Multiple Recurrent Acute Ischemic Strokes Treated by Thrombectomy in a Patient with Acute Pulmonary Embolism

Ton Mai Duy1, Luu Vu Dang2, Phuong Dao Viet1, Chi Nguyen Van1, Quang Anh Nguyen2, Thong Pham Minh2, Anh Nguyen Dat1, Nguyen Vu Thai Lien4, Vu Thi Nga5, Dinh Toi Chu2

1Emergency Department, Bach Mai Hospital, Hanoi, Vietnam; 2Radiology Center, Bach Mai Hospital, Hanoi, Vietnam; 3School of Odonto-Stomatology, Hanoi Medical University, Hanoi, Vietnam; 4Institute for Research and Development, Duy Tan University, 03 Quang Trung, Danang, Vietnam; 5Hanoi National University of Education, Hanoi, Vietnam

Abstract

BACKGROUND: Thrombectomy is recommended to treat for an acute ischemic stroke (AIS) patient with anterior large vessel occlusion. However, there were neither detailed guidelines nor systematic reviews of acute ischemic stroke patients having multiple times or re-occluded arteries.

CASE REPORT: In our case report, we struggled a multiple (4-times) AIS patient underwent by one intravenous r-tpA and 3 remaining of endovascular treatment of thrombectomy. Especially, the finding of both pulmonary embolism and cerebral arteries occlusion in this patient made us difficult to decide the appropriate treatment plan. The patient was considered having multiple cardiac thrombi pumping out to the brain and pulmonary vessels even in treatment with NOAC (New Oral Anticoagulant). Our priority, normally, was to recanalize the brain vessels compared to the pulmonary arteries.

CONCLUSION: In conclusion, based on this noticed case study, we want to share our experiences on the diagnosis of ischemic stroke, the strategy in treatment and prevention with anticoagulant therapy.

Introduction

Up to now, thrombectomy in the patient with acute anterior large vessel occlusion (LVO) has been recommended as the first choice of treatment for a high rate of recanalization [1]. However, as far as our knowledge, there is about 2.3% patients suffered from recurrent LVO stroke even within the first 48 hours had a very poor clinical outcome [2]. In such a special case, the indication of repeated thrombectomy is considered to be a good choice with the better result [3], [4]. In clinical practice, there are few case reports of patients with other arteries occlusion like pulmonary arteries embolism in combination with cerebral vessels thrombus. Although it is a very rare situation, it is still challenging for doctors in making a right decision. This case report aims to demonstrate our experiences in treatment of multiple recurrent acute ischemic stroke (AIS) due to occlusion of cerebral arteries associated with acute pulmonary embolism.

Case Report

A 53 years-old female patient came to our hospital at 8:45 am-75 minutes after the onset time (7:30 am), June 16th 2018 with the clinical symptoms of 3/5 left hemiplegia and dysarthria. The NIHSS (National Institutes of Health Stroke Scale) baseline was 5 and the blood pressure was 160/90 mmHg. Taking the past medical history showed that she had neither smoked nor taken oral contraceptives. The
after NCCT and CTA (Chloramphenicol Acetyl Transferase) indicated the ischemic lesions in the right insular with ASPECTS (Alberta Stroke Program Early CT Scan) baseline of 9 due to distal right M2 occlusion (Figure 1).

Figure 1: Imaging of the 1st stroke. A. NCCT; B. Distal R-M2 occlusion in CTA; C. MRI 24h post IV r-TPA

The patient was treated with intravenous (IV) r-TPA with a dosage of 0.9 mg/kg at 9:05 am (door to needle: 20 mins). 24 hours after treatment, she was stable with NIHSS (reduced to 2) and MRI follow-up (Figure 1) confirmed insular infarction with no extension or hemorrhage lesion. Transthoracic echocardiography and electrocardiogram (ECG) were performed without any abnormal indices. The glucose and lipid test resulted in a normal range. The patient was discharged 4 days after on June 20th, 2018 with a prescription of Asprin 100 mg/day and Lipitor 10 mg/day.

Four months later, on October 14th, the patient suddenly suffered from the same symptoms (1/5 left hemiplegia and dysarthria) at home. She was transferred to our center at 7:25 am 40 mins after onset, with a GCS (Glasgow Coma Scale) of 14 and NIHSS baseline of 12. The CT (Computed Tomography) Scan revealed right M1 occlusion in combination with ipsilateral A1 thrombus. ASPECTS baseline was 8. Patients then underwent endovascular treatment (EVT) with thrombectomy by experienced neuro-interventions. The right cerebral arteries were both TICI 3 recanalization with one-time aspiration of Sofia plus 6F for M1 and one-time stent-retriever of Eric 4/24 for A1 (Microvention). All the images were illustrated in Figure 2. The clinical outcome after 24-hour follow-up was significantly improved with mild left hemiplegia 4/5 and reduction of NIHSS to 2. Peripheral Doppler ultrasound showed normal signs, but this time, using transesophageal echocardiography (TEE), we found a 3mm of foramen ovale with small right to left shunt, no thrombus found inside either left atricle atrium or pulmonary arteries. The patient was also indicated to take Xarelto (Rivaroxaban) 20 mg/day.

Unfortunately, just 1 day after hospitalization at 4:00 am on October 16th, the patient was discovered to have 2/5 left hemiplegia, and NIHSS was 10. Right M1 was re-occluded on CTA with a hyperdense sign on NCCT, and ASPECTS was 6.

The patient was treated with intravenous (IV) r-TPA with a dosage of 0.9 mg/kg at 9:05 am (door to needle: 20 mins). 24 hours after treatment, she was stable with NIHSS (reduced to 2) and MRI follow-up (Figure 1) confirmed insular infarction with no extension or hemorrhage lesion. Transthoracic echocardiography and electrocardiogram (ECG) were performed without any abnormal indices. The glucose and lipid test resulted in a normal range. The patient was discharged 4 days after on June 20th, 2018 with a prescription of Asprin 100 mg/day and Lipitor 10 mg/day.

Four months later, on October 14th, the patient suddenly suffered from the same symptoms (1/5 left hemiplegia and dysarthria) at home. She was transferred to our center at 7:25 am 40 mins after onset, with a GCS (Glasgow Coma Scale) of 14 and NIHSS baseline of 12. The CT (Computed Tomography) Scan revealed right M1 occlusion in combination with ipsilateral A1 thrombus. ASPECTS baseline was 8. Patients then underwent endovascular treatment (EVT) with thrombectomy by experienced neuro-interventions. The right cerebral arteries were both TICI 3 recanalization with one-time aspiration of Sofia plus 6F for M1 and one-time stent-retriever of Eric 4/24 for A1 (Microvention). All the images were illustrated in Figure 2. The clinical outcome after 24-hour follow-up was significantly improved with mild left hemiplegia 4/5 and reduction of NIHSS to 2. Peripheral Doppler ultrasound showed normal signs, but this time, using transesophageal echocardiography (TEE), we found a 3mm of foramen ovale with small right to left shunt, no thrombus found inside either left atricle atrium or pulmonary arteries. The patient was also indicated to take Xarelto (Rivaroxaban) 20 mg/day.

Unfortunately, just 1 day after hospitalization at 4:00 am on October 16th, the patient was discovered to have 2/5 left hemiplegia, and NIHSS was 10. Right M1 was re-occluded on CTA with a hyperdense sign on NCCT, and ASPECTS was 6.

The patient was treated with intravenous (IV) r-TPA with a dosage of 0.9 mg/kg at 9:05 am (door to needle: 20 mins). 24 hours after treatment, she was stable with NIHSS (reduced to 2) and MRI follow-up (Figure 1) confirmed insular infarction with no extension or hemorrhage lesion. Transthoracic echocardiography and electrocardiogram (ECG) were performed without any abnormal indices. The glucose and lipid test resulted in a normal range. The patient was discharged 4 days after on June 20th, 2018 with a prescription of Asprin 100 mg/day and Lipitor 10 mg/day.

Four months later, on October 14th, the patient suddenly suffered from the same symptoms (1/5 left hemiplegia and dysarthria) at home. She was transferred to our center at 7:25 am 40 mins after onset, with a GCS (Glasgow Coma Scale) of 14 and NIHSS baseline of 12. The CT (Computed Tomography) Scan revealed right M1 occlusion in combination with ipsilateral A1 thrombus. ASPECTS baseline was 8. Patients then underwent endovascular treatment (EVT) with thrombectomy by experienced neuro-interventions. The right cerebral arteries were both TICI 3 recanalization with one-time aspiration of Sofia plus 6F for M1 and one-time stent-retriever of Eric 4/24 for A1 (Microvention). All the images were illustrated in Figure 2. The clinical outcome after 24-hour follow-up was significantly improved with mild left hemiplegia 4/5 and reduction of NIHSS to 2. Peripheral Doppler ultrasound showed normal signs, but this time, using transesophageal echocardiography (TEE), we found a 3mm of foramen ovale with small right to left shunt, no thrombus found inside either left atricle atrium or pulmonary arteries. The patient was also indicated to take Xarelto (Rivaroxaban) 20 mg/day.

Unfortunately, just 1 day after hospitalization at 4:00 am on October 16th, the patient was discovered to have 2/5 left hemiplegia, and NIHSS was 10. Right M1 was re-occluded on CTA with a hyperdense sign on NCCT, and ASPECTS was 6.

Unfortunately, just 1 day after hospitalization at 4:00 am on October 16th, the patient was discovered to have 2/5 left hemiplegia, and NIHSS was 10. Right M1 was re-occluded on CTA with a hyperdense sign on NCCT, and ASPECTS was 6.

The patient was treated with intravenous (IV) r-TPA with a dosage of 0.9 mg/kg at 9:05 am (door to needle: 20 mins). 24 hours after treatment, she was stable with NIHSS (reduced to 2) and MRI follow-up (Figure 1) confirmed insular infarction with no extension or hemorrhage lesion. Transthoracic echocardiography and electrocardiogram (ECG) were performed without any abnormal indices. The glucose and lipid test resulted in a normal range. The patient was discharged 4 days after on June 20th, 2018 with a prescription of Asprin 100 mg/day and Lipitor 10 mg/day.

Four months later, on October 14th, the patient suddenly suffered from the same symptoms (1/5 left hemiplegia and dysarthria) at home. She was transferred to our center at 7:25 am 40 mins after onset, with a GCS (Glasgow Coma Scale) of 14 and NIHSS baseline of 12. The CT (Computed Tomography) Scan revealed right M1 occlusion in combination with ipsilateral A1 thrombus. ASPECTS baseline was 8. Patients then underwent endovascular treatment (EVT) with thrombectomy by experienced neuro-interventions. The right cerebral arteries were both TICI 3 recanalization with one-time aspiration of Sofia plus 6F for M1 and one-time stent-retriever of Eric 4/24 for A1 (Microvention). All the images were illustrated in Figure 2. The clinical outcome after 24-hour follow-up was significantly improved with mild left hemiplegia 4/5 and reduction of NIHSS to 2. Peripheral Doppler ultrasound showed normal signs, but this time, using transesophageal echocardiography (TEE), we found a 3mm of foramen ovale with small right to left shunt, no thrombus found inside either left atricle atrium or pulmonary arteries. The patient was also indicated to take Xarelto (Rivaroxaban) 20 mg/day.

The patient was treated with intravenous (IV) r-TPA with a dosage of 0.9 mg/kg at 9:05 am (door to needle: 20 mins). 24 hours after treatment, she was stable with NIHSS (reduced to 2) and MRI follow-up (Figure 1) confirmed insular infarction with no extension or hemorrhage lesion. Transthoracic echocardiography and electrocardiogram (ECG) were performed without any abnormal indices. The glucose and lipid test resulted in a normal range. The patient was discharged 4 days after on June 20th, 2018 with a prescription of Asprin 100 mg/day and Lipitor 10 mg/day.
After 3 computed tomography, she decided to use Xarelto 20 mg/day for secondary preventative treatment, however, after only 6 hours, the patient suffered the 3rd stroke during the hospitalization due to right M1 occlusion. Imagine analysis in the CTA still supported us to continue with the second consecutive thrombectomy. This decision was similar to the ones done by other authors [3], [4], [5]. After discharge, our patient was prescribed continuously Xarelto, but she changed into Aspirin by herself without any consultant with us. Therefore, it led to her 4th stroke, meaning the 3rd stroke within only a month. In this recurrent time, she came with more severe condition (unconsciousness and unstable SpO₂) than all previous strokes. In CTA (Computed Tomography Angiography) images, not only the left distal M1 was occluded but also both pulmonary arteries embolism was identified.

In this situation, we rushed in the DSA room with thrombectomy for all two targets but aimed for the brain first because of its importance in making outcome. It was also our very first experience in ischemic stroke patient who have thrombus involved both cerebral and pulmonary arteries. Even having a successful operation with good recanalization, the patient was still in the fatal condition. Thank to our intensive care of treatment with the ventilator in combination with Dobutamine and Heparin infusion, she recovered progressively. After becoming conscious, she could breathe without ventilator support and do the rehabilitation with help. We decided to use Xarelto 15 mg 2 times/day for 3 weeks, then maintain a treatment with a dosage of 20 mg/day after discharge.

In conclusion, thrombectomy procedure treated for an ischemic stroke patient who has cerebral large vessel occlusion in combination with pulmonary arteries embolism seemed to be reasonable with an acceptable outcome.

**Ethical Approval**

The research was approved by the Ethics Committee of Hanoi Medical University, No 187/HĐĐĐHYHN on February, 20th 2016.

**Informed Consent**

Informed consent was obtained from the patient included in the study. The patient and her husband agreed both to participate in the treatment with understanding and allow our research group to use their studying image, data, and information in writing/publishing scientific article.
References

1. Mosimann PJ, Kaesmacher J, Gautschi D, Bellwald S, Panos L, Piechowiak E, Dobrocky T, Zibold F, Mordasini P, El-Koussy M, Wiest R. Predictors of Unexpected Early Recoeclusion After Successful Mechanical Thrombectomy in Acute Ischemic Stroke Patients. Stroke. 2018; 49(11):2643-51. https://doi.org/10.1161/STROKEAHA.118.021685 PMid:30355192

2. Bouslama M, Haussen DC, Rebello LC, Grossberg JA, Frankel MR, Nogueira RG. Repeated mechanical thrombectomy in recurrent large vessel occlusion acute ischemic stroke. Interventional neurology. 2017; 6(1-2):1-7. https://doi.org/10.1159/000447754 PMid:28611827 PMCid:PMC5465742

3. Fandler S, Deutschmann H, Fazekas F, Gattringer T. Repeated endovascular treatment of early recurrent proximal middle cerebral artery occlusion: Case report and brief review of the literature. Frontiers in neurology. 2018; 9:289. https://doi.org/10.3389/fneur.2018.00289 PMid:29774008 PMCid:PMC5943549

4. Lee Y, Yi H, Kim BM, Kim DJ, Kim SH, Nam HS, Heo JH, Kim YD. Recurrent cardioembolic stroke treated successfully with repeated mechanical thrombectomy within the acute index stroke period. Journal of Clinical Neurology. 2015; 11(3):275-8. https://doi.org/10.3988/jcn.2015.11.3.275 PMid:25749820 PMCid:PMC4507383

5. Meza HT, Caballo MR, Morte SG, Garcia RM, Moreno JM. Repeated Mechanical Thrombectomy in the Same Intracranial Artery Segment. Journal of Stroke and Cerebrovascular Diseases. 2017; 26(9):e180-2. https://doi.org/10.1016/j.jstrokecerebrovasdis.2017.06.015 PMid:28673810