Introduction:

Patients who are suffering from meningitis or have developed meningitis/Ventriculitis post operatively with culture sensitive pathogens sometimes do not respond adequately or show signs of improvement, to systemic antibiotic therapy. Even though appropriate agent is being used in the recommended dosage keeping systemic toxicity at the minimum. The cause of this could be mulifactorial but the issue of CNS penetration of the said agent via recommended systemic administration to achieve adequate therapeutic levels and clinically detectable improvement in patients clinical status, is unambiguous and merits further thought and exploration to achieve the therapeutic goals.

Case Summary:

A 68 yrs old patient with previous history of hypothyroidism, Diabetes , Atrial fibrillation on Dabigatran with past history of left cortical mastoidectomy for CSOM done in Jan 2018 was admitted with complains of intermittent headache and unsteadiness of gait . On evaluation he was found to have contiguous spread of CSOM to left petrous, cerebellum and adjacent temporal lobe with mass lesion around that area with communicating hydrocephalus . He was previously treated with a long term course of antibiotics and was planned for surgery in the form of left sub temporal craniotomy and debulking and biopsy of mass lesion along with revision mastoidectomy jointly by Neurosurgeons and ENT. Intraoperatively EVD was inserted and CSF was sent for analysis. In subsequent course in ICU, the EVD drain was continued and patient was extubated electively after adequate weaning. His biopsy was suggestive of CSOM but CSF culture revealed Candida Tropicalis. He was treated with liposomal Amphotericin B for a duration of seven days followed by Voriconazole. Meanwhile patient developed fever, deteriorating sensorium and signs of sepsis and subsequently was reintubated. His EVD was removed and samples sent for reanalysis. New EVD was inserted from opposite side. Reports came highly suggestive of super added bacterial meningitis with high cell count, very low sugar and high protein levels in CSF. EVD tip culture revealed heavy growth of Acinatobacter. Patient was subsequently put on systematic high dose Meropenem and Colistin as per sensitivity reports. In view of turbid CSF with evidence of pus draining through EVD, intra ventricular installation of Vancomycin @ 20 mg once daily and Colistin 1 lakh unit OD was started.

Patient sensorium gradually improved and fever subsided, total counts normalized

and CSF became clear. Subsequent fungal culture from CSF came negative and his cell count normalized and biochemistry improved. After seven days of intra ventricular antibiotics therapy his CSF culture revealed no growth. Patient was extubated on day 10 of intra ventricular antibiotic therapy.

Discussion:

Quite often during or post operative period patients who have undergone neurosurgical interventions have developed fever, sepsis and altered sensorium where revaluation had revealed CNS infection with varied MDR pathogens. Acinetobacter species are gram-negative aerobic bacteria that are coccobacillary in shape and are aerobic, nonmotile, nonlactose fermenting and does not need special factors for growth. The appearance of Acinetobacter varies with different stages of growth. Preferentially colonizes aquatic environments and is inherently resistant to multiple antibiotics. The virulence of Acinetobacter species is due to evasion from immune system, enabling high bacterial density that triggers lipopolysaccharide mediated sepsis. Capsular polysaccharide helps in immune evasion, while LPS triggers septic shock. However antibiotic resistance is the main factor that determines the clinical outcome.

There have been quite a few instances when Intra thecal / intra ventricular approach have been used to administer Colistin as an elective measure to cure patients having CSF growth of MDR Acinetobacter baumannii, Klebseilla pneumoniae, Pseudomonas aeruginosa with no long lasting nephro or neuro toxicity.

Conclusion:

Based on the encouraging out come in our case and various published case reports we conclude that, as a last therapeutic measure, intrathecal colistin can be a viable option in patients with growth of Acinetobacter species in the CSF, provided there is documented proof that organism is susceptible to Colistin along with careful monitoring of renal function, regular CSF analysis and change in clinical findings for improvements, deterioration or no change at all. The ultimate decision of intra thecal or intraventricular topical application should be based on multiple factors and cross consultation between different faculties.

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References:

1. Issues in pharmacokinetics and pharmacodynamics of anti-infective agents: distribution in tissue. M Müller, A dela Peña, H Derendorf.
2. The penetration of anti-infectives into the central nervous system BP Kearney, FT Aweeka – Neurologic clinics, 1999.
3. Treatment With Intrathecal Colistin of a Resistant Extended-Spectrum β-Lactamase-Producing Klebsiella pneumoniae in the Cerebrospinal Fluid Enfanto, Christopher M. PharmD, BCPS*; Shin, Sonya MD, MPH† Infectious Diseases in Clinical Practice: July 2007 – Volume 15 – Issue 4 – p 274-277.
4. Post-neurosurgical multidrug-resistant Acinetobacter baumannii meningitis successfully treated with intrathecal colistin. https://www.sciencedirect.com/science/article/pii/S1201971209003191#bib2
5. Intrathecal Use of Colistin. Walter Vasen, Pablo Desmery, Santiago Ilutovich, Icu Sanatorio Mitre, Bartolomé Mitre 2553 Capital (1039), Argentina, Ana Di Martino.
6. Clinical and Pathophysiological Overview of Acinetobacter Infections: a Century of Challenges. Wong D, Nielsen TB, Bonomo RA, Pantapalangkoor P, Luna B, Spellberg B. https://www.ncbi.nlm.nih.gov/pubmed/27974412.

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