CASE REPORT

Nocardia Cyriacigeorgica Bacteremia in an Immunocompetent Patient

Abdur Rafey, Aamir Khan, Salma Muhammad Abbas

Infectious Disease and Internal Medicine Department, Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan

Nocardia is a gram-positive rod with appearance of branching hyphae. *Nocardia asteroides* complex was responsible for most infections; now *Nocardia cyriacigeorgica* is more frequently identified.[1] It usually is an opportunistic pathogen with the majority of infections occurring in patients with immunosuppressive conditions. Patients with depressed cell-mediated immunity especially are at high risk for infection.[2,3] However, it can cause disease in immunocompetent patients.[4] Nocardia is rare and has mortality of 40%.[5]

We are writing this case report to address an unusual case of *Nocardia cyriacigeorgica* bacteremia in a young female without any risk factors. It will help for better understanding of Nocardia infection in healthy persons and improvement of patient care.

Introduction

Patient who presented to us with fever and work up revealed diagnosis of Nocardia bacteremia.

Case

15 years old female unmarried, student and resident of Raiwind Lahore, who presented with fever from 1 month. Fever was high grade with rigors and chills relieved only by taking paracetamol, with no other respiratory, abdominal, cardiovascular and nervous symptoms. There was no history of skin lesions, lumps bumps and weight loss. She was not taking any medications and no prior surgical procedures done. There was no animal exposure. No features suggestive of autoimmune disease. She had history of seasonal sinusitis, which was treated with antibiotics and antihistamines. She had history of allergy to dust. She remained vitally stable. There were no skin lesions. Chest had bilateral normal vesicular breathing with no added sounds. Nervous and cardiovascular system was unremarkable. She was started for evaluation for pyrexia of unknown origin. Baseline investigations were sent. They are mentioned in table 1. Chest X-ray was normal. Urine routine analysis and urine culture were normal. One set of blood culture was sent. One of the blood cultures showed *Nocardia cyriacigeorgica*, sensitive to: Amikacin, Ceftriaxone, Co-trimoxazole, Tobramycin, and Linezolid. The isolate was intermediate sensitive to Doxycycline, Minocycline and resistant to Co-amoxiclav, Imipenem, Ciprofloxacin, Moxifloxacin and Clarithromycin. CT brain with contrast showed mild deviated nasal septum projecting into the right nasal cavity, bilateral hypertrophy of the middle and inferior turbinate, mild mucosal thickening in left maxillary sinus. Brain parenchyma is unremarkable. CT Chest Abdomen and Pelvis with contrast was unremarkable. Transthoracic echocardiography was normal. She was started on oral Co-trimoxazole along with injectable Imipenem 1gm every 8 hourly for 1 week. Repeat blood cultures after one week were negative. Imipenem was then replaced with Injection ceftriaxone 2 g once daily along with Co-trimoxazole to complete total of 3 months. Patient remained on our follow up for three months. Her fever resolved after two weeks of treatment. She remained afebrile and symptom free for whole treatment duration till she completed three months of her treatment when she was advised to visit as needed.

Table 1: Baseline investigations

Baseline Investigations		
WBC	9.5 (4 – 10)	10.e 3/ul
HB	13 (13 – 17)	g/dl
Platelets	360 (150 – 450)	10.e 3/ul
ALT	25 (<42)	u/l
AST	21 (<41)	u/l
Bilirubin	0.4 (Up to 1.0)	mg/dl
Creatinine	0.72 (0.70 - 1.20)	mg/dl
CRP	8.5 (<5)	mg/l
ESR	4 (0-20)	mm/1 hr
Brucella antibodies	Negative	-
Anti HIV antibodies	Negetive	IU/ml
ANA	Negetive	-

Discussion

Nocardiosis has cutaneous, pulmonary, and disseminated form. Nocardia is found in the environment, typically in standing water, decaying plants, and soil. Infection occurs when breathing dust that contains the bacteria, traumatic inoculation through breaks in the skin, when a hospitalized patient is infected from contaminated medical equipment or from bacteria getting into a wound after surgery. Nocardiosis most commonly occurs in the lungs. With lung infection, spread to the brain can occur. Skin infections can occur when soil containing Nocardia species gets into open wounds or cuts.[6] Nocardia bacteremia is rare. A single center study showed 81 % patients were

Corresponding author: Abdur Rafey,
Department of Internal Medicine
Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan
Email: abdurrafey@skm.org.pk

immunocompromised with steroid use, malignancy, and transplant. 29% patients had endovascular devices and average duration of treatment was 2.5 months.[5] Literature review showed that presence of endovascular foreign bodies were the only risk factor associated with bacteremia.[7] *Nocardia cyriacigeorgica* septicemia and disseminated infection occurred in severely immunocompromised and transplant patients.[8] There are multiple studies and case reports that mention Nocardia bacteremia with above mentioned risk factors. In this case there were no risk factors neither clinical features of disseminated disease. We are reporting first case of *Nocardia cyriacigeorgica* bacteremia without any risk factors and clinical features associated with disseminated disease. Generally, treatment is given for 6 months. For central nervous system lesions treatment is given for 12 months. Trimethoprim-sulfamethoxazole is the drug of choice. Other options include minocycline, co-amoxiclav, amikacin, ceftriaxone, imipenem and tigecycline.[9]

Conclusion

Nocardia is the disease of immunocompromised people and may have cutaneous, pulmonary and disseminated forms. It is unusual to have Nocardia in blood culture in normal immunocompetent individuals without any risk factors that we have encountered in this patient. Rarely, invasive nocardiosis may be observed in immunocompetent individuals without apparent predisposing risk factors. This is the first reported case of *Nocardia cyriacigeorgica* bacteremia without any risk factors and clinical features associated with disseminated disease

References

1. Schlaberg R, Huard RC, Della-Latta P. Nocardia cyriacigeorgica, an emerging pathogen in the United States. *J Clin Microbiol* 2008;46(1): 265-273.
2. Young LS, Rubin RH. Mycobacterial and nocardial diseases in the compromised host. In: Rubin RH, Young LS, eds. A Clinical Approach to Infection in the Compromised Host. 4th ed. New York, NY: Kluwer Academic; 2002:257-261.
3. Long PF. A retrospective study of Nocardia infections associated with the acquired immune deficiency syndrome (AIDS). *Infection*. 1994;22(5):362–4.
4. Beaman BL, Burnside J, Edwards B, Causey W. Nocardial infections in the United States, 1972-1974. J Infect Dis. 1976; 134(3):286-289.
5. Williams E, Jenney AW, Spelman DW. Nocardia bacteremia: A single center retrospective review and a systematic review of the literature. *Int J Infect Dis* 2020;92: 197–207.
6. Bafghi, M.F. Nocardiosis from 1888 to 2017. *Microbial Pathogenesis* 2018;114(114): 369-384.
7. Kontoyiannis DP, Ruoff K, Hooper DC. Nocardia bacteremia. Report of 4 cases and review of the literature. *Medicine* (Baltimore) 1998;77(4):255–67.
8. Elsayed S, Kealey A, Coffin CS, Read R, Megran D, Zhang K. Nocardia cyriacigeorgica septicemia. *J Clin Microbiol* 2006;44(1):280–2
9. Steinbrink J *et al*. Manifestations and outcomes of nocardia infections: Comparison of immunocompromised and nonimmunocompromised adult patients. *Medicine* (Baltimore).2018;97(40): e12436