Successful endovascular removal of a chondroblastic osteosarcoma embolus within the left middle cerebral artery

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ABSTRACT

A 57-year-old woman with metastatic chondroblastic osteosarcoma developed sudden-onset right-sided weakness and aphasia. She was found to have an occluded left middle cerebral artery (M1 segment) and underwent endovascular stroke intervention with return to a normal neurological exam within 24 h. Histologic analysis of the embolus was consistent with chondroblastic osteosarcoma.

KEYWORDS Embolism; neoplastic cells; osteosarcoma; stroke; thrombectomy

Mechanical thrombectomy for acute stroke with large vessel occlusion has become the standard of care in patients who meet appropriate criteria.¹ Most acute large vessel occlusions are caused by thrombi, which are mixtures of fibrin clot and red cell aggregates in varying proportions.² We present an unusual case of a large vessel occlusion caused by a noncardiac primary tumor embolus. This is the third reported case of successful stroke-related endovascular removal of a tumor embolus originating from a noncardiac primary tumor and the first case involving chondroblastic osteosarcoma.

CASE DESCRIPTION

A previously neurologically normal 57-year-old woman with chondroblastic osteosarcoma of the chest wall, suspected renal metastasis, and deep venous thrombosis developed sudden-onset right-sided weakness and global aphasia. Two years before, the patient had undergone a chest wall resection of this tumor followed by external beam radiation and chemotherapy without complete remission. The patient was receiving salvage chemotherapy. She was living independently at home at the time of presentation. On arrival, she did not receive intravenous tissue plasminogen activator due to recent hematuria. An emergent computed tomography scan of her brain was normal. Computed tomographic angiography demonstrated an occlusion of the left middle cerebral artery M1 segment, and perfusion imaging showed a large area of penumbra in the left middle cerebral artery territory (not shown).

The patient underwent emergent endovascular embolectomy performed by the senior author (fellowship-trained in

neurointervention) with a 088 guide catheter, a large-bore aspiration catheter, and a stentriever device (Neuron Max, Jet 7, Penumbra 3 D, respectively; Penumbra, Inc., Alameda, CA) leading to complete revascularization (Thrombolysis in Cerebral Infarction score of 3) of the left middle cerebral artery territory in one pass (*Figure 1*). Inspection of the retrieved embolus revealed several pink fragments of tissue unlike a typical thrombus.

Follow-up magnetic resonance imaging of the brain was consistent with a small infarct in the left basal ganglia and corona radiata (*Figure 1*, inset); however, the patient had no neurological deficits. Histological analysis of the embolus demonstrated chondroblastic osteosarcoma identical to her known tumor (*Figure 2a, 2b*). Further three-dimensional transthoracic

Figure 1. (a) Catheter angiography confirming a left middle cerebral artery occlusion in the M1 segment. (b) After mechanical embolectomy, there is reperfusion (Thrombolysis in Cerebral Infarction score of 3). Inset shows a small area of diffusion restriction after intervention in the left basal ganglia that was asymptomatic.

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Figure 2. (a) Staining of the embolus with hematoxylin and eosin shows the gross morphological characteristics of the tumor embolus. (b) Higher magnification of the fragment shows characteristic findings of chondroblastic osteosarcoma. (c) Three-dimensional echocardiography shows evidence of tumor masses in the cardiac chambers.

echocardiography demonstrated large mobile masses in both atria extending through the tricuspid and mitral valves and a patent foramen ovale (Figure 2c). The patient was discharged home neurologically intact but succumbed to her widely metastatic disease about 30 days after the procedure.

DISCUSSION

Since 2015, endovascular intervention for acute stroke with large vessel occlusion has become the standard of care for patients who meet appropriate criteria.¹ At this time, our center performs about 35 endovascular thrombectomies per year, and this number has been increasing. As demonstrated here, a large-bore suction catheter combined with a stentriever is a highly effective method for stroke intervention and is the most common technique at our institution.^{3,4} In this case, the captured “thrombus” was in fact a tumor embolus that had occluded the M1 segment of the left middle cerebral artery.

The ethics of mechanical embolectomy for stroke have not been widely addressed. There is no consensus regarding how underlying medical conditions should affect access to endovascular therapy. When this patient presented to our institution with clinical symptoms of a stroke, her prognosis was unclear. She gained obvious benefit from the procedure and commented that she appreciated being able to spend more time with her family.

It is well documented that ischemic stroke can be caused by emboli from intracardiac tumors of cardiac origin, and several of these cases have been treated with mechanical embolectomy.^{5–11} Zander et al¹² and Pop et al¹³ have each reported a case of non-cardiac tumor emboli (lung carcinoma and sarcomatoid thoracic carcinoma, respectively) treated with endovascular embolectomy. Our case represents the third such case of a noncardiac tumor-related stroke treated with endovascular embolectomy. A high degree of suspicion should be maintained for this cause of stroke in patients with intravascular extension of metastatic disease.

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