Objective: Reperfusion by endovascular mechanical thrombectomy has been proven effective for patients with acute ischemic stroke. Although most embolization sources are thrombi, other types of clots could also be embolic sources. We report a sporadic case of acute ischemic stroke caused by mobilization of cardiac papillary fibroelastoma (CPF).

Case Presentation: A 79-year-old man presented was hospitalized with chronic heart failure due to disdialysis syndrome. He developed sudden consciousness disturbance and was diagnosed with basilar artery occlusion. Mechanical thrombectomy with only one pass of the Penumbra 5MAX ACE (Penumbra Inc., Alameda, CA, USA) was successful with a direct aspiration first-pass technique. Histopathological examination of the papilla-shaped fragile clot with white granular surface, revealed papillary fibroelastoma. Slight improvement in his clinical symptoms was seen after thrombectomy, but the patient died of deterioration of the disdialysis syndrome. CPF diagnosis was based on the pathological findings of the embolus, not on transesophageal echocardiography (TEE) or open heart surgery due to disdialysis syndrome in our patient. In addition, the presence of cardiac tumor could not be confirmed in the autopsy.

Conclusion: CPF is a rare benign cardiac tumor, which might cause cerebral infarction either directly or through thrombus formed by platelets and fibrin. While mechanical thrombectomy is safe and effective, but histopathological diagnosis of the aspirated clot can be recommended, especially if the appearance of the embolic material is unusual.

Keywords: acute ischemic stroke, basilar artery, cardiac tumor, papillary fibroelastoma, thrombectomy

Introduction

Primary cardiac tumors are rare entities which account for only 0.3%—0.7% of that of all cardiac tumors.1) Cardiac papillary fibroelastoma (CPF) is a papillary, pedunculated, and avascular tumor that is the second most common primary cardiac benign tumor. Reportedly, three-quarters of CPFs occur in the valves and affect both sexes equally, with a mean age of 60 years at diagnosis.2,3) The median size of these tumors is 8 mm, and the majority are smaller than 20 mm.4) Most patients with CPF are asymptomatic, but life-threatening complications might occur such as stroke, acute valve dysfunction, embolism, or sudden death. We report a sporadic case of acute ischemic stroke treated by mechanical thrombectomy which was caused by CPF diagnosed by histopathological examination.

Case Presentation

A 79-year-old man developed sudden consciousness disturbance during hospitalization for chronic heart failure due to disdialysis syndrome. The National Institutes of Health Stroke Scale (NIHSS) score was 40. The posterior circulation Acute Stroke Prognosis Early CT Score (pc-ASPECTS) on non-contrasted CT was 10 points. Diffusion-weighted...
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The procedure from the puncture to recanalization took 45 minutes. However, intratracheal intubation was required despite attaining TICI 3 because of respiratory dysfunction during the thrombectomy (Fig. 3A–3C). CT performed immediately after thrombectomy detected no subarachnoid hemorrhage. Anticoagulation therapy was not given after thrombectomy, as only free radical scavenger was used.

The patient exhibited slight improvement immediately after the thrombectomy, but his cardiopulmonary condition remained critical. The collected clot showed a fragment with the white granular surface of soft consistency appearing like a sea anemone (Fig. 4A). Histopathological examination of the clot revealed papillary fibroelastoma (Fig. 4B and 4C). Transthoracic echocardiography performed after the thrombectomy revealed no evidence of any cardiac tumor, and valvular disease or valvular dysfunction caused by the tumor. Transesophageal echocardiography (TEE) was not performed because of worsened chronic heart failure. No new antithrombotic therapies were initiated after the pathological diagnosis of papillary fibroelastoma. On postoperative day 16, T2-weighted MR imaging revealed a high-intensity area on the bilateral cerebellar hemisphere and right middle pons (Fig. 3D). On day 29, however, the patient died because of worsened chronic heart failure after the onset of the stroke. No agreement was given for postmortem examination by the family.

Discussion

Papillary fibroelastoma was first described in 1975, with the ultrastructural and electron microscopic findings of CPF in the same year. The etiology of CPF remains unclear, but the CPF is more frequently (> 95%) reported as a solitary lesion in the left side of the heart. However,
cases of multiple lesions have also been reported. To date, the histogenesis of CPF remains unknown, but several hypotheses have been proposed, such as organizing thrombi, congenital hamartomas, iatrogenic formations, cytomegalovirus infection, rheumatic valve disease, hemodynamic stress, and primary neoplasms.

CPF s are characterized by a flower-like appearance with multiple papillary narrow and elongated fronds attached to the endocardium. In addition, histologically confirmed tumor fragments have been isolated from the embolic material obtained from the coronary, pulmonary, and peripheral arteries. Notably, cerebral embolism caused by CPF is sporadic, with only two previous case reports. In the first case, the clot was removed from the intracranial artery by mechanical thrombectomy with a stent retriever. In the second case, thrombectomy was performed after thrombolytic therapy, but the diagnosis of CPF was made by TEE and was removed by cardiac surgery. Both cases were conveyed for a stroke without mentions such as the anamneses of the heart disease before a stroke. There are mentions of the antithrombotic therapy about neither case. Another case of cardiac myxoma stroke claimed that the aspiration thrombectomy would be safer because the device is not supposed to cross the lesion, which might reduce the risk of clot migration. Aspiration thrombectomy definitely provides benefit if the etiology of the embolus is known. However, tumor embolism is often difficult to diagnose before the procedure. In the case of embolism caused by myxoma, thrombectomy was performed with stent-retrieved devices in half of the cases, and the clinical outcomes were good.

Reportedly, CPFs develop cerebral infarction in the following two ways: (a) the tumor itself becomes an embolization source or (b) a thrombus formed by platelets and fibrin adheres to the surface of the tumor. Some case studies have demonstrated effective intravenous administration of rt-PA for acute cerebral infarction coexisting with CPF. In such cases, the thrombus is supposedly released from the tumor. In our case, cerebral infarction was caused by migration of the tumor. This is the second case of CPF pathologically diagnosed by thrombectomy. We could not confirm the presence of tumor in the heart by TEE and open heart surgery or pathological dissection, but the appearance and pathological findings of the embolus were characteristic of CPF, and this tumor is the only lesion which occurs in the heart, and the embolus source was the heart.

Notably, initial stroke severity, pc-ASPECTS on pretreatment diffusion-weighted MR imaging, and age are
Presumably, good prognosis will be observed for both tumor embolization and thrombosis embolization. Mechanical thrombectomy facilitates histological examination of the clot for diagnosis, which might contribute to the prevention of repeated etiology. In addition, histological examination of the clot recovered by thrombectomy helps in elucidating the cause of cerebral infarction, which could facilitate prevention of recurrence of stroke. Furthermore, the usefulness of the pathological diagnosis for the embolic material is considered to be high.

## Conclusion

CPF is a rare benign cardiac tumor, which might cause cerebral infarction either directly or through thrombus formed by platelets and fibrin. CPF diagnosis was based on the pathological findings of the embolus, not on TEE or open heart surgery due to disdialysis syndrome in our patient. Moreover, the presence of cardiac tumor could not be confirmed at postmortem. In our case, CPF was diagnosed than the appearance and pathological findings of the embolus collected by mechanical thrombectomy. Unusual appearance of embolus should be investigated to establish the pathological diagnosis.

## Disclosure Statement

All authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

## References