DOI: 10.7860/JCDR/2022/52879.16125

Case Report

Microbiology Section

Palatal Infection by Multidrug Resistant Non Fermenting Gram Negative Bacilli in a COVID-19 Positive Patient Mimicking Black Fungus Infection- A Case Report

LINO VARGHESE KOSHY[1], AMBUJAVALLI BALAKRISHNAN[2], JAISON JAYAKARAN[3], PRIYADARSHINI SHANMUGAM[4]

ABSTRACT

As the second wave of Coronavirus Disease-2019 (COVID-19) swept through India, many patients developed serious bacterial secondary infections such as pneumonia, sepsis and fungal infections such as mucormycosis. Among the bacterial infections, the most common organisms associated with secondary bacterial infections were *Pseudomonas aeruginosa*, *Acinetobacter baumannii* and *Stenotrophomonas maltophilia*. Here, authors present a rare case of 31-year-old COVID-19 positive male patient with sepsis who developed palatal necrosis due to infection caused by a non fermenting gram negative bacillus resembling the lesions seen in mucormycosis. The necrotic tissue, bronchoalveolar lavage fluid and blood samples were sent for culture. Blood cultures yielded *Elizabethkingia meningoseptica* and necrotic tissue yielded *Stenotrophomonas maltophilia*.

Keywords: Opportunistic infections, *Stenotrophomonas maltophilia*, Zygomycosis

CASE REPORT

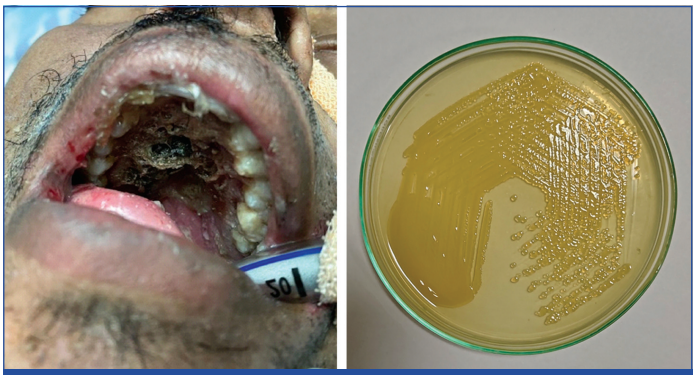
A 31-year-old male patient with no known co-morbidities was brought to the emergency room complaining of gradually worsening cough with increased difficulty in breathing for the past three weeks, with no similar complaints among family members. His oxygen saturation was 93% on room air which increased to 97% with nasal oxygen 4 lit/minute. He was haemodynamically stable. He was treated with doxycycline 100 mg twice daily, vitamin C 500 mg once daily, tab zincovit once daily and was admitted to the ward, after being diagnosed as COVID-19 positive by Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR). His Computed Tomography (CT) severity score was 12/25. Four days after admission, the patient gradually worsened and progressed to Acute Respiratory Distress Syndrome (ARDS) for which he was maintained on oxygen support by Non Re-breather Mask (NRM) and Non Invasive Ventilation (NIV) via bilevel positive airway pressure and bain circuit. He was treated with intravenous steroids (dexamethasone), remdesivir and antibiotics (intravenous ceftriaxone 1.5 g twice daily, piperacillin and tazobactam 4.5 g thrice daily for one week) and was transferred to the Intensive Care Unit (ICU) for further management and transferred back to the ward after his condition stabilised.

One week later, the patient developed severe breathlessness and was diagnosed to have a right sided pneumothorax for which an Implantable Cardioverter Defibrillator (ICD) was inserted. Pustular discharge was obtained after the insertion of ICD revealing a pyopneumothorax. On oral examination, a black colored lesion was observed on the hard palate [Table/Fig-1]. Tissue scrapings from the lesion, bronchoalveolar lavage and a blood sample were sent to the laboratory for culture and antibiotic sensitivity with suspected mucormycosis (Black Fungus). He was started on meropenem 500 mg thrice daily, colistin 150 mg twice daily and cotrimoxazole 300 mg twice daily for seven days. Ten days postthoracotomy, the bronchopleural fistula closure was done. He was intubated and ventilated and his vitals were stable. CT brain showed no evidence of intracranial haemorrhage. Seven days after maintaining status quo the patient deteriorated and was placed on ionotropic support. However, he succumbed to the illness without any response to treatment.

Consent was obtained from patients' attenders to publish this case report and to add a photograph of the hard palate.

Laboratory Investigations

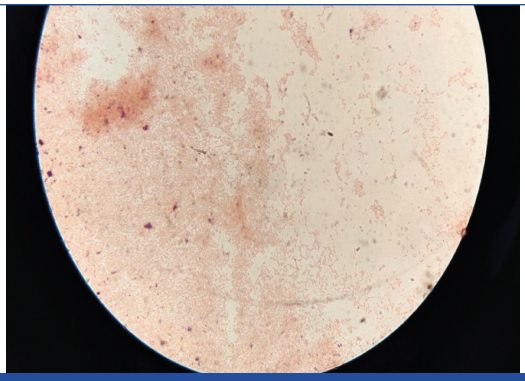
The Potassium Hydroxide (KOH) mount showed that there were no fungal growth. The samples were inoculated on the blood agar, chocolate agar, MacConkey agar, nutrient agar [Table/Fig-2], thioglycolate broth and Sabouraud's Dextrose Agar (SDA). Blood agar and chocolate agar gave a growth of grey white colonies with no lysis. MacConkey agar yielded medium sized translucent colonies which were lactose non fermenting without any pigmentation. A uniform turbidity was observed in the thioglycolate broth.



[Table/Fig-1]: Lesion on the hard palate; **[Table/Fig-2]:** *Stenotrophomonas* colonies on nutrient agar. (Images from left to right)

Gram's stain from the culture plates showed long and slender Gram negative bacilli [Table/Fig-3], which were oxidase negative, indole negative, Triple Sugar Iron (TSI) alkali slant by alkaline butt, citrate utilisation negative, urease negative, mannitol motility agar non fermenting and non motile and esculin hydrolysis positive. All these pointed towards a possible identity of *Stenotrophomonas maltophilia*, which was confirmed by Vitek 2 compact, automated ID and Antibiotic Susceptibility Testing (ABST) system. The organism was susceptible to minocycline, levofloxacin and cotrimoxazole. SDA yielded no growth suggesting no fungal involvement.

Blood cultures from the patient yielded *Elizabethkingia meningoseptica* which was susceptible to cotrimoxazole and pus



[Table/Fig-3]: Gram stained smear showing gram negative bacilli (40X).

from the pyothorax yielded *Pseudomonas aeruginosa* which was susceptible to aminoglycosides, fluoroquinolones, monobactam and carbapenems.

DISCUSSION

COVID-19 is ongoing pandemic with its manifestations and complications showing to be multifaceted. Non fermenting gram negative bacilli are an important group of pathogens causing hospital acquired infections. They can cause a wide range of infections including surgical site infections, ventilator associated pneumonia, catheter associated infections which can lead to sepsis and death if not controlled. These group of pathogens shows a wide range of antibiotic resistance which contributes to their virulence [1]. Secondary infections caused by non fermenting gram negative bacilli are seen in COVID-19 patients with prolonged hospital stay. The common non fermenters associated with these infections are *Pseudomonas aeruginosa, Acinetobacter baumannii* and *Stenotrophomonas maltophilia* [2]. Index case was of a COVID-19 positive patient who developed palatal lesion caused by non fermenting gram negative bacilli, resembling mucormycosis.

There have been reports of secondary infection with *Stenotrophomonas maltophilia* following COVID-19 infection in India which is an opportunistic pathogen [2,3]. *Stenotrophomonas maltophilia* is a non fermenting gram negative rod. In addition, *Stenotrophomonas* colonisation has been associated with lung damage [4]. Long term ICU stay, NIV, catheter related infections. *Stenotrophomonas maltophilia* can cause a spectrum of infections but the majority of the cases involve pneumonia and bacteremia [5]. Incidence of *Stenotrophomonas* infection increases with the severity of COVID-19 pneumonia [5].

Although the pathogen in the reported case is not considered to be very virulent, the organism is an opportunistic pathogen with a mortality rate of 43% in infected individuals [6]. Some studies reported a mortality of greater than 50% when associated with bacteremia [7,8]. Another cause of concern with this organism is that it is intrinsically resistant to β-lactam and aminoglycoside antibiotics [9]. *Stenotrophomonas* species is reportedly resistant to antipseudomonal antibiotics and administration of these antibiotics can enhance the growth of *Stenotrophomonas*.

CONCLUSION(S)

COVID-19 is associated with a wide array of secondary infections, both bacterial and fungal, especially in patients requiring prolonged hospitalisation. Therefore, a high index of suspicion is necessary while looking for infections with opportunistic infections such as *Stenotrophomonas maltophilia* which is associated with significantly higher mortality. Also, caution should be taken during administration of antipseudomonal antibiotics as these might enhance the growth of *Stenotrophomonas maltophilia*. Antibiotics targeting this organism also should be considered in patients with severe COVID-19 pneumonia and patients with central venous catheters.

REFERENCES

[1] Malini A, Deepa EK, Gokul BN, Prasad SR. Nonfermenting gram-negative bacilli infections in a tertiary care hospital in Kolar, Karnataka. Journal of Laboratory Physicians. 2009;1(02):062-66.

[2] Vijay S, Bansal N, Rao BK, Veeraraghavan B, Rodrigues C, Wattal C, et al. Secondary infections in hospitalised COVID-19 patients: Indian experience. infection and drug resistance. 2021;14:1893.

[3] Bilgic A, Sudhalkar A, Gonzalez-Cortes JH, de Ribot FM, Yogi R, Kodjikian L, et al. Endogenous endophthalmitis in the setting of COVID-19 infection: A case series. Retina. 2021;41(8):1709-14.

[4] Pek Z, Cabanilla MG, Ahmed S. Treatment refractory *Stenotrophomonas maltophilia* bacteraemia and pneumonia in a COVID-19-positive patient. BMJ Case Reports CP. 2021;14(6):e242670.

[5] Karpati F, Malmborg AS, Alfredsson H, Hjelte L, Strandvik B. Bacterial colonisation with *Xanthomonas maltophilia*—A retrospective study in a cystic fibrosis patient population. Infection. 1994;22(4):258-63.

[6] Robin T, Janda JM. *Pseudo-, Xantho-, Stenotrophomonas maltophilia*: An emerging pathogen in search of a genus. Clinical Microbiology Newsletter. 1996;18(2):09-13.

[7] Wang WS, Liu CP, Lee CM, Huang FY. *Stenotrophomonas maltophilia* bacteremia in adults: four years' experience in a medical center in northern Taiwan. Journal of Microbiology, Immunology, and Infection. 2004;37(6):359-65.

[8] Jang TN, Wang FD, Wang LS, Liu CY, Liu IM. *Xanthomonas maltophilia* bacteremia: An analysis of 32 cases. Journal of the Formosan Medical Association. 1992;91(12):1170-76.

[9] Pankuch GA, Jacobs MR, Rittenhouse SF, Appelbaum PC. Susceptibilities of 123 strains of *Xanthomonas maltophilia* to eight beta-lactams (including beta-lactam-beta-lactamase inhibitor combinations) and ciprofloxacin tested by five methods. Antimicrobial Agents and Chemotherapy. 1994;38(10):2317-22.

PARTICULARS OF CONTRIBUTORS:

1. Postgraduate Tutor, Department of Microbiology, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Chennai, Tamil Nadu, India.
2. Assistant Professor, Department of Microbiology, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Chennai, Tamil Nadu, India.
3. Assistant Professor, Department of Microbiology, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Chennai, Tamil Nadu, India.
4. Professor, Department of Microbiology, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Priyadarshini Shanmugam,
Professor, Department of Microbiology, Chettinad Hospital and Research Institute,
Rajiv Gandhi Salai, Chengalpattu District, Chennai, Tamil Nadu, India.
E-mail: priyadarshini0018@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Oct 17, 2021
- Manual Googling: Dec 29, 2021
- iThenticate Software: Feb 24, 2022 (2%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Oct 15, 2021**
Date of Peer Review: **Nov 24, 2021**
Date of Acceptance: **Jan 01, 2022**
Date of Publishing: **Mar 01, 2022**