Intraventricular Vancomycin

- Chemical Stability Testing of Solutions for Intraventricular Irrigations via IRRAflow Ventricular Drain System
- The use of intraventricular vancomycin in subacute brain abscess in an adolescent male: A case report
- Fatal Mycobacterium avium meningitis in an HIV-negative Vietnamese man: a case report
- A case of meningitis treated with intraventricular vancomycin in an infant
- Medical Therapy Alone for Ommaya Reservoir-Associated Bacterial Meningitis: When It Works and When It Fails
- Successful treatment of pan-drug resistant Acinetobacter baumannii meningitis/ventriculitis following craniotomy and external ventricular drainage: a case report
- Effective Treatment of Acinetobacter baumannii Ventriculitis With Interventricular Colistin: A Case Report
- Clinical, Microbiological Profile, and Treatment Response to Intraventricular Antibiotics in the Management of Postneurosurgical Meningitis: A Single-Center Experience

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The decision of vancomycin dosage for central nervous system (CNS) infections is still a challenge because its bactericidal nature in cerebrospinal fluid (CSF) has not been confirmed by human studies. A study systematically reviewed the literatures on vancomycin in patients with meningitis, ventriculitis, and CNS device-associated infections, to assess efficacy, safety, and pharmacokinetics to better serve as a practical reference. Using vancomycin to treat CNS infections appears effective and safe based on current evidence. However, the optimal regimens are still unclear. Higher quality clinical trials are required to explore the vancomycin disposition within CNS [1)].

Tartara et al. found that intrathecal Vancomycin administration in EVDs does not reduce the occurrence of External ventricular drainage (EVD)-related infection (ERI) compared with intravenous cefazolin prophylaxis, but induces selection of gram-negative bacteria [2)]

It seems that IVT vancomycin should be recommended for inclusion in hydrocephalus surgery protocol to reduce postoperative shunt infection. It is recommended that shunt protocols be adopted in future multicenter prospective randomized controlled trials on the reduction of ventriculoperitoneal shunt infections to further evaluate the efficacy of IVT antibiotics [3)]

A study aims to examine predictors of vancomycin penetration into cerebrospinal fluid (CSF) in patients with external ventricular drainage and the feasibility of CSF sampling from the distal drainage port for therapeutic drug monitoring. Fourteen adult patients (9 with primary CNS infection) were treated with vancomycin intravenously. The vancomycin concentrations in blood and CSF (from proximal [CSF_P] and distal [CSF_D] drainage ports) were evaluated by population pharmacokinetics. Model-based simulations were conducted to compare various infusion modes. A three-compartment model with first-order elimination best described the vancomycin data. Estimated parameters included clearance (CL, 4.53 L/h), central compartment volume (Vc, 24.0 L), apparent CSF

compartment volume (VCSF, 0.445 L), and clearance between central and CSF compartments (QCSF, 0.00322 L/h and 0.00135 L/h for patients with and without primary CNS infection, respectively). Creatinine clearance was a significant covariate on vancomycin CL. CSF protein was the primary covariate to explain the variability of QCSF. There was no detectable difference between the data for sampling from the proximal and the distal port. Intermittent infusion and continuous infusion with a loading dose reached the CSF target concentration faster than continuous infusion only. All infusion schedules reached similar CSF trough concentrations. Beyond adjusting doses according to renal function, starting treatment with a loading dose in patients with primary CSF infection is recommended. Occasionally, very high and possibly toxic doses would be required to achieve adequate CSF concentrations, which calls for more investigation of direct intraventricular administration of vancomycin. (This study has been registered at ClinicalTrials.gov under registration no. NCT04426383) [4)]

A retrospective cohort study was conducted on patients admitted to intensive care units who received IVT antibiotic treatment at participating centers in the USA between January 01, 2003, and December 31, 2013. Clinical and laboratory parameters, microbiology, surgical and antimicrobial management, and treatment outcomes were collected and described.

Results: Of the 105 patients included, all received systemic antimicrobial therapy along with at least one dose of IVT antimicrobial agents. Intraventricular vancomycin was used in 52.4% of patients. The average dose was 12.2 mg/day for a median duration of 5 days. Intraventricular aminoglycosides were used in 47.5% of the patients, either alone or in combination with IVT vancomycin. The average dose of gentamicin/tobramycin was 6.7 mg/day with a median duration of 6 days. Overall mortality was 18.1%. Cerebrospinal fluid (CSF) culture sterilization occurred in 88.4% of the patients with a rate of recurrence or persistence of positive cultures of 9.5%.

Conclusion: Intraventricular antimicrobial agents resulted in a high CSF sterilization rate. Contemporary use of this route typically results in a treatment duration of less than a week. Prospective studies are needed to establish the optimal patient population, as well as the efficacy and safety of this route of administration [5)].

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