

Case Report

Post COVID nocardiosis-an opportunistic enemy

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ABSTRACT

Nocardia is an opportunistic infection seen mostly in immunocompromised individuals. It has become an important pathogen especially in these post covid times in which multiple individuals had to go through high dose corticosteroid therapy as part of their severe COVID-19 treatment. We present a 62 years old male with diabetes mellitus and hypertension who had previously been hospitalized for a month for COVID-19 and received high dose corticosteroids for the same. He presented again one month later with symptoms of fever and breathlessness and was worked up extensively for infections in which all his investigations came negative. For suspicion of opportunistic pathogen his HRCT thorax was done which showed consolidation and cavitation in lung along with other infective changes. In view of HRCT thorax findings bronchoscopy was done and bronchoalveolar lavage was sent for examination which grew *Nocardia beijingensis* on culture. Cotrimoxazole was started for the patient and 3 days after the initiation of therapy he became afebrile and was weaned off of oxygen support gradually over next one month.

Keywords: Nocardia, *Nocardia beijingensis*, COVID-19

INTRODUCTION

Nocardia is a gram positive, weakly acid-fast branching filamentous bacteria ubiquitously found in soil and aqueous environments. 2 major forms of the disease exist: cutaneous and pulmonary. Cutaneous occurs via direct inoculation and pulmonary by inhalation of aerosolized bacteria. Being part of normal healthy gingival flora, pulmonary nocardiosis is mostly seen in immunocompromised individuals like HIV, diabetics, post-transplant or patients on long term immunosuppressants.¹ Exact data of incidence and prevalence is not known due to lack of systematic surveillance. It should be suspected in immunocompromised patients presenting with symptoms of lower respiratory tract infection like fever, breathlessness, cough with expectoration. Diagnosis is made by identifying the organism in body samples via special stains, culture or molecular methods. Once diagnosed, multidrug therapy, with Cotrimoxazole as backbone, is continued for 6 to 12 months based on symptoms.

CASE REPORT

Here we present a case of 62 years old male patient who is a known case of type II diabetes mellitus and hypertension with prior history of severe COVID-19 pneumonia along with CMV infection for which he was hospitalised for about a month and was treated with remdesivir, ganciclovir, and high dose corticosteroids. Patient responded to the treatment and became symptomatically better. His oxygen requirement also gradually reduced and was discharged home requiring domiciliary oxygen support of 2-3 litres.

Post discharge patient was symptomatically well for almost a month when he developed high grade fever for 3 days reaching upto 102-degree F with cough having scanty yellowish sputum and left sided non radiating dull aching chest pain with no history of rash, joint pain, abdominal pain, burning micturition or recent history of travel.

Initial general physical examination showed BP-120/70 mm Hg, pulse-90 bpm, temp-98.6-degree F, respiratory rate-20 per min, SpO₂-92% at 2 L of oxygen with absence of pallor, icterus, cyanosis, clubbing or lymphadenopathy. Systemic examination of respiratory system revealed bilateral infrascapular coarse crepts. Rest of the systemic examination was unremarkable.

Patient was started on inj. piperacillin-tazobactam, Inj. clindamycin and other supportive treatment. Investigations showed haemoglobin-12 gm/dl, Total leucocyte count-8.05 thous/ul with 80% neutrophils, platelet count-182 thous/ul, LFT and KFT were grossly normal. His inflammatory markers showed CRP-179 mg/L, ferritin-2322 ng/ml, procalcitonin-0.18 ng/ml, Ddimer-0.72 ug/ml. His COVID RT-PCR was repeated which came negative. Rest of the workup for infections including blood, urine and sputum cultures were all negative.

However, despite IV antibiotics, he was not relieved of fever and respiratory symptoms.

Considering a prior history of severe COVID-19 and receiving high dose corticosteroids for it, HRCT thorax was done keeping the possibility of fungal pneumonia or other opportunistic infection (Figure 1). HRCT thorax showed ground glass opacities, atelectatic changes with septal prominence and traction bronchiectasis suggestive of COVID-19 sequelae along with dense area of consolidation with cavity in lingular segment along fissure suggestive of secondary infection.

In view of CT findings, he underwent bronchoscopy and bronchoalveolar lavage (BAL) was done and sent for examination in which gram stain showed many polymorphonuclear cells with moderate gram-positive branching coccobacillary forms resembling Nocardia. Modified Kinyoun stain of BAL showed moderate acid-fast organism resembling Nocardia. It was followed by BAL culture growing *Nocardia beijingensis*. In view of above findings, diagnosis of post covid pulmonary nocardiosis was made.

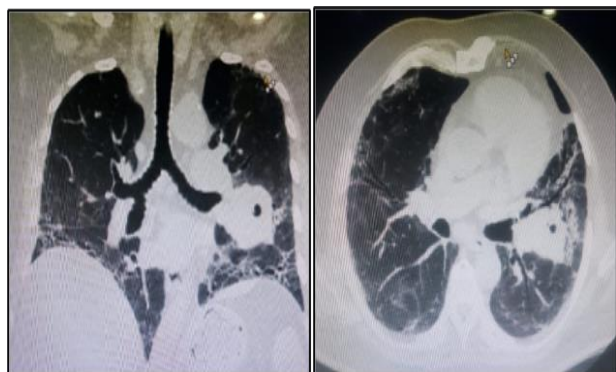


Figure 1: The consolidation seen on the left side of lung along with bilateral ground glass opacities in HRCT scan.

For Nocardia, inj. cotrimoxazole was initiated at dose of 15 mg/day of trimethoprim component. Patient became afebrile after 3 days of initiation of therapy and was discharged in haemodynamically stable condition but still requiring 2L oxygen via nasal prongs. On follow up after one month he was gradually weaned off of oxygen support. He is now asymptomatic and is maintaining normal oxygen saturation at room air.

DISCUSSION

Nocardiosis usually occurs in immunosuppressed states, such as HIV, diabetes, transplant recipients or in patients on long term immunosuppression therapy.² Glucocorticoids are widely used as an effective treatment to control inflammatory and autoimmune diseases with more recent prevalent use for COVID-19 infections.³

Due to lack of systematic surveillance and under detection of the disease, true incidence and prevalence of Nocardia infection is unknown but, in all studies, it has been unequivocally found to be much more prevalent in immunocompromised patients than immunocompetent. The immunosuppressive state allows this opportunistic pathogen to infect the lungs and cause full blown pneumonia and systemic infection which if diagnosed at the right time can be appropriately managed. The infection presents usually with symptoms of Lower respiratory tract infection like fever, cough with expectoration, difficulty in breathing, breathlessness.⁴

In case of a person still on immunosuppressive therapy, it can mask the symptoms of current infections making it difficult to make the diagnosis. The diagnosis can become even more complicated because of presence of multiple pathogens like *Candida*, *Cryptococcus*, *Mycobacterium*, *Pneumocystis*, *Toxoplasma*, etc in same person due to low immunity state.⁵

Diagnosis of Nocardia is based on identifying the branching filaments bacteria on Gram stain/modified Kinyoun stain or via growing the organism in culture or via the molecular methods of diagnosis like polymerase chain reaction.⁶⁻⁸ If there is high suspicion for Nocardia but all infective workup comes negative, Bronchoscopy can be performed and bronchoalveolar lavage can be sent for examination.⁹

Once diagnosis is confirmed, efforts should be made to reverse ongoing immunosuppression, if possible, like treating the HIV, tapering off the corticosteroids, treating the haematological malignancy, etc. notorious for disseminating virtually to any organ in the body and ability to relapse even on an ongoing treatment, systemic antibiotic therapy is suggested tailored according to the sensitivity report with initiation of first line antibiotic

Cotrimoxazole and two other agents empirically, to be modified later as per sensitivity report. Cotrimoxazole is recommended at 15 mg/kg in 3 to 4 divided doses via

intravenous or per-oral route for 6 to 12 months along with additional agent like imipenem, amikacin, linezolid, minocycline, etc, based on susceptibility. Once treatment is completed, patient should be kept on prophylactic Cotrimoxazole therapy for high-risk patients in whom immunosuppression cannot be reversed like solid organ recipients.¹⁰

CONCLUSION

Multiple post COVID-19 Nocardiosis cases are being reported because of the rampant use of corticosteroids in the treatment of acute respiratory distress syndrome in COVID-19. In post COVID-19 patients who were treated with steroids and present with pneumonia-like features, a possibility of Nocardia infection should always be kept in mind. This case also emphasizes the importance and utility of BAL examination in patients with undulating fever, CT changes but having no microbiological evidence on extensive investigation. The absence of facility of BAL in most peripheral centres is another challenge in diagnosis and management of this condition. In such a condition, prompt suspicion and referral of the patient to higher centre would dramatically change the outcome in these patients.

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