibiotics remain above the minimum inhibitory concentration.

Conflicts of Interest

The authors declare that they have no competing interests.

References

- 1. Van de Beek D, Brouwer M, Hasbun R, Koedel U, Whitney CG, Wijdicks E. Community-acquired bacterial meningitis. Nat Rev Dis Primers 2016; 2:16074.
- 2. Kat Franklin, Brenda Kwambana-Adams, Fernanda C. Lessa, Heidi M. Soeters, Laura Cooper, Matthew E. Coldiron. Pneumococcal Meningitis Outbreaks in Africa, 2000–2018: Systematic Literature Review and Meningitis Surveillance Database Analyses. J Infect Dis. 2021 Sep 1;224(12 Suppl 2): S174-S183.
- 3. Rossoni AM, Dalla Costa LM, Berto DB, Farah SS, Gelain M, Brandileone MC, et al. Acute bacterial meningitis caused by Streptococcus pneumoniae resistant to the antimicrobian agents and their serotypes. Arq Neuropsiquiatr 2008; 66: 509–15.
- 4. Esayas Kebede Gudina, Markos Tesfaye, Aynishet Adane, Kinfe Lemma, Tamiru Shibiru, Hans-Walter Pfister. Challenges of bacterial meningitis case management in low income settings: an experience from Ethiopia. Trop Med Int Health. 2016 Jul;21(7): 870-8.
- 5. Tunkel AR, Hartman BJ, Kaplan SL, Kaufman BA, Roos KL, Scheld Michael. Practice guidelines for the management of bacterial meningitis. Clin Infect Dis. 2004 Nov 1;39(9):1267-84. doi: 10.1086/425368.
- 6. D. van de Beek, C. Cabellos, O. Dzupova, S. Esposito, M. Klein, A. T. Kloek.ESCMID guideline: diagnosis and treatment of acute bacterial meningitis.Clin Microbiol Infect. 2016 May:22 Suppl 3: S37-62.