Letter

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Choosing the therapy for neurological infection with rapidly growing mycobacteria

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SUMMARY The management of neurological infections due to non-tubercular mycobacteria is extremely challenging because of scarce literature, issues with penetration, lack of easily available susceptibility platforms and adverse effects associated with long term therapy. We report a case of a young girl with neurological infection due to rapidly growing mycobacteria to discuss the factors that should be considered while choosing the therapy for such rare and persistent infections.

Keywords non-tubercular mycobacteria, rapidly growing mycobacteria, carbapenems, aminoglycosides

Rapidly growing non-tubercular mycobacteria (NTM) are uncommonly associated with infections involving lungs, bones or soft tissues (*1-4*). They usually occur following trauma, contamination during surgery, hematogenous infection from a distant focus or contiguous spread from wounds or perforated gut (*6-7*). These organisms may very rarely involve the central nervous system (CNS) as well. The treatment of NTM is mostly based on small observational studies as there are no properly conducted clinical trials in this area. With the exception of a few case reports, there is hardly any literature on NTM involving the CNS. This, along with the issues of penetration, lack of easily available susceptibility platforms and adverse effects associated with long term therapy, makes the management extremely challenging. We discuss the factors that should be considered while choosing the therapy for such infections using a case of ventriculoperitoneal (VP) shunt infection with *Mycobacterium fortuitum* that we managed recently.

A 13-years old female patient, a known case of posterior fossa glioma with bilateral ventriculoperitoneal shunt *in-situ* (for four years) presented to an outside hospital with acute appendicitis. She was found to have an inflamed appendix which was removed laparoscopically. Fifteen days after the surgery, she presented to our hospital with high-grade fever and altered sensorium with convulsions. She was found to have a Glasgow Coma Score of 9 (Eye-3, Verbal-2, Motor-4). A large, firm and mobile swelling was noticed on the abdominal examination. Computerized tomography (CT) scan of the brain showed dilated ventricles, and CT abdomen showed a large uniloculated cyst (pseudocyst) enclosing the shunt tips. Cerebrospinal fluid examination (CSF) revealed a total leucocyte count of 280/μL (neutrophil 70%, lymphocyte 30%), a glucose of 80 mg/dl and a protein of 14 mg/dl. Ziehl Neelsen staining of the CSF showed multiple acid-fast bacilli (3+) and the growth in culture was identified as *Mycobacterium fortuitum* by line probe assay and sequencing (Figure 1). The likely source of shunt infection in our case was the laparoscope used in the appendectomy. We hypothesized that the infection in the CSF was a result of ascending infection from the peritoneal end of the VP shunt. She was started on imipenem (intravenous), amikacin (intravenous),

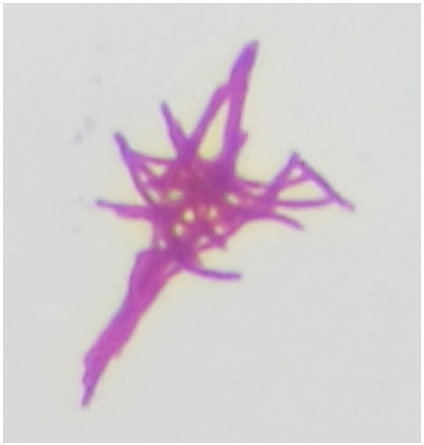

Figure 1. Ziehl Neelsen stain of cerebrospinal fluid showing acid-fast bacilli.

Table 1. Summary of drugs used for treatment of Mycobacterium fortuitum

Drug	Percentage susceptibility	Dose and formulation	AUCCSF/AUCS (uninflamed meninges)	Adverse effects
Amikacin	100	5 mg/kg/dose q8 h IV	0.2	Nephrotoxicity, Ototoxicity, neurotoxicity
Levofloxacin	100	500-750 mg q24h IV or oral	0.71	Gastrointestinal, headache, insomnia
Imipenem	100	500 mg q6 h IV	0.2	Anemia, thrombocytopenia, transaminitis
Linezolid	86	600 mg q12 h IV or oral	0.9	Diarrhea, leucopenia, thrombocytopenia
Doxycycline	50	100 mg q12 h IV or oral	0.2	Diarrhea, nasopharyngitis
Minocycline	50	200 mg loading followed by 100 mg q12 h	No data	Dizziness, fatigue, pruritus
Clarithromycin	50	500 mg q12 h oral	No data	Dysgeusia, diarrhoea

*AUCCSF/AUCS: Area under curve of drug in cerebrospinal fluid divided by area under curve in serum.

levofloxacin (oral) and linezolid (oral). All the shunt hard wares were removed, and a frontal Ommaya reservoir was inserted. The endoscopic third ventriculostomy was done after the CSF became sterile. She was discharged after two months with oral levofloxacin and linezolid. The therapy was discontinued after one and a half year of oral therapy.

Treatment in such cases requires appropriate antimicrobials effective against the species of NTM causing the infection. It is generally suggested to use at least one or two parenteral drugs for the initial part of therapy followed by a prolonged course of oral therapy (*5*). We chose a regimen containing four drugs for the initial part of the therapy considering the involvement of CNS, the severity of the condition and lack of susceptibility testing. The oral therapy with two drugs was prolonged beyond one year for the same reason. The choice was based on the percentage susceptibility, penetration in CSF and adverse effect profile (*8*) (Table 1). Shunt hardware is a source for colonization of the bacteria because of its inherent property to form biofilms. Removal of all such shunt material is necessary to achieve a good outcome, as noted in the literature. CNS infection with NTM is a rare but potentially fatal condition. Besides a high index of suspicion and early diagnosis, choosing the right therapy for the correct duration is paramount for a favourable outcome.

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