



Research Article

A CASE OF MENINGITIS DUE TO *Corynebacterium striatum* IN AN HIV INFECTED PATIENT

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Abstract- *Corynebacterium striatum* is a known component of normal skin microbiome and is nearly always discarded as contaminants in clinical microbiology laboratories. However it can be a potential pathogen in immuno-compromised as well as immuno-competent individuals, especially those with indwelling medical devices. It has been mostly implicated in causing meningitis, blood stream infections and respiratory infections. We describe a case of meningitis due to *C. striatum* in an HIV infected individual with external ventricular drainage. Isolation of *C. striatum* should not be ignored as it can be a potential nosocomial pathogen with a propensity to carry multi-drug resistant genes.

Keywords- *Corynebacterium striatum*, Meningitis, External ventricular drainage

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Introduction

The members of the genus *Corynebacterium* are aerobic or facultative anaerobic, catalase positive; non-partially acid fast, asporogenous irregularly shaped Gram positive rods. The genus contains *Corynebacterium diphtheriae* causing diphtheria and other *Corynebacterium* species collectively termed as diphtheriae. The pathogenic potential of these organisms are often underestimated and they are often considered to be part of the normal microbiome present on the skin and mucous membrane [1]. For a long time, these diphtheroids were considered as simple cutaneous contaminants with little or no potential pathogenicity and often discarded as contaminants if isolated in the clinical microbiology laboratories. However, numerous *Corynebacterium* species have been recently implicated in various infectious processes especially in immunocompromised hosts [1-3]. Of the various *Corynebacterium* species, *Corynebacterium striatum* is one among the frequently isolated species in the laboratory and is often discarded as a contaminant. Several case reports have been published describing *Corynebacterium striatum* causing meningitis, bacteremia and sepsis, respiratory infections, tubo-ovarian abscess, septic arthritis, prosthetic valve endocarditis and keratitis [2,4-15]. To our knowledge, we report the first case of *Corynebacterium striatum* causing meningitis in an HIV infected individual.

Case Presentation

A 33 yrs old heterosexual male, known case of HIV infection and pulmonary tuberculosis on antiretroviral and anti-tubercular therapy respectively for the past 9 months presented to the emergency department with complaints of fever with chills, headache, neck pain, giddiness, altered sensorium, absence of speech and left sided weakness for the past 2 days. No history of trauma, seizures, vomiting. Ventriculostomy was done 15 days back on suspicion of tubercular meningitis and external ventricular drainage (EVD) was established.

On examination, the patient was poorly built and nourished, conscious but appeared confused and had a severe headache. His oral temperature was 38° Celsius and vital signs were normal. Neurological examination revealed neck stiffness, positive Kernig sign and left upper and lower limb paralysis. Physical examination was otherwise unremarkable and on local examination there was no infection at the EVD site. Neurosurgery consultant opinion was obtained for the

EVD. Under aseptic precautions, EVD was removed and a fresh drain was inserted and tube fixed. His CD4 count was 247 cells/ μ l, CD3- 410 cells/ μ l and CD45 was 617 cells/ μ l.

Cerebrospinal fluid (CSF) collected through the fresh drain yielded cloudy CSF. Analysis of CSF revealed a protein concentration of 136mg/dl (Normal value-15-40mg/dl), glucose concentration of 12mg/dl (Normal value- 40-70mg/dl), simultaneous random blood glucose level was 131 mg/dl, CSF chloride of 104mEq/L (Normal value- 116-130mEq/L), and an elevated WBC count (>95% neutrophils and occasional lymphocytes). Gram stain from the CSF sample revealed the presence of plenty of pus cells but no organisms were seen. CSF sample was plated onto Blood agar and Chocolate agar and incubated aerobically at 37 °C. After 24 hrs of aerobic incubation, plates were examined for the presence of growth. Heavy pure growth of 1-2 mm sized, cream coloured, non-hemolytic colonies were observed in blood agar. Similar types of colonies were also observed in chocolate agar. Gram stain from both the plates revealed short Gram positive bacilli. They were non-motile, catalase positive and reduced nitrate to nitrite. Since in the direct smear no organisms were demonstrated, an initial report of possible contamination with the skin flora was sent. A request was made to repeat the specimen after taking proper antiseptic precautions. A repeat sample was sent on the same day and the next day and still direct Gram stain did not reveal any organisms. Culture from the both the specimens revealed the similar type of growth and Gram stain morphology as that of the first sample. Identification of the bacterium was subsequently done by BD Phoenix™ 100 ID/AST (Becton Dickinson Co. [BD], Sparks, Md.) automated microbiology identification system as *Corynebacterium striatum* with 98% agreement and the organism was found to be susceptible to vancomycin and erythromycin, resistant to penicillin, ampicillin and co-trimoxazole. Patient was on Cap. Cloxacillin 500mg 6 hrly for EVD prophylaxis and on T. Co-trimoxazole for prophylaxis of *P.jiroveci* pneumonia. Unfortunately patient expired due to acute worsening of his symptoms and sudden cardiac arrest.

Discussion

Corynebacterium species other than *C. diphtheriae* are being reported with an increasing frequency in the past few years due to the improved medical care for

the critically ill patients and increasing use of indwelling medical devices. Most often the exact role of this organism as a pathogen when isolated from the clinical specimen poses a difficult situation for the clinical microbiologist as they are usually part of the normal skin and mucous membrane. *C. striatum* was first described by von Besser in 1889 even though the first case report of was published in 1980 by Bowstead and Santiago in a chronic lymphocytic leukemia patient who had a pleura-pulmonary infection[16]. Since then there are several case reports and even case series implicating *C. striatum* as the causative agent [4-15,17,18].

To our knowledge this is the first case report of serial cerebrospinal fluid positive for *C. striatum*. There are few case reports describing *C. striatum* causing meningitis and this case report confirms its pathogenic potential in causing meningitis. Since these organisms are part of the normal flora of skin and mucous membrane, infections due to these organisms are usually considered to be of endogenous origin. However patient to patient transmission of *C. striatum* also has been described [19]. In this case, the patient is immunocompromised due to HIV infection and there is direct communication between the subarachnoid space and the skin through the EVD left in-situ through which organisms can gain entry into the subarachnoid space, which explains the pathogenesis of meningitis in this particular case.

Identification of *Corynebacterium* species often poses difficulty because of its cultural similarity with common Coagulase negative *Staphylococci*. But it should be performed if isolated in pure culture from normally sterile samples as they may be the only causative agent. Antimicrobial susceptibility testing and choosing appropriate antibiotics for the treatment of these infections can be life saving as multi drug resistant strains of *C. striatum* are reported in causing nosocomial outbreaks [8, 9, 19,20-23].

Conclusion

As seen in our case and other reports from the literature, it should be noted that if isolated from the clinically appropriate specimen, *Corynebacterium* species should not be dismissed as a contaminant especially in patients with underlying diseases. This case report highlights the growing importance of *C. striatum* as a nosocomial pathogen and the relevance of timely diagnosis and prompt treatment of these infections using appropriate antibiotics in order to reduce the mortality associated with it.

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Conflicts of interest: None declared

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Abbreviations- EVD (External ventricular drainage)

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