Gordonia sputi related multiple brain abscesses, an AIDS-presenting illness: Thinking outside the box

Ahmed Eribi, a,b, Kawthar Al-Amri a, Amal Al-Jabri a,c, Alsayed Osman d, Osman Mohamed Elfadil b,d,*

a Division of Infectious Diseases, Department of Medicine, Armed Forces Hospital, Muscat, Oman
b Department of Medicine, Armed Forces Hospital, Muscat, Oman
c Department of Infection Prevention and Occupational Safety, Khoula Hospital, Muscat, Oman
d Mayo Clinic, Rochester, MN, USA

ABSTRACT

HIV/AIDS has been recognized as a global health issue with significant burden on healthcare services worldwide. Diagnostic and therapeutic challenges include wide range of difficult to identify and treat infections. Gordonia sputi is known to cause multi-system infections in setting of HIV/AIDS. It is often difficult to isolate this organism requiring high suspicion index and special testing techniques. While there is no guidelines-recommended antibacterials regimen for Gordonia sputi infection, extended combined broad spectrum antibacterials have been successfully used. Our patient in this report is a 50-year-old male with no past history who presented with progressive weakness on the right side of the body and urinary incontinence over the duration of one month. MRI scan of the brain showed bilateral ring-enhancing lesions. Gordonia sputi was identified from a tissue biopsy using 16S ribosomal RNA sequencing technique. HIV test for antibodies came to be reactive and a CD4 cell count of 7/μL. The patient was treated with combination of antibacterials and had remarkable radiological interval changes and relatively slower yet apparent clinical improvement. Unfortunately, and despite initial recovery, patient has later developed multi-drug resistant hospital acquired pneumonia leading to his death in ICU during course of hospitalization. Treatment of Gordonia sputi in setting of HIV infection with a combination of antibacterials over extended period appears to be safe and effective. To our knowledge, this is the first report of Gordonia sputi related multiple brain abscesses as AIDS-presenting illness.

© 2020 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Gordonia (formerly: Gordona), a bacteria species with taxonomic classification under the sub-order of Corynebacterium under Actinomycetales [1]. They are aerobic, gram-positive and weakly acid-fast Cocobacilli that are frequently mistaken as Rhodococcus or Nocardia bacteria by conventional identification methods [2,3]. Given the organism’s ability to biodegrade [4] and adhere to rubber with biofilms formation, its pathogenicity was linked to long-term indwelling catheters and implantable devices [2,4,5]. However, possible infections unrelated to medical devices include wound and skin infections, mediastinitis, otitis externa, brain or breast abscesses, arthritis and ocular infections were reported as well [2,4,6].

Case report

A 50-year-old male presented to our center with a one-month history of progressive right-sided weakness and urinary incontinence. He also reported intermittent neck and right-sided body pain, fever and night sweats. He unintentionally lost around 18 lbs. in weight. Systemic review was unremarkable, particularly for headaches, vomiting, dysphasia, dysphagia, altered sensorium, seizures, cognitive impairment and change in vision. On clinical examination he was found to be emaciated and depressed. No signs of instability, pallor, jaundice, palpable lymph nodes or meninges were identified but oral thrush was noted. Examination of cardiovascular system, chest, and abdomen revealed no abnormality. Neurological examination revealed diffuse muscle wasting, global hypertonia and hyperreflexia as well as significantly reduced power on the right side. Sensation was diminished on
the right side of body. Initial blood investigations including basic hemo-gram and biochemical profile were unremarkable except for mild relative lymphopenia.

Magnetic Resonance Imaging (MRI) of the brain showed multiple, bilateral and asymmetrical ring enhancing (T1 hypointense, T2 and FLAIR hyper-intense) lesions of varying sizes in cerebral hemispheres, right basal ganglia and cerebellum with perilesional edema. The largest lesion was located on right frontal lobe and measured 30 x 24 mm, surrounded by vasogenic edema and causing mass effects (Fig. 1: A). HIV tests panel reported as following: positive antibodies screening test; viral load = 317,077 RNA copies/mL; helper cells (CD4) Count 7/µL; CD4:CD8 ratio = 0.03. Screening for Cryptococcus and TORCH (Toxoplasmosis, Rubella, Cytomegalovirus and Herpes) was negative. Lumbar puncture is thought to be unsafe in view of increased intra-cranial pressure.

The patient underwent diagnostic brain biopsy. No organism was seen on gram, India ink and acid-fast stains. 24 h later, some whitish dry non-hemolytic colonies were observed on 5% sheep blood agar and chocolate plates. Gram staining of the colonies revealed medium to long beaded, non branching gram-positive rods, which were positive for modified acid-fast stain as well. At this stage and considering the clinical presentation, suspicion of Nocardia or other aerobic Actinomycetes was raised. However, 48 h later, the growth looked slightly pinkish with undulating margins. Using API® Coryne strip (BioMérieux SA, Marcy l’Etoile, France), the isolate was identified biochemically as Rhodococcus species. However, as this was inconsistent with morphological observations, we performed 16S rRNA gene sequencing which matched that of Gordonia sp. The E-test minimum inhibitory concentration (MIC) was reported as following (in µg/mL): vancomycin 1.5; ceftrixone 1.5; imipenem 0.023; amikacin 0.19; gentamycin 0.032; meropenem 0.19; ciprofloxacin 0.125.

The patient was empirically begun on meropenem, vancomycin and rifampicin at admission to hospital. In light of antibacterials sensitivity tests, consensus opinion was to continue on this regimen for extended period of at least 4–6 weeks. Anti-retroviral (efavirenz, emtricitabine and tenofovir) treatment was started 2 weeks later. Repeated MRI after a month of treatment showed interval resolution of most of the lesions with remaining few lesions in the upper cerebrum with development of right frontal subdural hematoma adjacent to the previously noted large lesion and post-biopsy related changes (Fig. 1: B).

The patient showed slow but apparent clinical improvement and remained clinically stable and afebrile. Unfortunately, after a month of hospitalization he developed progressive shortness of breath, hypoxemia and hypotension and was shifted to ICU with hospital acquired pneumonia. Chest radiograph showed bilateral infiltrates. Actinobacter sensitive to colistin was isolated from sputum. Accordingly, colistin was added as well as trial of corticosteroids for possibility of Immune Reconstitution Inflammatory Syndrome (IRIS). Patient continued to deteriorate despite all supportive measures and, unfortunately, died few days after admission to ICU.

**Discussion**

The genus Gordonia was first described in 1971 by Tsukamura [7]. Fang et al. described twenty-nine Gordonia species [8]. Fortunately, only few can cause human infections, these include Gordonia terrae, Gordonia sputi and Gordonia bronchialis. Less frequently reported species are Gordonia rubropertincta, Gordonia polysporovenorans, Gordonia otitidis and Gordonia arenii. Gordonia species may have multisystem involvement and typically affect immunocompromised hosts [6]. Seventeen cases of Gordonia sputi infection reported between 1996 and 2017 worldwide. Brust et al. has described *Gordonia sputi* septicemia in a patient with AIDS [5]. *Gordonia*-related CNS infections were reported in patients with no HIV infection, including meningitis and brain abscesses [9]. Differential diagnoses of brain ring-enhancing lesions in patients with HIV/AIDS are toxoplasmosis, cryptococcosis, lymphoma and tubercula. *Gordonia sputi* is a rare another cause, but should be suspected whenever common organisms are not identified.

Our patient responded to combined antibacterials regimen with noticeable clinical response. We believe that the cause of death was respiratory failure due to multi-drug resistant *Actinobacter* pneumonia. Choosing appropriate antibacterials is crucial in treatment of *Gordonia sputi* infection in immunocompromised patients. Blaschke et al. [10] elaborated on antibacterials sensitivity in a case series including 6 patients as well as another 24 cases previously published. They suggested the use of carbapenem or fluoroquinolone in combination with aminoglycosides as empirical therapy for period of at least 4–6 weeks as relapses were reported with shorter period of treatment [10].

**Conclusion**

To our knowledge, this is the first report of *Gordonia sputi* related multiple brain abscesses as AIDS-presenting illness. Treatment of *Gordonia sputi* in setting of HIV infection with a
A combination of sensitivity-based antibacterials over a period of 4–6 weeks appears to be safe and effective.

Author statement

Eribi, A., Al-Amri, K. and Mohamed Elfadil, O. contributed equally to conceptualization, literature review, critical revision and editing of the manuscript. Al-Jabri, A. and Osman, A. contributed to literature review and manuscript drafting.

Funding

None.

Ethical approval

Not applicable.

Informed consent

Consent was obtained from patient’s family.

Declaration of Competing Interest

Authors declare no conflict of interest.

References

[1] Stackebrandt E, Rainey FA, Ward-rainey NL. Proposal for a new hierarchic classification system, Actinobacteria classis nov. Int J Syst Evol Microbiol 1997;47(2):479–91. doi:http://dx.doi.org/10.1099/00207713-47-2-479.

[2] Ramanan P, Deziel PJ, Wengenack NL. Gordonia bacteremia. J Clin Microbiol 2013;51(10):3443–7. doi:http://dx.doi.org/10.1128/JCM.01449-13.

[3] Lechevalier H. Nocardioform actinomycetes. BERGEY’S Manual of systematic bacteriology 1989;4: p. 2348–408.

[4] Arenskötter M, Bröker D, Steinbüchel A. Biology of the metabolically diverse genus Gordonia. Appl Environ Microbiol 2004;70(6):3195–204. doi:http://dx.doi.org/10.1128/AEM.70.6.3195-3204.2004.

[5] Brust JCM, Whittier S, Scully BE, McGregor CC, Yin MT. Five cases of bacteremia due to Gordonia species. J Med Microbiol 2009;58(Pt 10):1376–8. doi:http://dx.doi.org/10.1099/jmm.0.010272-0.

[6] Tsukamura M. Proposal of a new genus, Gordona, for slightly acid-fast organisms occurring in spuva of patients with pulmonary disease and in soil. J Gen Microbiol 1971;68(1):15–26. doi:http://dx.doi.org/10.1099/00221287-68-1-15.

[7] Fang W, Li J, Cui H-S, Jin X, Zhai J, Dai Y, et al. First identification of Gordonia sputi in a post-traumatic endophthalmitis patient – a case report and literatures review. BMC Ophthalmol 2017;17(1):190. doi:http://dx.doi.org/10.1186/s12886-017-0573-5.

[8] Martín D, Barrios A, Domingo D, Sánchez P, Ruiz-Dassy A, et al. Cerebrospinal fluid shunt-associated meningitis caused by Gordonia sputi: case report and review of the literature. Infecz Med 2017;25(2):174–8.

[9] Blaschke AJ, Bender J, Byington CL, Korgenski K, Daly J, Perti CA, et al. Gordonia species: emerging pathogens in pediatric patients that are identified by 16S ribosomal RNA gene sequencing. Clin Infect Dis 2007;45(4):483–6. doi:http://dx.doi.org/10.1086/520018.