

Cite this article as: Kowatari R, Suzuki Y, Daitoku K, Fukuda I. Cryptococcal infective endocarditis in a child with acute lymphocytic leukaemia. *Interact CardioVasc Thorac Surg* 2019;28:642–4.

Cryptococcal infective endocarditis in a child with acute lymphocytic leukaemia

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Received 17 July 2018; received in revised form 28 August 2018; accepted 16 September 2018

Abstract

A 4-year-old boy with acute lymphocytic leukaemia presented with left hemiplegia during chemotherapy. Computed tomography revealed cerebral infarction, and an echocardiogram showed vegetation in the right and left ventricles. Despite antifungal therapy, he experienced another stroke; and 9 days after the first stroke, he underwent total extirpation of the vegetative nodules and fragile vegetation. The postoperative course was unremarkable with no recurrence of infective endocarditis. Although a bacterial culture of the vegetation could not identify the presence of any organism, a pathological specimen examination revealed *Cryptococcus* with a round and mucinous capsule.

Keywords: Infective endocarditis • *Cryptococcus* • Fungal

INTRODUCTION

Cryptococcus is an encapsulated saprophytic fungus that causes life-threatening diseases, such as cryptococcosis, meningitis and lung infection, especially in immunocompromised patients [1]. Although there are several well-known cryptococcal infections, infective endocarditis (IE) caused by *Cryptococcus* is poorly documented [2]. We report the presence of cryptococcal IE in a boy with acute lymphocytic leukaemia, who was successfully treated with surgery and an antifungal agent. The patient and his family provided informed consent for the publication of this report.

CASE REPORT

A 4-year-old boy with acute lymphocytic leukaemia was admitted to the paediatric unit for chemotherapy. After intensive, triple intrathecal therapy, he experienced haemophagocytic lymphohistiocytosis and received immunosuppressive therapy. Unfortunately, chronic disseminated candidiasis developed despite prophylactic antifungal therapy. Three weeks after the administration of antifungal therapy, he exhibited left hemiplegia. Computed tomography revealed multiple cerebral infarction, and echocardiography showed multiple atypical vegetative nodules, with their hyperechogenic surfaces and hypoechogenic insides, in the ventricles (Fig. 1A and B). For treating chronic disseminated candidiasis, corticosteroid and voriconazole, instead of micafungin, were administered. His condition improved gradually, but a second stroke occurred, resulting in urgent extirpation of the vegetative nodules 9 days

after the first stroke. A conventional dose (3 mg/kg) of heparin was injected, and cardiopulmonary bypass (CPB) was established by aortic and bicaval cannulation through median sternotomy. Using an interatrial approach, vegetation attached to the anterior mitral leaflet and the posterior papillary muscle were resected (Fig. 1C). Then, through the main pulmonary artery, the vegetation below the pulmonary valve was resected (Fig. 1D). There was no valve destruction. Weaning from CPB was uneventful. CPB time and cross-clamping time were 78 and 58 min, respectively. No organism was isolated from the vegetation. Pathologically, Periodic acid–Schiff staining (Fig. 2A) and Grocott's staining (Fig. 2B) revealed round organisms with mucinous capsules—characteristic findings of *Cryptococcus*.

The next day, the patient was weaned from the ventilator uneventfully. Chemotherapy for leukaemia was resumed 15 days postoperatively. Voriconazole and caspofungin were administered for 4 months until 1 month after chemotherapy completion. The patient had complete remission, and he was discharged 5 months postoperatively. He is doing well without the recurrence of IE and leukaemia 3 years later.

DISCUSSION

There are few reports on native valve cryptococcal IE [2], and to the best of our knowledge, this is the first reported surgical case of cryptococcal IE. The occurrence of fungal IE is rare and is associated with poor prognosis, and *Candida albicans* is the most commonly detected organism in fungal IE [3]. Initially, we misdiagnosed the patient with *Candida* IE as *C. albicans* was isolated

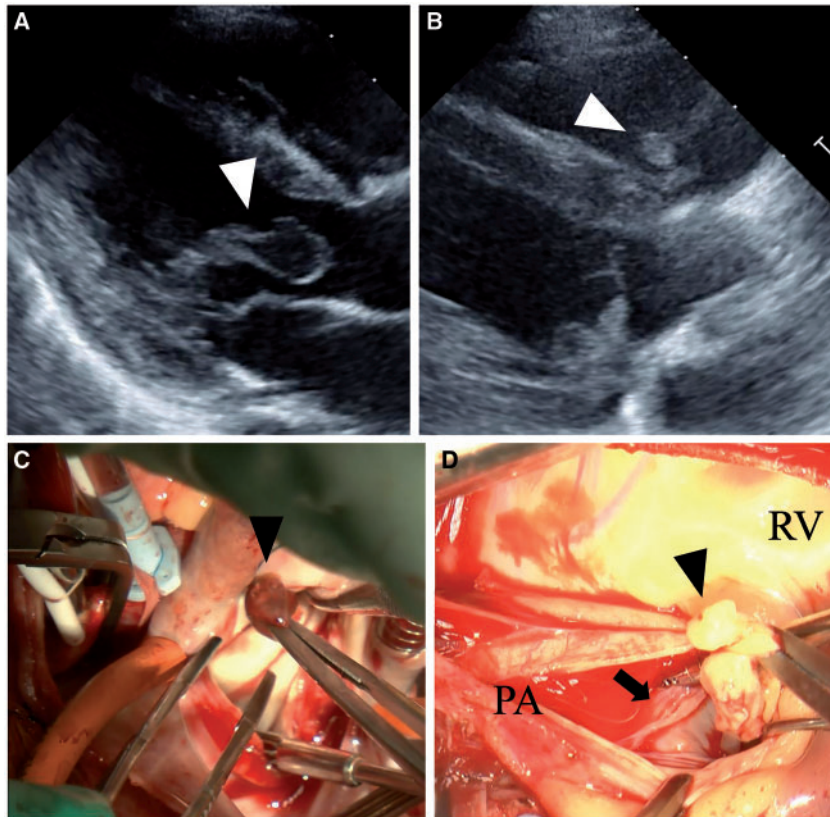


Figure 1: Echocardiogram: vegetation (arrow head) in the (A) left ventricle and (B) RV. Anatomical specimen: vegetation (arrow head) in the (C) left ventricle and (D) RV below the PV (arrow). PA: pulmonary artery; PV: pulmonary valve; RV: right ventricle.

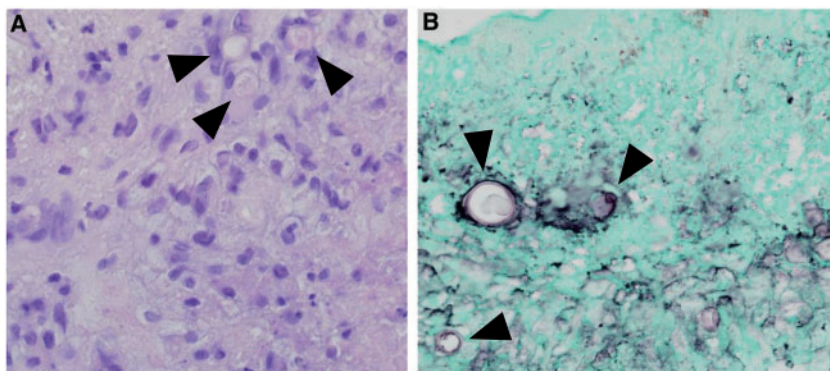


Figure 2: Pathological specimen of vegetation. (A) Periodic acid–Shiff staining and (B) Grocott's staining show the *Cryptococcus* with round and mucinous capsule (arrow head).

from the blood culture. After changing the antifungal drug from micafungin to voriconazole, to which both *Cryptococcus* and *Candida* are sensitive, the patient's condition improved. A histopathological investigation is essential to correctly diagnose cryptococcosis, although organism detection takes 2 weeks. A faster test such as the cryptococcal antigen lateral flow assay, a major test for the cryptococcal infection [1], will be useful. The characteristic echocardiographic features of fungal IE [4], showing large and hyperechogenic vegetations, as in our case, can also support the diagnosis.

Fungal IE is a known risk factor of stroke, and early surgical intervention after stroke is reasonable if the neurological

damage is not severe [5]. In this case, medical treatment was chosen by the paediatrician because the chronic disseminated candidiasis was severe; however, a second stroke occurred. Fortunately, the patient was successfully treated with emergent surgery; however, in our experience, earlier surgery may be necessary if fungal IE is suspected, especially in cases with large (>10 mm) vegetations or unstable haemodynamics. Prompt surgery is essential to improve treatment outcomes and prevent patient mortality. This may lead to the accumulation of knowledge regarding this condition and thus help understand the pathophysiology and progression of cryptococcal or fungal IE.

ACKNOWLEDGEMENTS

The authors are grateful to Akira Kurose, Professor at the Department of Anatomic Pathology, for the helpful discussion on pathological specimens.

Conflict of interest: none declared.

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