Clinical Case Report

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A case report of purulent pericarditis caused by *Candida albicans*

Delayed complication forty-years after esophageal surgery

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Abstract

Rationale: Candida pericarditis is a rare condition with high mortality. Risk factors include thoracic surgery and immunosuppression. We report a case of candida pericarditis which developed forty-years after esophageal reconstruction surgery.

Patient concerns: A 42-year-old female presented with nausea, abdominal discomfort, and chest pain, and was found to have a cardiac tamponade secondary to candida pericarditis. Her notable risk factor was colonic interposition done during her infancy for esophageal atresia.

Diagnoses: The patient underwent emergent pericardial window where 500cc of purulent fluid was drained. The pericardial fluid culture grew *Candida albicans*.

Interventions: Esophagram did not show any visible leak and the patient improved with surgical drainage and antifungal treatment with Caspofungin. Caspofungin was continued intravenously for a total of four weeks and was switched to fluconazole.

Outcomes: An Echocardiogram performed one month after pericardial window revealed trivial pericardial effusion. Serum beta-D-glucan at the time was negative.

Lessons: This report highlights that candida pericarditis infection could occur as a late complication of colonic interposition. We also demonstrate the utility of using an echinocandin in treating this entity.

Abbreviations: CT = computed tomography, HIV = human immunodeficiency virus, PPD = purified protein derivative, RBC = red blood cells, WBC = white blood cells.

Keywords: candida pericarditis, caspofungin, colonic interposition, echinocandin, esophageal atresia

1. Introduction

Candida pericarditis is a rare entity with few cases reported in the literature. It is almost uniformly fatal without timely treatment.[1] The most important risk factors identified in prior cases have been recent thoracic surgery and immunocompromised state.[2] Successful treatment in prior cases usually included Amphotericin B and surgical drainage.[2]

Colonic interposition is a surgical technique used to treat esophageal atresia in pediatric patients.[3] However, there is scarce data about complications in adulthood. We report the first case of candida pericarditis resulting from colon interposition 40 years after the corrective surgery. We also report the successful use of an echinocandin in treating this entity.

2. Case report

A 42-year-old American female with a history of esophageal atresia that was repaired with colonic interposition as an infant presented to the emergency room with nausea and epigastric abdominal discomfort for two days. On further questioning, she admitted having chest pain 6 days prior to the presentation, with radiation to her right arm. The pain improved by leaning forward and worsened by lying flat. It was as associated with intermittent dyspnea. She was febrile (102.4°F), tachycardic (133 beats per minute), and hypotensive with a systolic blood pressure of 70 mm Hg, which improved after fluid resuscitation. Labs were remarkable for leukocytosis (36,700/μL) with 87% of segmented neutrophils, and lactic acidosis (lactate 4.4 mmol/L). An EKG revealed diffuse ST segment elevation. A computed tomography (CT) of the chest showed a large pericardial effusion, a retrosternal conduit, and left lower lobe infiltrate. The patient was started on broad-spectrum antibiotics and admitted to the intensive care unit.

The patient tested negative for human immunodeficiency virus (HIV) and latent tuberculosis with negative purified protein derivative (PPD) and quantiferon. An echocardiogram revealed tamponade physiology and an emergent pericardial window was performed with 500cc of purulent fluid drained, which showed 5400 red blood cells (RBC) and 1145 white blood cells (WBC) (84% granulocytes, 10% lymphocytes). Five days postoperatively, pericardial fluid grew yeast, which was later confirmed to be *Candida albicans*. After identification of yeast from pericardial

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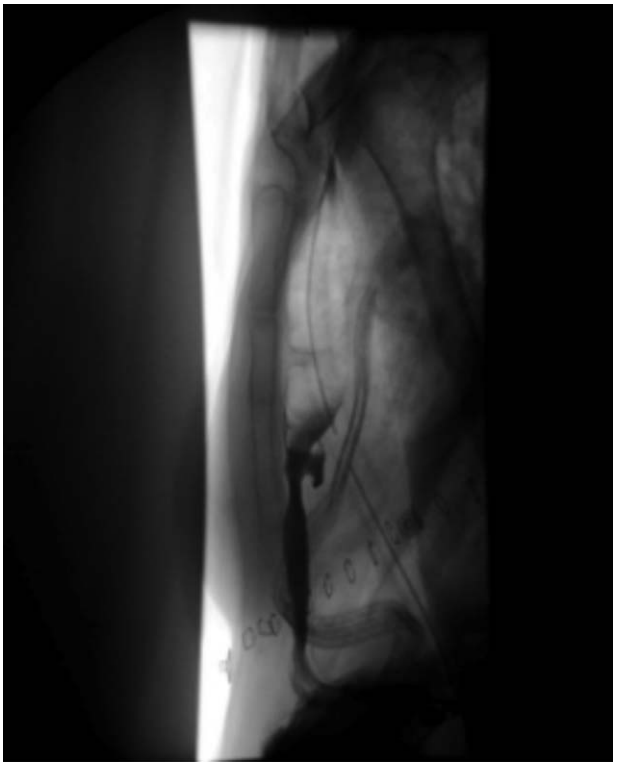

Figure 1. Esophagram showing a diverticulum interposed bowel at the level of the mid-sternum. No leak or fistula was identified.

culture, the patient was started on intravenous Caspofungin (70 mg on the first day, followed by 50 mg daily). Broad-spectrum antibiotics were continued for aspiration pneumonia. An esophagram revealed a diverticulum proximal to the heart without a visible leak (Fig. 1). The patient failed swallowing evaluation and recurrent aspiration pneumonia complicated her hospital course. A Barium swallow study showed severe dysmotility throughout colonic interposition with minimal to no emptying from the mid to distal end. A diverticulum was again also seen with significant pouching downward with stasis.

After 2 weeks of antifungals and 2.5 weeks of systemic antibiotic treatment, she subsequently defervesced and her leukocytosis resolved. The patient had a jejunostomy placed for enteral nutrition and was discharged home. Caspofungin was continued for a total of 4 weeks and then switched to fluconazole via jejunostomy tube. An echocardiogram performed 1 month after pericardial window revealed trivial pericardial effusion. Serum beta-D-glucan at the time was negative (31 pg/mL, < 60 pg/mL considered negative). The patient was continued on fluconazole for 3 weeks until she got hospitalized at a different hospital for aspiration pneumonia and was lost to follow-up.

3. Discussion

Candida is a rare cause of purulent pericarditis. On a previous review of 660 cases of purulent pericarditis, only 1% of the cases were caused by Candida species, whereas the majority of cases were caused by bacteria.[4]*Candida albicans* is the most common species of candida pericarditis.[5] There are reported cases of pericarditis caused by *C tropicalis, C kruzei, C glabrata, C guillerimondii*, or *C parapsilosis*.[5,6] The diagnosis of candida pericarditis was made postmortem in more than half the cases in the past.[2] Thus, a high index of clinical suspicion is critical.

Risk factors for candida pericarditis include recent thoracic or abdominal surgery, malignancy, or immunosuppression.[5] In this case, given the history of esophageal atresia repair, we were concerned that the patient's retrosternal esophagus might be communicating with the pericardium; however, an esophagram did not reveal any fistula or leak. Transmural translocation of microbes or previously healed perforation was thought to be a possible source of the infection.

Our case suggests that translocation of micro-organism from the gastrointestinal tract to the pericardium could lead to the development of candida pericarditis. On our literature review, we identified four previously reported cases of candida pericarditis attributed to a gastrointestinal source.[2,6–8] Two patients were immunocompetent and underwent gastric surgery, and two patients had a history of gastric cancer. *C albicans* was isolated in two cases, while *C kruzei* and *C glabrata* were found in others. However, contrary to our case, all previously reported case of candida pericarditis from gastrointestinal sources were preceded by recent surgery or a procedure complicated by the development of a fistula.

The notable risk factor in our patient was colonic interposition performed in her infancy. Colonic interposition is a surgical procedure performed for esophageal replacement. It is used for esophageal atresia or corrosive ingestion in the pediatric population and esophageal cancer in the elderly. While early complications of colonic interposition are well described and include anastomotic leak or conduit ischemia, literature regarding late complications of colonic interposition is scarce. A small series from France described long-term complications in 32 pediatric patients who had colonic interposition.[9] Among them, 15 patients had more than 10 years of follow-up. Long-term complications, defined as occurring 1 year or later after surgery, were observed in 27 of 32 patients (84%). Of them, 9 had a stricture, 4 had bezoars, and 3 had anemia. Additionally, one had a gastric perforation, another had a graft ulceration. Fifty percent of patients had chronic pulmonary manifestations which may be due to recurrent aspiration. Almost one-third of patients were thought to suffer from undernutrition.

Surgical drainage and antifungal treatment have been the mainstay of therapy for candida pericarditis. Surgical drainage is a crucial part of treatment. Amphotericin B was the most consistently used antifungal therapy, although fluconazole was also often used for reported cases.[2] Our case demonstrates successful use of caspofungin in treating pericarditis caused by *C albicans*. Caspofungin is an echinocandin, a class of antifungals that work by inhibiting glucan synthesis in the fungal cell wall. Echinocandins are also shown in vitro to have activity against Candida biofilms.[10] There was one report of successful use of echinocandin and fluconazole in a patient with *C albicans* pericarditis in heart transplant patient, making this case the second use of echinocandin in treating candida pericarditis.[5] However, it should be noted that candida species resistant to caspofungin have also been reported.[11] In our patient, the organism was susceptible to caspofungin in vitro. Given the rarity of the disease, there is insufficient data to guide the duration of therapy.

4. Conclusion

In summary, this is the first case in the literature of an immunocompetent patient who developed candida pericarditis

40 years after esophageal surgery. This case demonstrates that candida pericarditis could occur as a long-term complication of colonic interposition despite the absence of visible leak on esophagram. It also emphasizes that fungal origin should be considered in a patient with purulent pericarditis and risk factors that includes esophageal or gastric surgery. We also demonstrate a successful use of echinocandins for treating candida pericarditis. For susceptible organisms, echinocandins should be considered as a treatment.

Author contributions

Conceptualization: Joowhan Sung.
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Validation: Joowhan Sung.
Writing – original draft: Joowhan Sung.
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