Case Report

A case of *Candida* mediastinitis after dental extraction

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Abstract

Acute mediastinitis is a serious infection involving the connective mediastinal tissue in the interpleural spaces and other thoracic structures. *Candida albicans* mediastinitis is a rare clinical entity associated with high mortality and morbidity. We present a rare case of a previously healthy and immunocompetent man with *Candida* mediastinitis due to retropharyngeal abscess after dental extraction, who presented with odynophagia and fever. Antibiotics were prescribed and surgical drainage was performed after diagnosis of mediastinitis by CT scan; however, the patient remained febrile. The second culture obtained during irrigation of the mediastinum was positive for *Candida albicans* and the patient was responsive to antifungal therapy and survived. This case illustrates the need to consider a fungal cause in immunocompetent patients with mediastinitis who are not responsive to broad spectrum antibiotics and surgical drainage.

Key words: *Candida*; mediastinitis; odynophagia

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Introduction

Candida spp. are a common cause of fungal infections in humans, producing infections that range from non life-threatening mucocutaneous disorders to invasive diseases that can involve any organ [1].

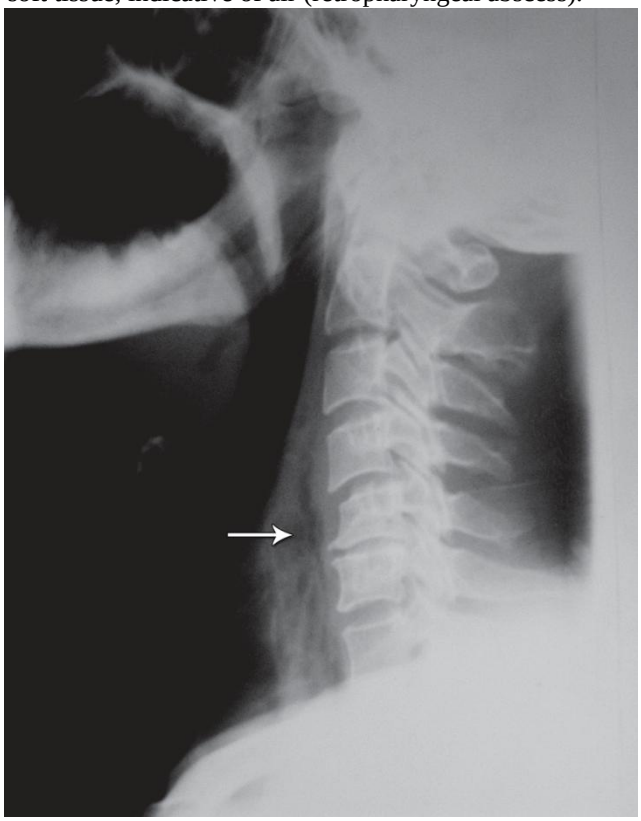
Invasive candidiasis is a clinical condition that generally affects immunosuppressed patients and those with general defects in the immune system. The mortality rate associated with disseminated candidiasis can be as high as 30–40%, despite extensive antifungal therapies [2]. *Candida* mediastinitis is a rare clinical entity associated with high mortality and morbidity [3]. The most common causes of mediastinitis are esophageal perforations and infections after operations through sternotomy incisions. Occasionally acute mediastinitis occurs as a complication of infections that arise from odontogenic or cervicofascial infections, or cervical trauma [4].

We describe a case of mediastinitis caused by *C. albicans* in an immunocompetent patient occurring after several of his teeth were extracted.

Case report

A male 48-year-old farmer came to the emergency department of Khalili hospital, affiliated with the Shiraz University of Medical Sciences, Shiraz, Iran, reporting a seven-day history of odynophagia and fever. The patient had a history of extraction of eight teeth 14 days prior to hospitalization, with no prescription of any antibiotics. He had no history of consumption of alcohol or cigarette smoking and also no history of any disease which was indicative of immunodeficiency. A few days after his last tooth (left inferior third molar) was extracted, he felt swelling in the left lateral side of his jaw and he developed fever, so penicillin was prescribed for the patient by his dentist. However, he remained febrile and developed odynophagia, so he was referred to the hospital. On admission, vital signs included an oral temperature of 40°C, a heart rate of 110 beats per minute, a respiratory rate of 18 breaths per minute and a blood pressure reading of 130/80 mmHg. Examination of the oral cavity revealed poor oral hygiene, trismus and pussy discharge from the left side of his oral cavity. Laboratory results included a leukocyte count of $18 \times 10^3/mm^3$, a serum glucose level of 143 mg/dl, blood urea nitrogen of 40 mg/dl, a creatinine level of 1.7 mg/dl and normal levels of serum electrolytes. The patient was therefore admitted with the impression of pterygomandibular abscess. After he was stabilized by the administration of intravenous (IV) fluids, he was treated with clindamycin (4 × 600 mg IV) and dexamethasone (8

Figure 1. Lateral view of neck X-ray showing increased prevertebral soft tissue thickness and lucent areas (arrow) in soft tissue, indicative of air (retropharyngeal abscess).



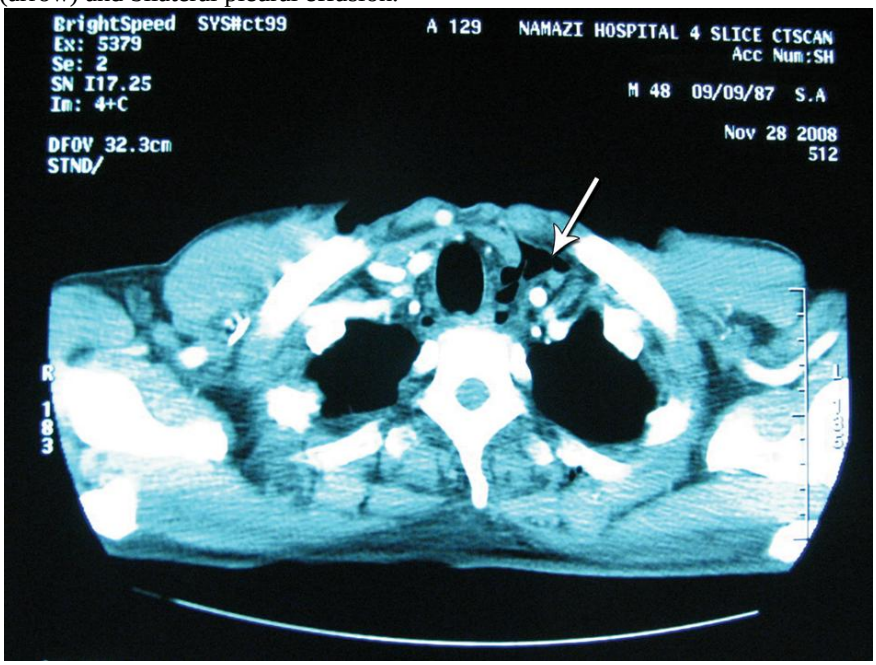
mg IV for three doses) and the pterygomandibular abscess was drained under local anesthesia.

The following day, the patient developed respiratory distress and he received one 200 mg dose of hydrocortisone intravenously. The lateral neck X-ray showed a retropharyngeal abscess (Figure 1) and the chest X-ray revealed a widened mediastinum that was suggestive of mediastinitis; this was confirmed by a computed tomography (CT) scan. Due to his poor condition, the patient was transferred to the operating room where a left posterolateral thoracotomy and irrigation of the mediastinum and retropharyngeal area were performed. Additionally, two chest tubes were inserted into the left pleural cavity and two Penrose drains inserted into the neck. When cultured, frank pus from the mediastinum and retropharyngeal area was negative for any microbiological agent .In the surgery ward, the patient's antibiotic regimen was changed to imipenem (4 × 500mg IV) and vancomycin (2 × 1gr IV). Following surgery, his temperature continued to spike and he was pyrexial. Therefore, a chest CT scan with IV contrast was performed three days after the operation, which revealed paratracheal collection 3 cm above and under the tracheal bifurcation, pneumomediastinum, bilateral pleural effusion, and basilar consolidation (Figure 2). Consequently, another operation was performed for irrigation. During surgery, 50 cc of pus was drained and two cultures were taken from the content of the abscess for the microbiology and mycology labs. The KOH smear was positive and pseudohyphae were detected. The results of the cultures on sabouraud dextrose agar (Merck, Darmstadt, Germany) and blood agar (Merck KGaA, Darmstadt, Germany) were positive for *Candida* spp. The germ tube test was positive and the documented diagnosis using API 20 C AUX (BioMeriux, Marcy-l'Etoile, France) was *C. albicans*, which is sensitive to amphotericin B, fluconazole, itraconazole, voriconazole, nystatin, caspofungin and ketoconazole. Based on the opinion of Prof. Abdolvahab Alborzi (an infectious disease specialists and coauthor in this study), we prescribed amphotericin B deoxycholate at 0.3 mg/kg/day, and this was increased to 1mg/kg/day within three days. The patient responded to antifungal therapy and the fever abated. After further review the medication was changed from amphotericin B to oral fluconazole (2 × 200 mg) and after five days he was discharged in a healthy condition, with fluconazole follow-up for four weeks. His discharge was 27 days after his initial admission to the hospital.

Discussion

Yeasts of the genus *Candida* have been recognized as important agents of nosocomial infections. Invasive candidiasis (of which *C. albicans* is the main causative agent) is encountered with increasing incidence in immunocompromised patients and causes considerable morbidity and mortality. Mortality rates for systemic candidiasis are in the high range, despite appropriate treatment [2]. Overall, *Candida* spp. are a rare cause of mediastinitis; Clancy *et al.* reported a 0.3 % overall incidence of *Candida* mediastinitis after cardiothoracic surgery on 3,061 patients [5]. However, an increase in individual case reports of *Candida* mediastinitis has appeared in the literature since 1990 [3,5-8]. Only rare reports of candidal deep neck space infections and mediastinitis secondary to oropharyngeal infections exist [9]. Adult studies cite a 30% to 40% or higher mortality rate for all the infectious causes of mediastinitis [10].

Figure 2. Contrast-enhanced computed tomography showing pneumomediastinum (arrow) and bilateral pleural effusion.



The following two criteria for proving invasive candidiasis can be applied to any patient, either immunocompromised or immunocompetent: 1) the isolation of *Candida* from normally sterile body sites including blood, peritoneal fluid, pleural fluid, intra-articular fluid or cerebrospinal fluid; and 2) microscopic analysis of the sterile material of the body site showing pseudohyphae or true hyphae according to the standard definition given by the European Organization for Research and Treatment of Cancer/Invasive Fungal Infections Cooperative Group and the National Institute of Allergy and Infectious Diseases Mycoses Study Group (EORTC/MSG) Consensus Group in 2008 [11].

In the present case, the patient was immunocompetent with no history of using immunosuppressive drugs or history of surgery. Fungal infection, therefore, was not initially considered as a diagnosis. Since the patient was not responsive to broad-spectrum antibiotics, fungal infection was considered during his second operation.

It is worth noting that the first bacteriological results from the samples obtained from the neck, pleura and mediastinum did not reveal any microorganisms. These results might have been due to the fact that samples from abscesses are not routinely considered for fungal, anaerobic, and mycobacterial pathogens unless specified by the physician performing the procedure. Additionally, the microbiology laboratory personnel's lack of awareness might have caused them to overlook fungal agents. Another important observation is the development of the secondary fungal infection, due to administration of broad spectrum antibiotics that made the patient susceptible to fungal infections.

The patient had all the criteria for proven invasive candidiasis and also responded well to antifungal therapy resulting in improved health, which together indicate the presence of *Candida* infection.

According to the clinical practice guidelines for the management of candidiasis by the Infectious Diseases Society of America, "For most forms of invasive candidiasis, the typical intravenous dosage for amphotericin B deoxycholate is 0.5– 0.7 mg/kg daily, but dosages as high as 1 mg/kg daily should be considered for invasive *Candida* infections, caused by less susceptible species, such as *C. glabrata* and *C. krusei*. For patients with invasive candidiasis, fluconazole should be administered with a loading dose of 800 mg (12 mg/kg), followed by a daily dose of 400 mg (6 mg/kg); a lower dosage is required in patients with creatinine clearance < 50 mL/min" [12]. At the advice of our infectious disease specialist, amphotericin B deoxycholate (0.3 mg/kg/day) was initiated and increased to 1 mg/kg/day within three days. Once the fever stopped, amphotericin was changed to oral fluconazole (2 × 200 mg) for four

weeks. In spite of the high morbidity and mortality rates of *Candida* mediastinitis, the patient survived due to the combination of early detection of mediastinitis, surgical drainage, antifungal therapy with amphotericin B deoxycholate and fluconazole, and his immunocompetency.

In conclusion, *Candida* mediastinitis secondary to descending odontogenic infection and retropharyngeal abscess is rare. However, it should be suspected even in immunocompetent patients who have not responded to broad spectrum antibiotics and surgical drainage.

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References

1. Fridkin SK (2005) The changing face of fungal infections in health care settings. Clin Infect Dis 41: 1455-1460.
2. Pfaller MAand Diekema DJ (2007) Epidemiology of invasive candidiasis: a persistent public health problem. Clin Microbiol Rev20: 133-163.
3. Glower DD, Douglas Jr, JM, Gaynor JW, Jones RN, Oldham Jr HN (1990) *Candida* mediastinitis after a cardiac operation. Ann Thorac Surg 49:157-163.
4. Iwata T, Sekine Y, Shibuya K, Yasufuku K, Iyoda A, Iizasa T, Saito Y, Fujisawa T (2005) Early open thoracotomy and mediastinopleural irrigation for severe descending necrotizing mediastinitis. Eur J Cardiothorac Surg 28: 384-388.
5. Clancy CJ, Nguyen MH, Morris AJ (1997) Candidal mediastinitis: An emerging clinical entity. Clin Infect Dis 25: 608-613.
6. Weil RJ (1991) Candidal mediastinitis after surgical repair of esophageal perforation. South Med J 84: 1052–1053.
7. Backer CL, Pensler JM, Tobin GR, Mavroudis C (1994) Vascularized muscle flaps for life-threatening mediastinal wounds in children. Ann Thorac Surg 57: 797– 802.
8. Lew TWK, Darby J, Marion DW (1995) *Candida* mediastinitis and septic shock following occult esophageal perforation in a patient with posttraumatic quadriplegia. J Trauma 39: 805–808.
9. Kofteridis DP, Mantadakis E, Karatzanis AD, Bourolias CA, Papazoglou G, Velegrakis GA, Samonis G (2008) Non-*Candida* albicans *Candida* mediastinitis of odontogenic origin in a diabetic patient. Med Mycol 46: 345-348.
10. Kiernan PD, Hernandez A, Byrne WD, Bloom R, Dicicco B, Hetrick V, Graling P, Vaughan B (1998) Descending cervical mediastinitis. Ann Thorac Surg 65: 1483-1488.
11. De Pauw B,Walsh TJ, Donnelly JP, Stevens DA, Edwards JE, Calandra T, Pappas PG, Maertens J, Lortholary O,Kauffman CA, Denning DW, Patterson TF, Maschmeyer G, Bille J, Dismukes WE, Herbrecht R, Hope WW, Kibbler CC, Kullberg BJ, Marr KA, Muñoz P, Odds FC, Perfect JR, Restrepo A, Ruhnke M, Segal BH, Sobel JD, Sorrell TC, Viscoli C, Wingard JR, Zaoutis T, Bennett JE, European Organization for Research and Treatment of Cancer/Invasive Fungal Infections Cooperative Group; National Institute of Allergy and Infectious Diseases Mycoses Study Group (EORTC/MSG) Consensus Group (2008) Revised definitions of invasive fungal disease from the European Organization for Research and Treatment of Cancer/Invasive Fungal Infections Cooperative Group and the National Institute of Allergy and Infectious Diseases Mycoses Study Group (EORTC/MSG) Consensus Group. Clin Infect Dis 46: 1813-1821.
12. Pappas PG, Kauffman CA, Andes D, Benjamin DK Jr, Calandra TF, Edwards JE Jr, Filler SG, Fisher JF, Kullberg BJ, Ostrosky-Zeichner L, Reboli AC, Rex JH, Walsh TJ, Sobel JD; Infectious Diseases Society of America (2009) Clinical practice guidelines for the management of candidiasis: 2009 update by the Infectious Diseases Society of America. Clin Infect Dis 48: 503-535.

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