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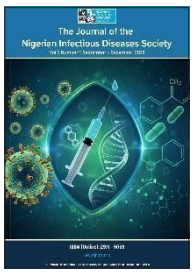

Case Report

Is Coccidioidomycosis Being Missed in Africa?

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ABSTRACT

Coccidioidomycosis is an endemic fungal infection in the Americas. It is common in immunocompromised hosts or those with underlying lung disorders/damage. In this article, we report a case of Pulmonary Coccidioidomycosis in an immunocompetent African patient with normal lungs and no history of travel to endemic zones. A 51yr old Chadian presented to the clinic with four (4) months history of recurrent cough, generalized body weakness and weight loss. He has no known risk factor. He was wasted with features of right lower zone consolidation. Screening for HIV and tuberculosis was negative. Histology of right lung mass seen on imaging was consistent with Coccidioidomycosis. Had oral Itraconazole with remarkable improvement after six (6) weeks. This communication can stimulate clinicians to search for and report more cases of coccidioidomycosis that might be missing in Africa with the potential of changing the epidemiologic description of this important fungal infection.

Keywords: Coccidioidomycosis, endemic, Sub-Saharan Africa, Nigeria, Immunocompetent, pulmonary

BACKGROUND

Coccidioidomycosis commonly known as valley fever is caused by the di-morphic soil dwelling fungi of the Genus Coccidioides, which has two species that causes clinically indistinguishable disease, *C. immitis* and *C. posadasii* [1] The risk of infection is increased by direct exposure to the soil harbouring the Coccidioides[1], although, infection occurs in endemic areas without obvious exposure to soil or dust. Infection occurs through inhalation of arthroconidia[2] ,which due to their size are able to evade the mechanical mucosal barrier and cause infection in non-immune host. About 60% of infected patients are asymptomatic [3,4] while 40% develop pulmonary symptoms including fever, cough, and pleuritic chest pain. It is commonly misdiagnosed as community acquired pneumonia or tuberculosis. [1] In most patients, primary pulmonary disease resolves spontaneously without sequelae. However, some develop complications like pulmonary infiltrations, cavities, and nodules indistinguishable from malignancies. Extra pulmonary dissemination occurs in <1% of patients, especially those with impaired cellular immunity like HIV, post-transplant, or those on steroid therapy.[5]The disease has been largely restricted to desert regions of the southwest United States, Central, and South America, with few reported cases outside the Americas mostly in travelers who had visited the endemic areas.[6,7] Though cases have been reported in Africa (table 1), to our knowledge there was only one reported case from West African sub- region.[8] In this article, we present a case of isolated pulmonary Coccidioidomycosis in an immunocompetent patient from Chad Republic.

PRESENTATION

A 51year old Chadian presented to the clinic with four (4) months history of recurrent cough, generalized body weakness and weight loss. He had occasional low-grade pyrexia and hemoptysis. He is a known hypertensive on Amlodipine and Lisinopril. He was not a known diabetic or asthmatic patient, and neither smoked cigarettes nor ingests alcohol. No history of tuberculosis or travel to coccidioidomycosis endemic areas in the past. On physical examination he was wasted. The respiratory examination revealed features of right lower zone consolidation. Complete blood count, renal and liver function tests, electrolytes, blood sugar, urinalysis were all within normal limits.

Sputum microscopy and culture yielded no bacterial growth and sputum Gene Xpert test was negative for Mycobacterium tuberculosis. Erythrocyte sedimentation rate was 80mm fall/hour. HIV screening using determine and unigold was negative. Abdominal ultrasound scan revealed right sided pleural effusion. Chest radiograph (fig 1, left) showed features of right lung consolidation, and chest computed tomography scan (fig 2) revealed right lower pleural mass with pneumonic consolidation consistent with malignancy. Histology of the tru-cut biopsy of the lung mass revealed thick-walled fungal spherules containing numerous endospores that stained positive for Grocott-metheneamine silver stain (fig 3 a & b), consistent with Coccidioidomycosis. The patient was placed on oral Itraconazole 200mg 12hrly and responded positively as evidenced by resolution of radiographic features after six (6) weeks of therapy (fig. 1, right) and falling ESR of 04mm fall/hour.

Table 1: Comparison between index case and other reported African cases referenced in the report.

Case year	Country (region) of origin	Geographical location	Country of reporting	Travel history to endemic areas	Clinical site	Age (yrs.)/sex	HIV status	Reference
2022	Tchad (south-west)	Sahel region/ 12^0 06'36"N 15^0 03'00"E	Nigeria	None	Pulmonary	51, M	Negative	Index case
2020	Uganda (Central Uganda)	Tropical rainforest / 0^0 20'33"N, 32^0 34'37"E	Uganda	None	Pulmonary and cutaneous	23, M	Negative	Number 2
2019	Nigeria (North-east)	Sahel region/ 11^0 50'48.91"N, 13^0 9'25.63"E	Nigeria	None	Cutaneous	28, F	Positive	Number 9

Figure 1: Chest Radiograph showing Right basal consolidation before treatment (left), and its resolution following treatment (right)

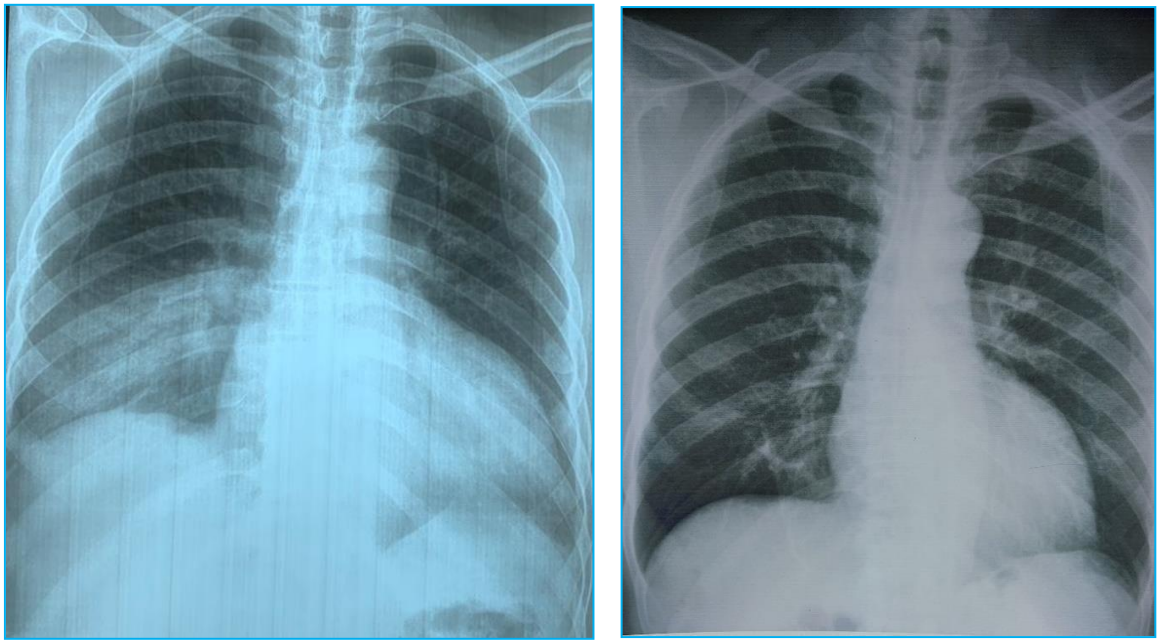


Figure 2: Chest Computed Tomography showing right basal pulmonary mass

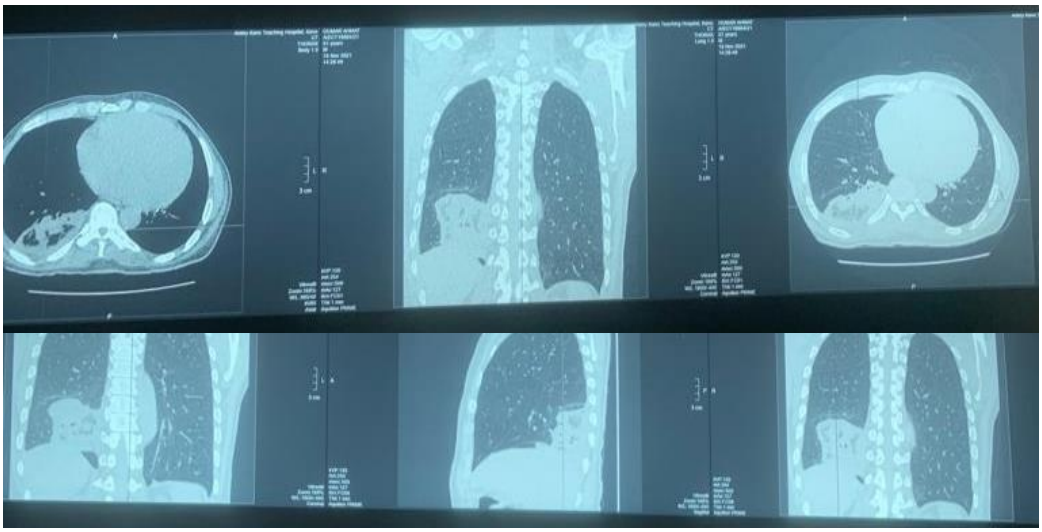
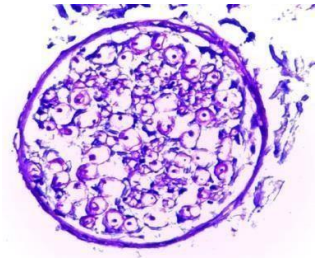
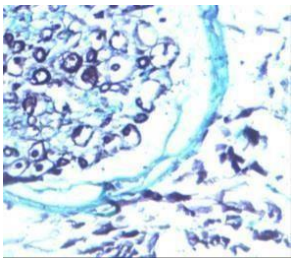


Figure 3a and 3b: fungal spherules showing endospores on Grocott-metheneamine silver staining





DISCUSSION AND CONCLUSIONS

Coccidioidomycosis is a disease that is endemic in the Americas. All the reported cases in Europe and Asia were traced to have been imported by travelers from endemic regions. Only few cases have so far been reported from Africa with only one of them from West African sub region, and none of them having travel history to endemic regions. [2,9]

However, this traditional epidemiologic description seems challenged by the increasing reportage of cases from Africa (Table 1), and perhaps, with more interest and search, Coccidioidomycosis might eventually turn out to be a neglected disease outside the Americas. It is transmitted by inhalation of arthroconidia, usually present in contaminated soil. Most infected individuals are asymptomatic, but those who develop the disease typically present with pulmonary symptoms like cough, chest pains, hemoptysis, and weight loss, as is the case with our index patient. Symptomatic patients are usually immunosuppressed, but in contrast to this, our patient is immunocompetent with no identified background lung pathology. Extrapulmonary/disseminated disease is rare and mostly seen in cases reported outside the United State.[1] However, our patient has no extrapulmonary disease, even though he is outside United States. Coccidioidomycosis is usually misdiagnosed, and treatment given for other conditions like community acquired pneumonia or tuberculosis, and the index patient was similarly considered to have tuberculosis or bronchogenic carcinoma at presentation. However, there has been reported cases of coexistence of tuberculosis and Coccidioidomycosis [10], hence the need to investigate for both of them when patient present with consistent clinical symptoms and signs. In compliance with this, our patient had negative screening results for tuberculosis which made its coexistence unlikely. The mainstay for the diagnosis of Coccidioidomycosis has been through serologic tests, microscopy and culture.[11] Although serologic tests have significantly high sensitivity and specificity, they are not without limitations[12] which places tissue diagnosis, as with our index patient, at a higher pedestal. The mainstay of treatment of Coccidioidomycosis still remains the triazoles, although disseminated and more severe disease might require the use of polyenes like Amphotericin B. Conventional Itraconazole was given to our patient since he has isolated pulmonary disease, although some studies in patients with hematological malignancy showed rapid attainment of therapeutic levels with less inter-patient variability when SUBA-itraconazole (SUper BioAvailability) was compared with conventional itraconazole.[13]

In conclusion, coccidioidomycosis has long been described as the disease of the Americas, and that even cases seen out of the Americas were believed to have been imported from the Americas. However, this case we are reporting and other few reported cases from African patients that had no prior history of travel to the Americas seems to challenge that proposition. It is envisaged that more diligence by clinicians in search of, and reporting of this condition has the potential of changing the age long epidemiologic description of this important fungal infection.

Declarations

i. **Funding:** No funding available

ii. **Conflict of interests:** On behalf of all authors, the corresponding author states that there is no conflict of interest.

iii. **Ethics approval:** Not applicable

iv. **Consent to participate:** Not applicable.

v. **Consent for publication:** Given.

vi. **Availability of data and materials:** Not applicable

vii. **Code availability:** Not applicable

viii. **Authors contribution:** MBD, DAA, DSN, and AMS wrote most of the manuscript and did some literature search, HAG and IG came up with the conceptual framework and did overall editing of the manuscript, IN and MH contributed to manuscript editing and literature search, GLS examined the histological slides from the patient and did some literature search.

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