Title

Coccidioidal Hepatic Abscess in a Patient With Disseminated Coccidioidomycosis: A Case Report

Authors

Raza, Nadia
Nasrawi, Faisal
Heidari, Arash
et al.

Publication Date

2021

DOI

10.1177/23247096211033051

Peer reviewed

Journal of Investigative Medicine High Impact Case Reports
Volume 9: 1–3

DOI: 10.1177/23247096211033051
journals.sagepub.com/home/hic
SAGE

Coccidioidal Hepatic Abscess in a Patient With Disseminated Coccidioidomycosis: A Case Report

Nadia Raza, MD[1], Faisal Nasrawi, MD[1], Arash Heidari, MD[1,2], Rasha Kuran, MD[1,2], Navinchandra Amin, MD[3], and Royce Johnson, MD[1,2]

Abstract

Coccidioidomycosis is an infection caused by inhalation of arthroconidia of *Coccidioides*. Forty percent of patients will develop mild and self-limited respiratory infection, and a small fraction of these individuals will develop extrapulmonary disseminated disease. This is the case of a patient with a known history of disseminated coccidioidomycosis, who initially presented for symptoms of persistent pneumonia. On evaluation, the patient was found to have a hepatic abscess for which he underwent percutaneous drainage. Culture grew *Coccidioides immitis*, and the patient was treated with systemic antifungal. This is a rare case of disseminated coccidioidomycosis in the liver.

Keywords

coccidioidomycosis, disseminated coccidioidomycosis, hepatic abscess, coccidioidomycosis involving liver

Introduction

Coccidioidomycosis is a fungal infection that is endemic to the Southwestern region of the United States. It is caused by inhalation of spores of *Coccidioides immitis* and *Coccidioides posadasii.* It has a wide clinical manifestation, from asymptomatic to fatal disease. It presents as flu-like symptoms and pneumonia. In minority of cases, extrapulmonary dissemination occurs to skin, joints, bones, and the central nervous system (CNS).[1-5] Dissemination to liver frequency is unknown and is only limited to a few published case reports presenting as granulomatous hepatitis.[6]

Methods

A literature search was conducted to evaluate whether similar cases have reported previously. The search included databases PubMed, Google Scholar, and Infectious Disease society of America's (IDSA) Clinical Infectious Disease Journal database. The following search terms were applied: coccidioidomycosis, disseminated coccidioidomycosis, hepatic abscess, coccidioidomycosis involving liver.

Case Presentation

The patient was a 50-year-old male with type 1 diabetes mellitus, end-stage renal disease (ESRD) on hemodialysis. He was originally diagnosed with pulmonary coccidioidomycosis in 2005, and in 2007, he was found to have disseminated tibial osseous and coccidioidomycosis meningitis. Patient was previously treated with amphotericin B that was transitioned to voriconazole.

In 2020, the patient was experiencing subjective intermittent fevers, cough, and dyspnea for 2 months and received 2 courses of treatment for community-acquired pneumonia (CAP) without improvement. He presented to our emergency department (ED) with low-grade fever and leukocytosis of $15.5 \times 10^3/\mu L$ with neutrophilia. Liver tests showed alkaline phosphatase of 219, aspartate aminotransferase (AST) of 99, alanine aminotransferase (ALT) of 45, albumin 1.9, and total protein 6.5, and viral hepatitis workup was negative. Coccidioides immunodiffusion IgG and IgM assays were both reactive with complement fixation of $>1:512$. Chest X-ray in the ED showed diffuse patchy and confluent right

[1]Kern Medical, Bakersfield, CA, USA
[2]Valley Fever Institute, Bakersfield, CA, USA
[3]Rio Bravo Family Medicine Inc, Bakersfield, CA, USA

Received June 14, 2021. Revised June 22, 2021. Accepted June 27, 2021.

Corresponding Author:
Faisal Nasrawi, MD, Department of Internal Medicine, Kern Medical, 1700 Mount Vernon Avenue, Bakersfield, CA 93305, USA.
Email: faisalnasrawi@mail.rossmed.edu

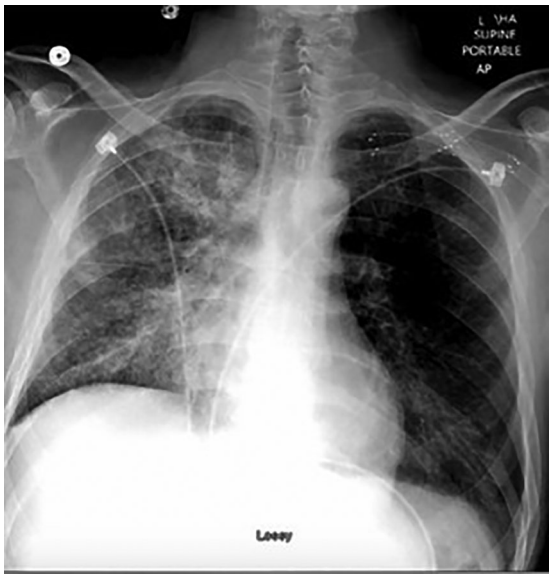

Figure 1. Chest X-ray showing diffuse patchy and confluent right greater than left airspace disease with consolidation and micronodular densities.

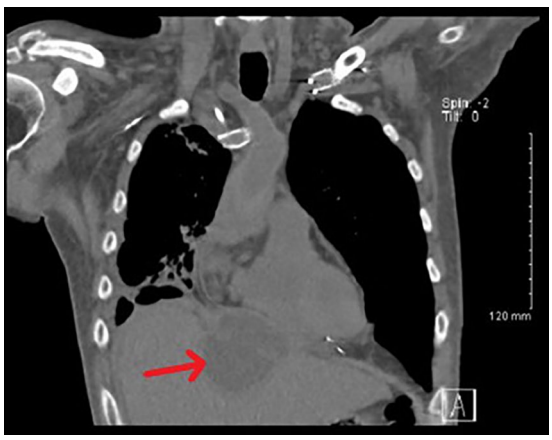

Figure 2. Computed tomography scan showing hepatic septate collection measuring 7.3 × 6.8 × 5.4 cm.

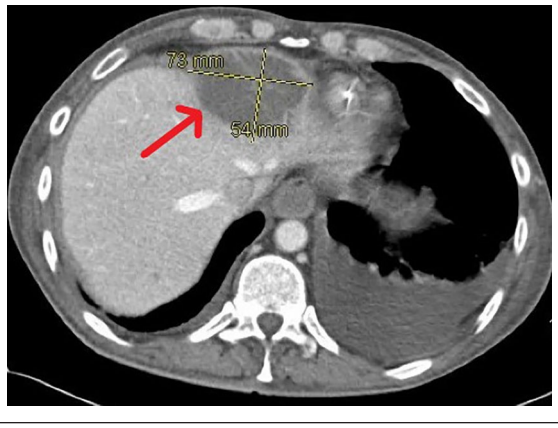

Figure 3. Computed tomography scan of abdomen showed a rim-enhancing, septate, cystic versus necrotic lesion centered in hepatic segment 4 measuring roughly 5.4 × 7.3 × 7.3 cm (AP × TV × SI) with associated delayed enhancement including delayed hyperenhancement of the rim and no associated capsular retraction.

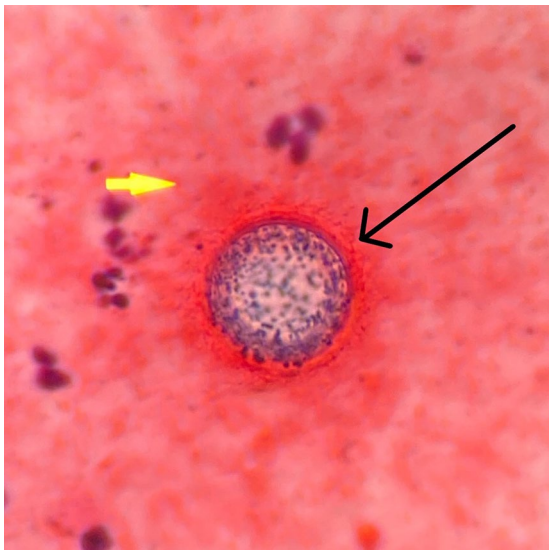

Figure 4. Gram stain showing spherules resembling *Coccidioides* sp (black arrow).

greater than left airspace disease with consolidation and micronodular densities (Figure 1).

Computed tomography (CT) scan of chest revealed diffuse patchy right lung airspace disease with ground glass opacities. As the patient presented during SARS 2 COVID-19 pandemic, COVID-19 testing was performed and returned negative. CT chest also showed an accidental collection in the liver (Figure 2). As a result, then CT scan of abdomen was obtained and demonstrated a rim enhancing hepatic septate collection measuring 7.3 × 6.8 × 5.4 cm (Figure 3).

Patient underwent an ultrasound-guided percutaneous drainage and sampling of the hepatic collection with placement of a percutaneous drain. Periodic acid-Schiff (PAS) staining of the fluid showed multiple spherules with endosporulation resembling coccidioidomycosis with no bacteria isolated. Gram stain showed spherules resembling *Coccidioides* sp (Figure 4). Fungal culture eventually grew and was sent to reference fungal laboratory (University of Texas at San Antonio) where growth of *Coccidioides immitis* was confirmed. Antifungal susceptibility testing at the same reference fungal laboratory for amphotericin B, 5-flurocytosine, fluconazole, itraconazole, and voriconazole minimum inhibitory concentrations were ≤0.03, >64, 8, 0.06, and 0.125 μg/mL, respectively.

Parental treatment with liposomal amphotericin B was discussed with the patient, but he deferred. Therefore, he was switched from oral voriconazole to oral isavuconazonium 372 mg daily and discharged with close follow-up with the infectious disease clinic.

Discussion

Hepatic abscess is usually bacterial, less commonly parasitic, rarely fungal. When faced with HA, one should seek advice from a multispecialty team including an interventional radiologist, a hepatobiliary surgeon, and an infectious disease specialist. Needle aspiration and microbiology is a valuable approach.

Coccidioidomycosis is usually self-limiting in most immunocompetent hosts. It is estimated that more than 60% of infections are asymptomatic.[7] Involvement of the liver in disseminated coccidioidomycosis is probably common. In most instances, this is subclinical and suspected 5′-nucleotidase and alkaline phosphatase are elevated. Symptomatic hepatic involvement in coccidioidomycosis is rare.[8] There is limited literature regarding symptomatic liver involvement, those reported are typically immunocompromised and have long-standing systemic coccidioidomycosis. This patient suffered lifelong diabetes, ESRD, as well as his 15-year history of disseminated coccidioidomycosis.

Coccidioidal hepatic abscess is clearly rare, and this is the first case report to the best of our knowledge. The literature regarding therapy of other fungal liver abscess may have some insight to offer how to treat coccidioidomycosis liver abscess. Cases of hepatosplenic candidiasis that were successfully treated with fluconazole have been reported by Kauffman et al.[9] Our treatment approach should be modeled after treatment of disseminated coccidioidomycosis, which is initial use of liposomal amphotericin B with transition to azoles.[10]

Conclusion

This case report demonstrates that it is paramount for clinicians to maintain a high clinical suspicion to include disseminated coccidioidomycosis in the differential diagnosis of patients with exposure to endemic regions, particularly for those who are immunocompromised and had coccidioidomycosis in the past. This case demonstrates a rare manifestation of disseminated coccidioidomycosis to the liver with abscess formation. As per our literature search as well as many years of treating coccidioidomycosis in an endemic area, this seems to be a unique case. Furthermore, we are fairly certain that this is the first such case to be reported.

Authors' Note

This case poster presentation was done at 64th Annual Coccidiodomycosis Study Group Meeting conducted by University of Arizona (April 3 and 4, 2021) and Southern San Quoin Valley Research Forum held by Kern Foundation (2020).

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethics Approval

Ethical approval to report this case was obtained from Kern Medical Institutional Review Board (ID# 20021).

Informed Consent

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

ORCID iDs

Nadia Raza https://orcid.org/0000-0002-9518-859X
Faisal Nasrawi https://orcid.org/0000-0002-6792-7666
Arash Heidari https://orcid.org/0000-0003-1091-348X

References

1. Jameson JL, Fauci AS, Kasper DL, et al. Part III: Infectious diseases and their etiologic agents. In: *Harrison's Principles of Internal Medicine*. McGraw-Hill Education; 2018.
2. Deresinski S, Mirels LF. Coccidioidomycosis: what a long strange trip it's been. *Med Mycol*. 2019;57(suppl 1):S3-S15. doi:10.1093/mmy/myy123
3. Hung CY, Hsu AP, Holland SM, Fierer J. A review of innate and adaptive immunity to coccidioidomycosis. *Med Mycol*. 2019;57(suppl 1):S85-S92. doi:10.1093/mmy/myy146
4. Taylor JW, Barker BM. The endozoan, small-mammal reservoir hypothesis and the life cycle of *Coccidioides* species. *Med Mycol*. 2019;57(suppl 1):S16-S20. doi:10.1093/mmy/myy039
5. Thompson GR, Lewis JS 2nd, Nix DE, Patterson TF. Current concepts and future directions in the pharmacology and treatment of coccidioidomycosis. *Med Mycol*. 2019;57(suppl 1): S76-S84. doi:10.1093/mmy/myy029
6. Howard PF, Smith JW. Diagnosis of disseminated coccidioidomycosis by liver biopsy. *Arch Intern Med*. 1983;143: 1335-1338.
7. Smith CE, Beard RR. Varieties of coccidioidal infection in relation to the epidemiology and control of the diseases. *Am J Public Health Nations Health*. 1946;36:1394-1402.
8. Kuprian M, Schofield C, Bennett S. Symptomatic hepatitis secondary to disseminated coccidioidomycosis in an immunocompetent patient. *BMJ Case Rep*. 2014;2014:bcr2013202144. doi:10.1136/bcr-2013-202144
9. Kauffman CA, Bradley SF, Ross SC, Weber DR. Hepatosplenic candidiasis: successful treatment with fluconazole. *Am J Med*. 1991;91:137-141.
10. Johnson RH, Sharma R, Kuran R, Fong I, Heidari A. Coccidioidomycosis: a review. *J Investig Med*. 2021;69: 316-323.