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ENDOVASCULAR INTERVENTION FOR ACUTE ISCHEMIC STROKE: A REVIEW OF RECENT TRIAL IN CANTHO UNIVERSITY OF MEDICINE AND PHARMACY

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ABSTRACT

Introduction: *Acute cerebral ischemic stroke is a severe condition with high rate of mortality and morbidity. Treatment for ischemic stroke could be intravenous thrombolysis or catheter based revascularization. In many institutes, intravenous thrombolysis was used regularly for the ischemic stroke patients who come to the hospital within 3 hours since the onset. In other big institutes, endovascular revascularization including mechanical thrombectomy with or without intra-arterial thrombolysis, angioplasty with or without stenting has been increasingly used as one of the treatments for cerebral thromboembolism. In this article, we are reporting our outcomes of endovascular intervention as a treatment for ischemic stroke with catheter based thrombectomy, angioplasty and stenting.* ***Method and subjects:*** *All cerebral ischemic stroke patients who come to Can Tho University of Medicine and Pharmacy Hospital within 8 hours from the first symptom would be included. National institute of health stroke (NIHSS) scale were used for stroke grading which should be 10 or above. Diagnoses were confirmed by plain computed tomography (CT) of brain and cerebral computed tomography angiography (CTA) or magnetic resonance imaging (MRI) of the brain. Routine biochemical pre-op investigations were conducted and the patients were screened for other comorbidities. Cerebral angiography would be indicated when CT angiography showed occlusion at carotid artery, M1 middle cerebral arteries and basilar arteries. Vascularization procedure would be performed with penumbra thrombus aspiration system. In cases that needed angioplasty and stenting, gateway and saphire balloons were used for vessel dilation. Wingspan and carotid wallstent were used for intra and extracranial stenoses respectively. Post-procedure cares were conducted in combination with anesthesiology department, endovascular intervention team and medical physicians for at least 2 weeks.* ***Results:*** *A total of 28 patients were recruited from 1st January 2016 to 30th of March 2017 (15 months). Male and female ratio were 1.54:1(17/11). Ages ranged from 38 to 90 (mean 64). NIHSS score ranged from 10-24. 100% (28/28) of patients had comorbidity with hypertension (23/28), diabetes (6/28), atrial fibrillation (13/28), mitral valve stenosis and insufficiency (1/28). 22/28 patients had*

cerebral arterial occlusion due to thrombus (16 patients had intracranial carotid artery (ICA) occlusion and 7 patients had middle cerebral artery (MCA) occlusion). Among these 22 thromboembolism cases, 2 patients had ICA origin stenosis and tandem thrombus occlusion at the MCA which were successful revascularized with thrombectomy at the MCA and stenting at the ICA stenosis. 1 patient had MCA occlusion with thrombus over stenosis at left proximal MCA which was revascularized with thrombectomy, angioplasty and stenting. The rest of 19 patients with thrombus occlusion were experienced catheter based thrombectomy and successfully restored blood flow for 14 patients with TICI from 2B or above. 3 other patients had severe internal carotid artery stenosis (>70% of the lumen) at the origin which were successful in angioplasty and stent deployment. 3 other patients had severe stenosis of intracranial ICA which were successfully dilated by ballooning angioplasty without stenting. The total technical successful rates for all procedures were 23/28 (82%) with TICI (thrombolysis in cerebral infarction) perfusion scale rates from grade 2B to grade 3. 05 patients had not been revascularied successfully (TICI from 2a to below) due to vessel tortuosity and unable to advance the catheters to the occlusion sites. Among 5 patients with unsuccessful procedures, 2 had survived and had hemiparesis. 03 patients were dead due to disease severity. Among the patients with successful revascularization, 2 were dead (1 patient was dead due to aspiration pneumonia. 1 patient with multiple comorbidities of diabetes and hypertension was dead due to uncontrolable hyperglycemia and progressive cerebral edema). The rest 20/28 (71.4%) patients had remarkably recovered in muscle movement, language and cognition after 2 weeks with muscle power 3/5 or above. ***Conclusion:*** *Endovascular intervention is an effective treatment for management of ischemic stroke with high successful revascularization rate which was 82%. Among whom, 71% of patients had significant muscle power and cognition recovery after 2 months.*

Keywords: *acute ischemic stroke, IV rTPA, intra-arterial thrombolysis, catheter-based thrombectomy, intra and extracranial, angioplasty and stenting.*

I. INTRODUCTION

Acute cerebral ischemic stroke is a severe condition with high rate of mortality and morbidity. Treatment for ischemic stroke could be intravenous thrombolysis or catheter based revascularization. In many institutes, intravenous thrombolysis was used regularly for the ischemic stroke patients who come to the hospital within 3 hours since the onset. Currently, endovascular revascularization including mechanical thrombectomy with or without intra-arterial thrombolysis, angioplasty with or without stenting has been increasingly used as one of the treatments for cerebral thromboembolism. In this article, we are reporting our outcomes of endovascular intervention as a treatment for ischemic stroke with catheter based thrombectomy with and without thrombolysis, angioplasty and stenting.

II. MATERIALS AND METHODS

All ischemic stroke patients with NIHSS grading scale of 10 or above were included from 1st of January, 2016 until 30 of March, 2017 in Can Tho University of Medicine and Pharmacy (CTUMP) Hospital. The time of stroke was within 8 hours since the onset or since when the patients' symptoms have been identified until the admission.

Exclusion criteria include cerebral infarction later than 8 hours from the onset or there were evidence of obvious hypodensity at the infarcted areas on plain CT images to indicate that brain parenchyma has been severely infarcted Other exclusion criteria were

ischemic stroke with hemorrhage, severe comorbidities that might cause fatality i.e myocardial infarction, unstable vital signs.

The diagnosis would be made by clinical assessment, plain CT, CT angiography or MRI. At first, the patient's were assessed clinically. NIHSS score was used to grade the stroke scale and the included patients should have NIHSS of 10 or above. Blood samples would be taken for renal function test, ALP, AST, blood glucose, coagulation and ECG in the emergency room. Unless the patients had history of chronic renal failure, we did not wait for the renal function test results to reduce time consuming. Subsequently, plain CT and CT angiography were performed to exclude hemorrhagic stroke, to assess brain parenchyma and confirm the occlusion sites. MRI would be indicated for those who had NIHSS score of less than 10 or for cooperative patients since it is quite sensitive to motion artefacts. Digital substraction angiography would be indicated when there were evidence of occlusion at carotid arteries, M1 portion of middle cerebral artery, vertebral artery and basilar artery. Revascularization procedure would not be indicated if there were evidence of obvious hypodense lesions at the infarcted areas because those lesions could be too late to recover and it should increase the risk of cerebral heamorhage.

During the procedure, if the arteries were totally occluded due to thrombus, thrombectomy and thrombus aspiration would be performed first. The thrombus aspiration system included 5MAX ACE 64, 3MAX, transcend 0.014", Neuron Guiding catheter 6F. Heparin would be injected 2000IU IV when starting the procedure and would be topped up 1000 IU for every hour. If the 5MAX ACE64 catheter could not be advanced to the clot, 3 MAX catheter could be used for aspiration of the thrombus. The thrombi would be aspirated repeatedly in many times until the occluded vessels were totally revascularized. Otherwise, the procedures would be stopped if the stroke time went beyond 8 hours from the onset to reduce the risk of hemorrhage. After clots were removed from the occluded sites, if there were remained stenosis, angioplasty and stenting would be proceeded. If the procedure was unsuccessful because of the impossibility to advance the catheter to the clot sites, thrombolysis would be indicated if the stroke time was still within 6 hours from the onset. Alteplase was diluted and injected via intraarterial catheter located adjacent to the clot sites with the rate of 1mg/5 minutes and maximum dose of 20mg.

In cases there were stenosis and the patient had severe stroke with NIHSS 20 or above with muscle power 0 to 1/5, urgent angioplasty and stenting would be indicated. If the stenosis was extracranial i.e at ICA origin, balloon dilation would be done and followed by stent deployment using balloon Saphire or Gateway and Carotid Wallstent. If the stenosis was intracranial, balloon dilation would be performed first, if the stenosis recoiled, stent would be deployed using Gateway balloon and Wingspan stenting system. In cases the patient had mild limb weakness with muscle power 2/5 or above, stenting would be done in a delay at least 3 days after administration of clopidogrel 75mg/d and aspirin 81mg/d.

If the patients were incorporative, general anesthesia (GA) would be indicated.

After procedure, endotracheal (ET) tube could be removed when vital signs were stable. The patients would be followed up in post-procedure care unit or the anesthesiology department in combination of neurointerventionalists, anesthetists, neurologists and medical physicians. The patients would be transferred to medical department when his or her vital signs were stable.

Plain CT scan would be performed right after the procedure if we could not rule out hemorrhage or it could be indicated during follow-up for reassessment of the brain parenchyma. Clopidogrel 75 mg and aspirin 81 mg would be indicated right after procedure and maintained every day for at least one month. After that, clopidogrel 75 mg per day would be indicated in at least 3 months.

If cerebral edema progressed with midline shift or herniation, decompressing craniotomy would be performed by neurosurgeons. After the patients were discharged, follow-up appointments would be allocated one week, three weeks, and two month afterwards.

III. RESULTS

A total of 28 patients was recruited in the study from 1st January 2016 to 30th of March 2017 (15 months) [Table 1]. Male to female ratio were 1.54:1(17/11). NIHSS score ranged from 10-24. Ages ranged from 38 to 90 (mean 64). Approximately 95% of patients came after 4 hours. There was only 1 (5%) patients coming to emergency department within 3 hours from the onset. 100% (28/28) of patients had comorbidity with hypertension (23/28), diabetes (6/28), atrial fibrillation (13/28), mitral valve stenosis and insufficiency (1/28). There was association between patients' recovery of clinical symptoms with the patients' comorbidities and the time of stroke. The more comorbidities the patients had, the poorer the chance of recovery and the higher the incidence of dead rate (p=0.001). The later the patient came to emmergency department, the poorer the prognosis (p=0.005). However, the sample was small, so there could be bias.

Table 1: The outcomes

		number	**Procedure**	**Technical success**	**Complication**	**Clinical progression**	**Outcome**
Thr Ombus embolism	without stenosis	19	14 thrombectomy TICI 2b-3	successful	12 no complication	recover well	recover (12)
					1 aspiration pneumonia 1 progressive cerebral edema	dead	dead (2)
			5 unsuccessful thrombectomy (TICI 0-2a)	unsuccessful	2 bilateral carotid occlusion 1 cerebral hemorrhage	dead	dead (3)

		number	Procedure	Technical success	Complication	Clinical progression	Outcome
					1 no improvement	survive with hemiparesis	no improvement (1)
					1 cerebral hemorrhage	survive with hemiparesis	no improvement (1)
	with ICA origin stenosis	2	successful thrombectomy and stenting	successful	no	recovered	recover (1)
					no	dead due to progressive cerebral edema	dead (1)
	with MCA stenosis	1	successful thrombectomy and stenting	successful	no	recover movement and cognition	recover (1)
severe carotid artery stenosis at the origin		3	successful angioplasty and stenting	successful	no	recover movement and cognition	recover (3)
severe intracranial ICA stenosis		3	successful angioplasty with balloon dilation	successful	no	recover movement and cognition	recover (3)

The technical successful rate for all procedures (including thrombectomy, angioplasty and stenting) was 23/28 (82.1%) with TICI (thrombolysis in cerebral infarction) perfusion scale rates for thrombectomy cases from grade 2B to grade 3 [Table 2]. In the group of patients with successful revascularization, 20/28 (71.4%) patients had remarkably recovered in muscle movement, language and cognition after 2 weeks to 2 months [Table 3]. The total dead rate for both successful and unsuccessful cases was 6/28 (21.4%). Hemorrhagic complication happened in 2/28 cases (7.2%) [Table 4].

Table 2: Technical success

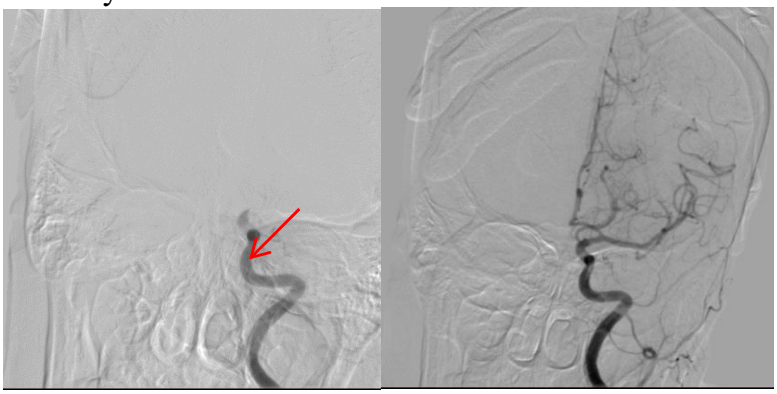
Procedure	Number of patients	Technical result	Recovery
Thrombectomy alone	14	successful technically	12 recovered well
			2 dead
	5	unseccessful	2 unchanged clinically
			3 dead
Thrombectomy with angioplasty and stenting	3	successful technically	2 recovered well
			1 dead

Procedure	Number of patients	Technical result	Recovery
Angioplasty of intracranial stenosis	3	successful technically	3 recovered well
Stenting of ICA origin	3	successful technically	3 recovered well

Table 3: Recovery rate

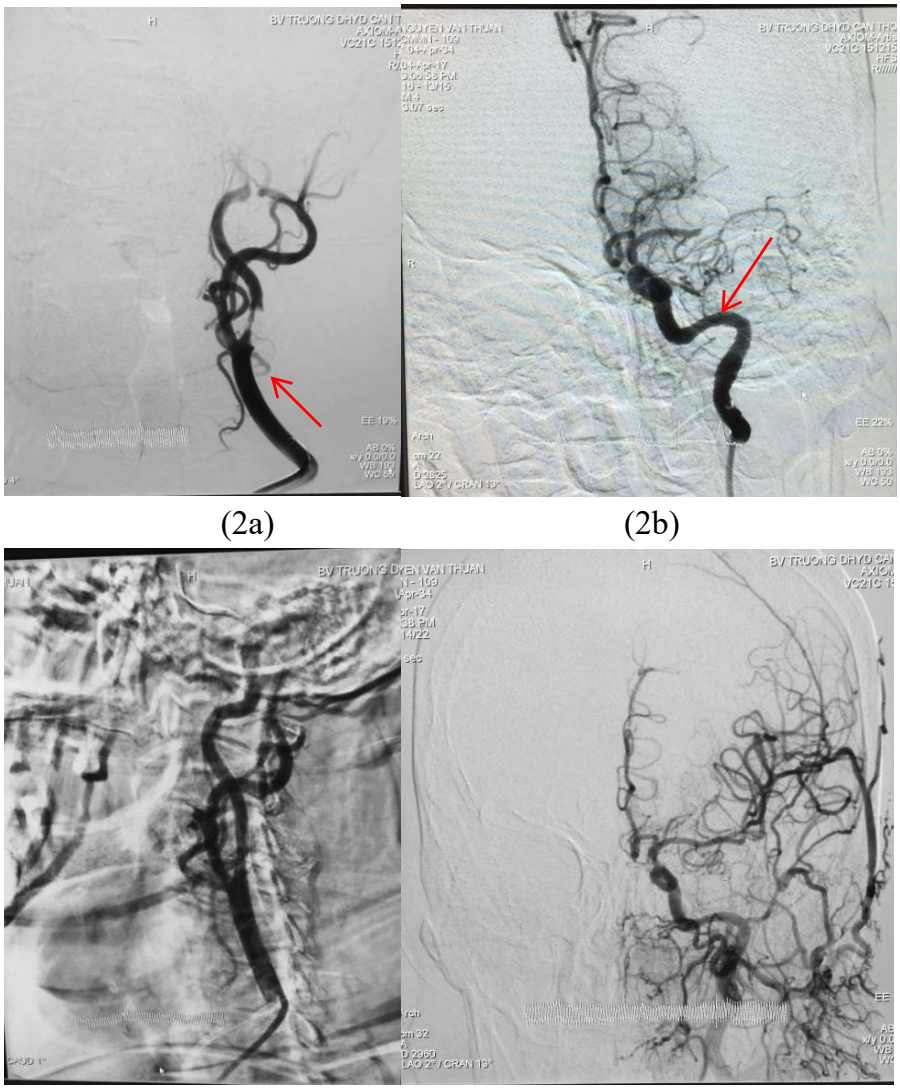
	Recover well	Unchanged	Worsening	Total
Thrombectomy	12	2	5	19
Thrombectomy with stenting	2	0	1	3
Angioplasty	3	0	0	3
ICA origin stenting	3	0	0	3
Total	20	2	6	28

There were 22/28 patients having cerebral arterial occlusion due to thrombus (16 patients had intracranial carotid artery (ICA) occlusion and 7 patients had middle cerebral artery (MCA) occlusion). Among these 22 cases, 20 patients have arterial occlusion due to thromboembolism and experienced thrombectomy [Figure 1]. 2 other patients had ICA origin stenosis and tandem thrombus occlusion at the ipsilateral MCA and ICA. These two patients had experienced catheter-based thrombectomy at the occluded vessels and stenting in the origin of the ipsilateral carotid arteries. Both of them were successful in revascularization with satisfied blood flow [Figure 2]. Of the two, one patient recovered well in cognition and movement. The other patient became worse due to severe progressive cerebral edema with uncontrollable hyperglycemia and unstable blood pressure. 1 other patient had MCA occlusion with thrombus over stenosis at left proximal MCA which was revascularized with thrombectomy, angioplasty and stenting. At first, the blood clots were removed to expose the stenosis part of the vessel. Angioplasty was done and stent was deployed. This patient can walk and communicate well after 2 months. The rest of 19 patients with thrombus occlusion were experienced catheter based thrombectomy and we could successfully restore blood flow for 14/19 patients with TICI from 2B or above. Among these 14 successful cases, 2 patients were dead (1 due to progressive cerebral edema, another one had aspiration pneumonia). 12 of 14 patients with successful thrombectomy recovered well.



(1a) (1b)

Figure 1: Image of a patient with occluded left ICA (1a, arrow) and the left ICA after successful thrombectomy. Before revascularization (1a) and after revascularization (1b)



(2a) (2b)

(2c) (2d)

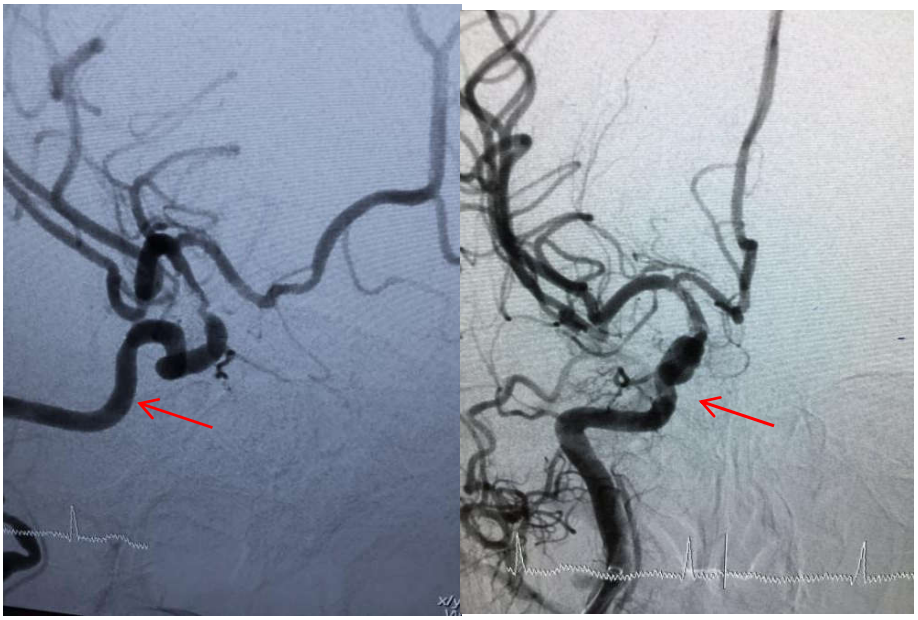
Figure 2: DSA images showed ICA origin stenosis (2a, arrow). Left MCA occlusion (2b, arrow). The left ICA stenosis after stenting (2c). The left MCA after thrombectomy (2d).

There were 3 patients having severe internal carotid artery stenoses (>70% of the lumen) at the origins which were successfully revascularized by angioplasty and stenting. One patient experienced stenting urgently and another two were experienced angioplasty and stenting after 3 days of clopidogrel (75mg/day) and aspirin (81mg/day) because there was irregularity at the stenosis portions to indicate presence of thrombus and the patient muscle power was over 2/5. In these cases, the patients were indicated clopidogrel and aspirin before the procedure. Upon admission, all patients had hemiparesis, dysarthria, slurred speech and unable to walk. After the procedure, all patients had improvement of their muscle power, language and cognition.

(3a) (3b)

Figure 3: DSA images of the patient with severe stenosis of the ICA origin before (3a, arrow) and after angioplasty and stenting with good flow (3b, arrow).

A total of 3 other patients having severe stenosis of intracranial ICA. These patients were admitted with hemiparesis (muscle power 1/5 to 2/5), clouding of conciousness and obtundation. CT angiogram and cerebral angiogram showed severed stenosis of the supraclinoid portions of the carotid arteries in all patients. Angioplasty was performed and the stenosis was successfully dilated without stenting. The good blood flows were obtained without complication. All the patients had improvement in movement and cognition.



(4a) (4b)

Figure 4: DSA images of the patient with severe intracranial ICA stenosis before angioplasty (4a, arrow) and after angioplasty (4b, arrow).

In 22 cases of thromboembolism experiencing thrombectomy with/without stenting, the technical successful rate was 17/22 (77.2%) Figure 1. The clinical improvement rate was 14/22 (63.6%) after follow-up 2 weeks to 2 months. 3/22 patients (13%) with successful thrombectomy were dead due to aspiration pneumonia (1/22) and progressive cerebral edema (2/22). The first of them was 90-year-old man with hypertension and diabetes melitus. He had right ICA occlusion due to thrombus and got thrombectomy done successfully. After the procedure he had aspirated pneumonia and dead after multi-organ failure. Second patient was a 56-year-old man with history of diabetes and hypertension. After the successful procedure of right ICA thrombectomy, his blood glucose was fluctuating and his blood pressure was unstable. He subsequently had severe cerebral edema and experienced decompressing craniotomy. His cerebral edema became worse and progressed with early death and he was discharged to home. Third patient was 83-year-old man with history of hypertension and dyslipidemia. He was admitted with left hemiparesis due to occlusion of the right MCA and severe stenosis of the right ICA origin. The patient was revascularized with thrombectomy at the right MCA and stenting at the right ICA origin stenosis. After procedure, he had progressive cerebral edema and respiratory distress and he was discharged home. All these death cases were associated with multiple comorbidities.

There were 5 patients with unsuccessful revascularization (TICI from 2a to below). All these patients had tortuous carotid arteries and had acute angle between carotid arteries and the aortic arch, therefore we could not advance the catheter to the occluded sites. Among these 5 patients, 2 patients survived and had hemiparesis, 3 patients were dead due to disease severity. The first patient was dead due to cerebral hemorrhage. The other two patients had bilateral carotid artery occlusion with atrial fibrillation. Both of them came to the hospital later than 6 hours from the onset. The revascularization procedures were performed incompletely and were stopped in the middle since the stroke time went over 8 hours from the onset. Both of them were partial revascularized in anterior cerebral arteries at one side of the hemisphere. The rest of the arteries were still occluded. Both of them were death afterwards.

The major complication was cerebral hemorrhage which happened in 2/28 cases (7.2%) [Table 4]. These two cases were related to thrombolysis and their revascularization procedures were not successful. The first patient had IV thrombolysis and subsequently had left hemisphere parenchymal bleed. She became worse and dead afterwards. The other patient had intra-arterial thrombolysis with bleed in the right basal ganglia. She has still survived and being conscious but has hemiparesis. Other complications were mild include rigor after the procedure which could be due to contrast adverse reaction. The rigor had all resolved after 100mg of hydrocortisone IV and fast infusion of rifaxon (paracetamol) 1gram in 100ml. Groin hematoma also happened in a few cases and were simply resolved after compression.

Table 4: Complications

	Hemorrhage	No hemorrhage	Total
Thrombectomy	2	17	19
Thrombectomy with stenting	0	3	3
Angioplasty and Stenting	0	6	6
Total	**2**	**26**	**28**

IV. DISCUSSION

Requirement for the diagnosis of acute ischemic stroke is accurate and fast to reduce time consuming which might lead to brain cell death. Plain CT scan is an initial study which could provide information on the early stage of the cerebral ischemia. The finding includes dense MCA sign [Figure 5], effacement of sulci of the insula (aka insula ribbon sign), effacement of the cerebral hemisphere sulci, loss of corticomedullary differentiation (1). Additionally, plain CT scan can rule out hemorrhagic stroke. If there is no lesion seen on the CT images which is a discrepancy to the patient clinical symptoms, the CT angiography would be indicated to identify the occluded sites of the cerebral arteries. If there is hypodensities seen on the brain parenchyma, it indicates that the patient has come at the late stage which could be more than 3 hours (2) and the chance for recovery is deminishing. General biological assessment of renal function, serum electrolytes, total blood count, PT, APTT, INR and ECG should be performed before the revascularization procedure to obtain the patient general condition necessary for patient prognosis.

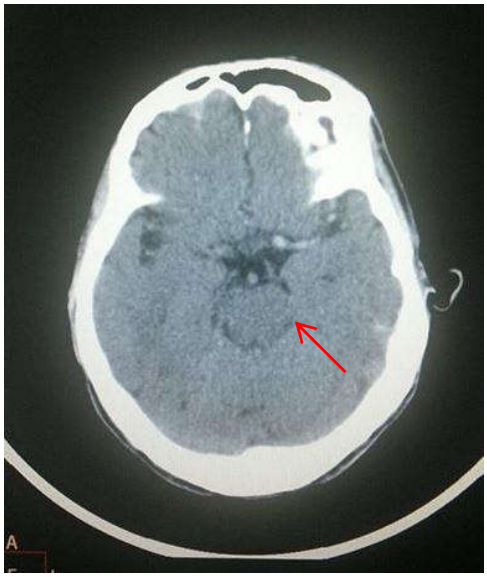
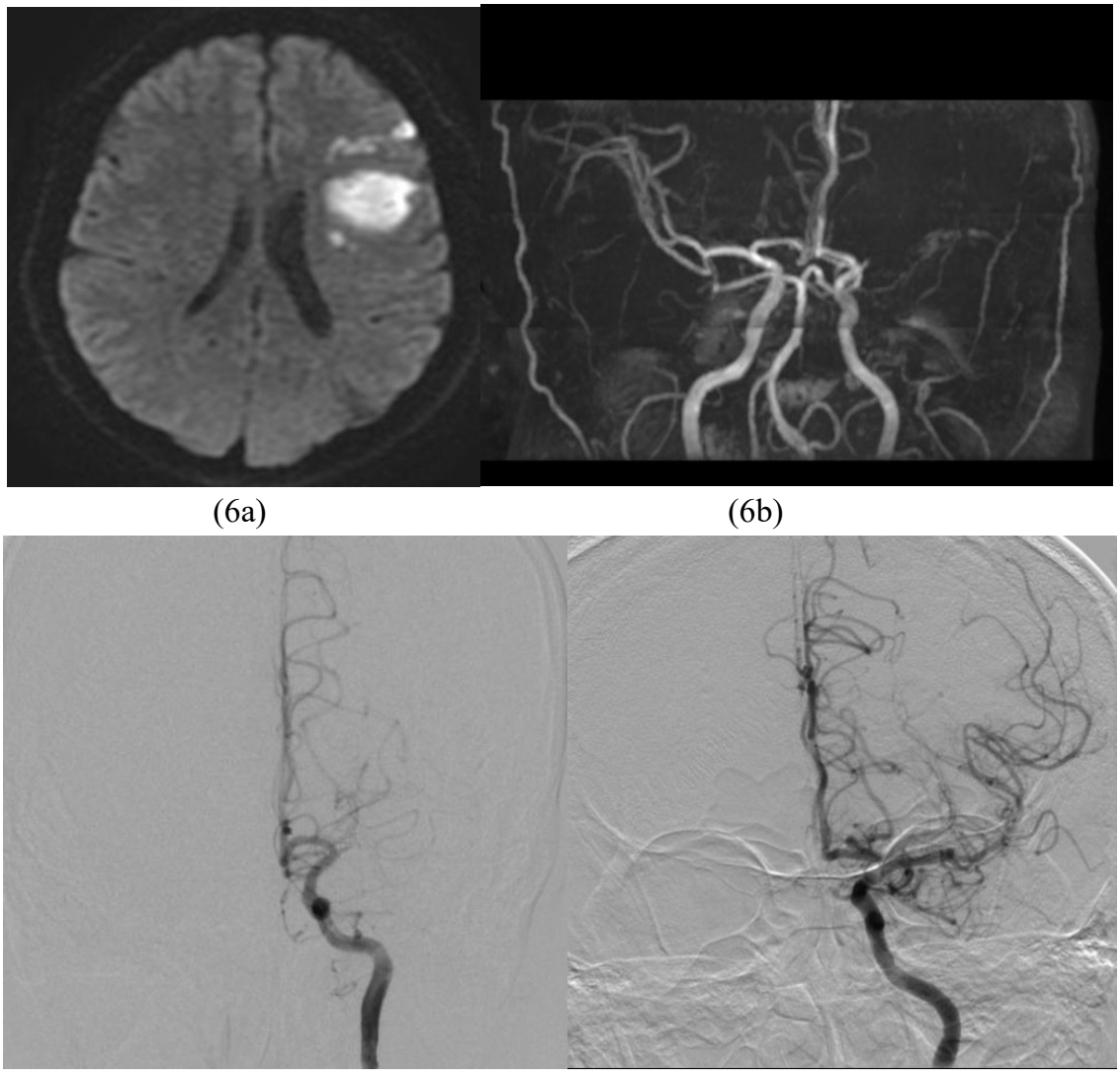


Figure 5: Dense MCA sign on CT scan image (arrow)

MRI is very sensitive to diagnose ischemia by using the diffusion sequence. Restricted areas [Figure 6] could be observed about 10 minute after the event (3). MRI

could provide information about the brain parenchyma and vascular lesions without the need for contrast media injection. In cases the patients come later than 8 hours or when the patient in contraindicated for CT scan or contrast media, MRI could be the modality of choice to assess brain parenchyma. MRI is also a more superior study compared to CT scan for identification of acute MCA thromboembolism based on 3D susceptibility-based perfusion MR images (4). However, MRI is sensitive to motion artifact requiring the patient to stay still during image acquisition which is hardly obtained in stroke patients. Moreover, MRI could not tell us whether the lesions are still in early state or too late for intervention because all the infarcted areas would show bright. On CT scan images, if the lesions are hypodense, they indicate that the possibility for patient recovery is diminished due to brain damages.



(6a) (6b)

(6c) (6d)

Figure 6: MRI and DSA images of the patient with ischemic stroke. DWI sequence (6a) showed restricted areas at the left frontal region. TOF sequence (6b) showed occlusion of the left MCA. DSA image showed occluded left MCA (6c). DSA image after revascularization (6d) showed good flow to the left MCA.

The indication for DSA and intervention is when there are occlusions at MCA, ICA or vertebral artery observed on CT angiography and there would be minimal hypodensities on the brain parenchyma. In our experiences, the densities of brain parenchyma is crucial for the patient prognosis. Hypodensities on the brain parenchyma is a sign that carries poor prognosis of recovery eventhough the patients came early within 6 hours after the onset. However, sometime the patient came later than 6 hours, but the brain parenchyma is still intact with very minimal change in density. This indicated that the brain parenchyma could have collateral supplies and the brain can be salvaged.

Traditionally, the treatment for ischemic stroke is intravenous thrombolysis if the patient come within 4 hours from the onset. However, it has been shown that IV thrombolysis has been shown to be ineffective and hemorhage rate is common. A study of 624 ischemic stroke patients treated with 0.9mg/kg IV thrombolysis and the patient come within 3 hours from the onset show that, 31-50% of them obtained partial to total recovery after 3 months. Intracranial bleed was 6.4%. Death rate were 17% and 24% after 3months and 1 year respectivelly (5). A series of 4 studies including ECASS I and II (European Cooperative and Acute Stroke Study), ATLANTIS A and B (Noninterventional Therapy in Acute in Ischemic Stroke) also report the similar outcome (6, 7). One of the important issue for IV thrombolysis is that the time from the onset to the admission time, if it is beyond 4 hour or the later it is, the greater the risk of hemorrhage and death rate (8).

A comparison between two studies of intravenous and catheter based thrombolysis show that the revascularization rates were 23% in IV group and 53 % in arterial injection group. The treatment for acute cerebral ischemia using catheter became more common and it showed more effective compared to IV thrombolysis (9).

A study on 157 patients who came within 8 hours after onset experienced thrombectomy using Penumbra thrombectomy system showed that partial or total revascularization rate could be obtained at 87% of cases. The complication rate is 5.7% (10).

On the study SARIS (Stent Assisted Recanalization in Acute Ischemic Stroke), there were 20 patients experienced emergency angioplasty and stenting after ineffective thrombolysis or catheter thrombectomy. All the patients achieved total or partial recanularization. Functional recovery was 60% after 6 months and hemorrhage complication was 5%. The author stated that angioplasty and stenting could be benefit for the acute ischemic patients (11).

Our practice showed that the successful revascularization was 82.1% and 71% of all patients had significant improvement in symptoms within 2 weeks to 2 months. For the group of patients with vascular occlusion due to thrombi and experienced thrombectomy with/without stenting, the successful rate was 77.2% and the clinical improvement rate was 63.6% which were quite high and encouragable eventhough the number of samples were still small.

The successful rate was dependent on the vessel tortuosity since the occluded sites could not be approached. Catheter exchange, stabilization of the guiding catheter could be useful to facilitate the vessel cannulation. When these solutions seem to be ineffective,

direct puncture to carotid artery could be considered (12) to skip all the angulated proximal portions from the puncture site to the aortic arch and the carotid artery. However, carotid direct puncture should be considered as the last option because of possible complication including severe hematoma causing compression to the airways. The incidence of significant hematoma causing compression may happen in 1%. Injury of the carotid artery and also infarction caused by direct cannulation of the carotid arteries were recorded at 1% of the stroke subjects.

The indication for urgent stenting in stroke patients with severe stenosis has been reported in . A study of 17 patients with severe cervical ICA stenosis experienced emergent stenting showed good technical feasibility and favorable outcome (13). In our study, three patients with severe stenosis of the carotid artery origin had experienced urgently stenting and they were recovered well. This is an initial positive outcome and it needs for further study in larger group. One of the issues for these patients was that whether the plaques were stable or not stable with thrombi within. In our practice, if the plaque was very smooth, it is likely stable and we proceeded to stenting right away. If the plaques were irregular in CT angiography, it is likely that those plaques could not be stable and we prescribed at least 3 days of clopidogrel 75mg/d and aspirin 81 mg/d before the procedure. However in cases the clinical symptoms were severe regardless the plaque appearances, urgent angioplasty and stenting were also performed and thrombolysis would be injected after stents were deployed.

Angioplasty alone for vascular stenosis or occlusion is also another option besides stenting. Multiple studies showed that balloon angioplasty is safe, effective adjuvant therapy in patient who have intracranial occlusion. Balloon angioplasty could prevent reocclusion of the artery and permit distal infusion of thrombolysis (14). We had 3 patients with severe intracranial carotid artery stenosis and had experienced balloon angioplasty. All three patients obtained good flow through the stenosis portions and no stent were needed. In cases angioplasty was not sufficient and the stenosis portion recoiled after dilation, stent would be deployed subsequently. The number of cases was still small and it needs a larger number of samples.

Post procedure multidisciplinary management is crucial for the patient recovery. This necessitates cooperation between neurointerventionists, ICU staffs, anesthetics and medical physicians. Multiple problems should be aware after the procedure including renal failure, electrolyte imbalance, severe cerebral edema, respiratory and urinary tract infection. Aspirated pneumonia is one of the severe conditions which could happen after stroke. One of our patients had aspirated pneumonia after the successful procedure. His status progressed to respiratory distress and cerebral edema that needed ventilator and decompression craniotomy. He subsequently was death due to severe pulmonary distress and multiple organ failure. For prevention, close observation, nil-by-mouth with parenteral nutrition, nasal gastric tubes and endotracheal tube insertion could reduce the risk of aspirated pneumonia.

V. CONCLUSIONS

Endovascular intervention has been an effective treatment for ischemic stroke. Under endovascular intervention, the blood flow could be regained in 82.1% technically. Among the successful revascularization cases, there were 20/28 patients (71.4%) having significant improvement in clinical symptoms. Among the total, cerebral hemorrhage complication happened in 2/28 cases (7.2%). The total dead rate for both successful and unsuccessful cases was 6/28 (21.4%).

In the group of thromboemlolism patients who experienced catheter based thrombectomy with or without angioplasty/stenting, the technical success rate was 17/22 (77.2%). The clinical improvement rate was 14/22 (63.6%) after follow-up 2 weeks to 2 months. Cerebral hemorrhage happened in 2/22 (9%) cases which were related to thrombolysis. The death rate for this thromboembolism group was 6/22 (27%). There was relation between death rate and multiple comorbidities.

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SISTER MARY JOSEPH'S NODULE AS A METASTASIS FROM GASTRIC CANCER: A CASE REPORT

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ABSTRACT:

Sister Mary Joseph's nodule is a well-known umbilical sign that may indicate an underlying abdominal or pelvic malignancy. The patients with this uncommon sign usually have poor outcome. We present a case of a 58-year-old woman with an umbilical firm nodule that originated from a gastric cancer. The patient underwent laparoscopic subtotal gastrectomy successfully, however, her prognosis still remains a question. Careful examination of a suspected umbilical lesion is the key that can identify the presence of the malignancy early and may improve the prognosis for the patient.

Keyword: *Sister Mary Joseph's nodule – gastric cancer – umbilical metastasis.*

CASE REPORT

Mrs. Dang Thi Hai, a 58-year-old woman, was admitted to the Can Tho University of Medicine and Pharmacy Hospital due to severe epigastric colicky pain on April 23, 2018. She had a history of dull ache of the epigastric region and anorexia for 3 months. The pain worsened after each meal accompanying with nausea and she did not get any treatment. After several weeks, the patient's condition deteriorated as her pain appeared more often and she vomitted about 5 times a day without eating anything. Then she was taken to a local clinic and was prescribed some kinds of medicine (including colloidal aluminium phosphate). However, after taking the medicines, her symptoms did not reduce. Then she came to our hospital for esophagogastroscopy. A fungating tumor was identified