CASE REPORT

A Rare Cause of Black Material in Endobronchial Ultrasound Guided Transbronchial Needle Aspirate: A Case Report

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Endobronchial ultrasound-guided transbronchial needle aspirate is a standard method for diagnosing and staging lung cancer. However, the appearance of black material in sample obtained through transbronchial needle aspiration is uncommon and is typically associated with anthracosis or melanoma. This case reports described an unusual finding of black material in a transbronchial needle aspiration sample caused by Mucormycosis in a 68-year-old man presenting with chronic cough, non-massive hemoptysis, a lung mass, and mediastinal lymphadenopathy.

Keywords: Black material; EBUS-TBNA; Mucormycosis

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Endobronchial ultrasound-guided transbronchial needle aspirate (EBUS-TBNA) has become increasingly utilized to obtain tissue for investigating hilar and mediastinal lymphadenopathy, particularly in cases of lung cancer[1]. Although uncommon, the presence of black material obtained from TBNA has been reported. Herein, we reported a case of black material obtained from EBUS-TBNA attributed to Mucormycosis.

Case Report

A 68-year-old man with a history of poorly controlled diabetes mellitus (HbA1c 12%) and heavy smoking presented with chronic cough and recurrent non-massive hemoptysis for one year. Computed tomography (CT) of the chest demonstrated a spiculated right upper lung mass, hilar and mediastinal lymphadenopathy with small calcifications (Figure 1). Convex-probe EBUS (CP-EBUS) revealed an enlarged right lower paratracheal lymph node with coagulation necrosis sign. On TBNA, a black material was obtained (Figure 2). Radial EBUS-guided transbronchial biopsies of the right upper lung mass also showed similar black material. Fungal culture was not performed, as fungal infection was not initially suspected. The cytology of the aspirate was non-diagnostic. Histopathology examination of the black material revealed broad-based, short perpendicular hyphae-like organism associated with acute inflammatory reaction. Grocott–Gömöri's methenamine silver stain confirmed Mucormycosis (Figure 3). Serum anti-granulocyte-macrophage colony-stimulating factor (anti-GM-CSF) antibody was tested to evaluate

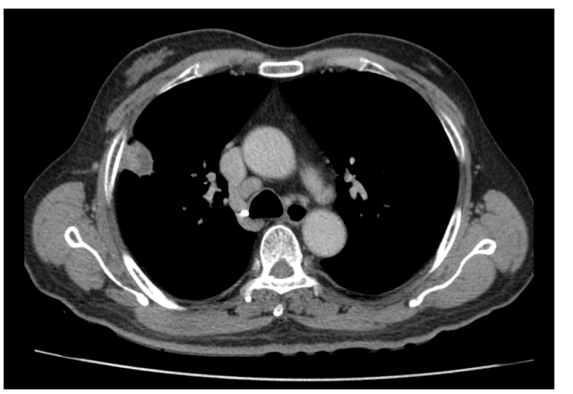

Figure 1. Chest CT in mediastinal window demonstrating a right upper lung nodule with internal necrosis and right lower paratracheal lymphadenopathy.

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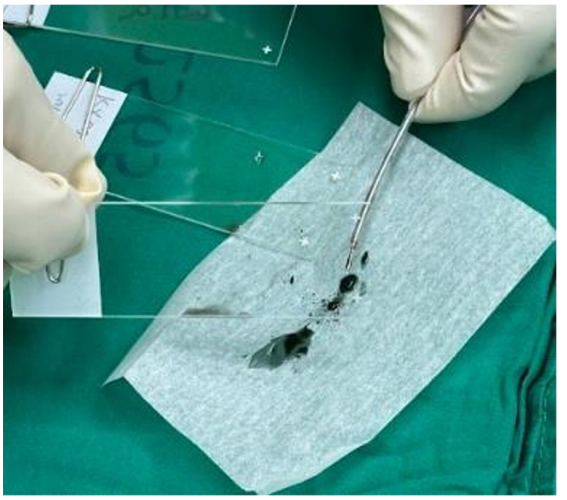

Figure 2. Black material obtained from TBNA.

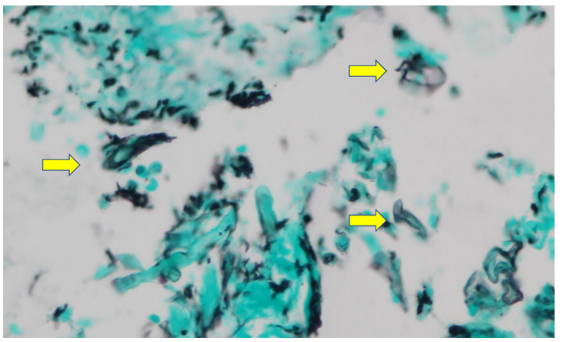

Figure 3. Grocott–Gömöri's methenamine silver stain confirmed Mucormycosis (Arrow).

for potential immunodeficiency and returned negative. Rhino-orbital cerebral involvement was absent. The patient denied surgical debridement. Treatment was initiated with intravenous Amphotericin B deoxycholate, but due to acute kidney injury, it was switched to an oral delayed-release tablet of Posaconazole after one week. Monitoring of serum Posaconazole trough level remained within the therapeutic range (1.00 to 3.75 µg/mL). The only adverse event was mild nausea, with no signs of hepatitis. Follow-up showed clinical improvement, and a subsequent CT scan revealed resolution of the lung mass and lymphadenopathy after six months of Posaconazole treatment combined with stringent glycemic control.

The present study was approved by the Human Research Ethics Committee of Khon Kaen University (HE671559).

Discussion

Black EBUS-TBNA findings have been reported in conditions such as pneumoconiosis, anthracofibrosis, metastatic melanoma, and infections like tuberculosis and aspergillosis[2,3]. A rare cause of Black EBUS-TBNA is Mucormycosis. Although Mucorales lack melanin in their cell walls, necrotic tissue resulting from angioinvasion by the fungus can cause black material to appear in the aspirate[4]. In the presented study, diagnosing mucormycosis was challenging due to the patient's history of smoking, the presence of a spiculated lung nodule, and the coagulation necrosis sign on convex-probe EBUS. The only significant clue pointing to mucormycosis was the patient's poorly controlled diabetes mellitus[5]. The histopathological finding of broad-based, short perpendicular hyphae without pigment-laden macrophages confirmed mucormycosis as the cause of the black EBUS-TBNA findings in this case.

Mucorales have a strong tropism for invasion of blood vessels, resulting in tissue infarction and necrosis. Early recognition and treatment are critical for improving patient survival before angioinvasion, and necrosis becomes too extensive. The principle of management of mucormycosis includes rapid initiation of effective antifungal therapy, prompt surgical debridement of necrotic lesions, and control of underlying medical conditions. The only effective systemic antifungals are Amphotericin B, Posaconazole, and Isavuconazole[6]. In this case, the patient denied surgical debridement, so treatment began with Amphotericin B, followed by Posaconazole. The duration of treatment for mucormycosis depends on clinical response; for Posaconazole, treatment durations range from one week to almost three years, with a mean duration was approximately 6 months[6], as seen in this case.

Conclusion

Mucormycosis should be considered in a differential diagnosis of black material obtained from TBNA, particularly in patients with risk factors such as poorly controlled diabetes mellitus. Treatment with Posaconazole alone can be effective in selected cases.

What is already know on this topic?

The causes of black EBUS-TBNA are pneumoconiosis, anthracofibrosis, metastatic melanoma, tuberculosis, and aspergillosis.

What this study adds?

The present study identifies mucormycosis as a potential cause of black EBUS-TBNA, particularly in patients with risk factors such as diabetes mellitus.

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Conflicts of interest

The authors declare no conflict of interest.

References

1. Detterbeck FC, Lewis SZ, Diekemper R, Addrizzo-Harris D, Alberts WM. Executive summary: Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest 2013;143(5 Suppl):7S-37S.
2. Dhillon SS, Harris K, Ylagan L. Black Endobronchial Ultrasound. J Bronchology Interv Pulmonol 2015;22:332-7.
3. Roostaei G, Asgari A, Kazemizadeh H, Abtahi H, Fakhri BM, Khoshnam Rad N. Black pigment on EBUS-TBNA sampling: A case of malignant melanoma. Respirol Case Rep 2024;12:e01398.
4. Ribes JA, Vanover-Sams CL, Baker DJ. Zygomycetes in human disease. Clin Microbiol Rev 2000;13:236-301.
5. Kontoyiannis DP, Lionakis MS, Lewis RE, Chamilos G, Healy M, Perego C, et al. Zygomycosis in a tertiary-care cancer center in the era of Aspergillus-active antifungal therapy: a case-control observational study of 27 recent cases. J Infect Dis 2005;191:1350-60.
6. Cornely OA, Alastruey-Izquierdo A, Arenz D, Chen SCA, Dannaoui E, Hochhegger B, et al. Global guideline for the diagnosis and management of mucormycosis: an initiative of the European Confederation of Medical Mycology in cooperation with the Mycoses Study Group Education and Research Consortium. Lancet Infect Dis 2019;19:e405-21.