

1

:
(percutaneous transluminal angioplasty; PTA)
:
PTA 10 . Stealth
PTA 50%
가 4 - 64 (23.5)
:
PTA 6 50 - 75% 4 75%
. PTA 10 - 40% 10 9 (90%)
7
1
가 24 . 1
3
: PTA

(percutaneous transluminal angio- (transient ischemic attack, TIA
plasty, PTA) 1978 Gruntzig (1)) 10 PTA
.
PTA
(perforating artery)
1980 PTA가 1994 6 1999 12 TIA
MCA PTA
10 6 , 4
PTA (2 - , 38 75 61 .
13). PTA TIA
가
.
6 (lacuna infarction)
(middle cerebral artery, MCA) (transcranial doppler
sonography, TCD) SPECT(single photon emission
CT) 3 . TCD 3
MCA 가 가(2.1 -
2.6) , SPECT 3
1999
2001 2 1 2001 5 24
651

가 PTA 3,000 IU 1,000 ml
(, ,) 3 300 ml (Y connector)
(, ,) 4 (Terufusion infusion STC-503, Terumo, Japan)
aspirin 5 7

(Multistar T.O.P. PTA
Siemens, Erlangen, Germany) 가 50,000 - 100,000 IU 3,000 - 5,000 IU
가

Seldinger
4F Headhunter (Mallinkrodt, St. Louis,
U.S.A.) PTA 50%
PTA

MCA Headhunter 0.035 inch
Amplatz (Cook, Bjæverskov, Denmark) TCD 3 , 가 4 - 64
6F Guider soft tip (Boston SPECT 1 가 4 - 64
Scientific, Boston, U.S.A.) White PE X-ray (23.5)
(BALT, Montmorency, France)

MCA Stealth
(Boston Scientific, Boston, U.S.A.)
(0.014 inch valve wire)
(coaxial insertion) , PTA 6 50 - 75%
, 4 75% MCA

MCA 1 - M1 1 cm 4 (Fig. 1), M1
2 5 2(1 cm 3 (Fig. 2), M2 1 cm
) × 20() mm 4 , 2.5 × 10 mm 3 , 2 × 10 (Fig. 3) MCA (genu portion)
mm 2 , 3 × 20 mm 1 MCA

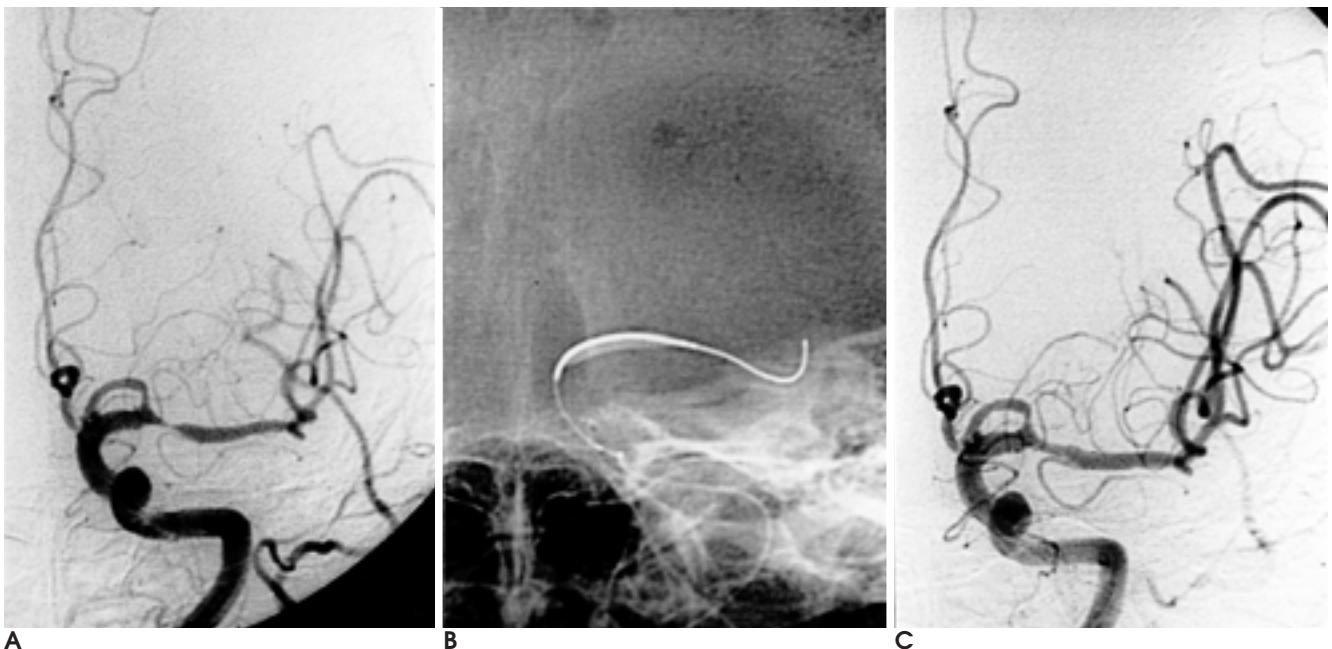


Fig. 1. A 69-year-old woman with right hemiparesis and dysarthria.
A. Left internal carotid angiogram shows a 90% degree stenosis in the first horizontal segment(M1) of middle cerebral artery.
B. Fluoroscopic image shows an inflated Stealth balloon catheter(2 × 20mm) at the stenotic site.
C. Angiogram after percutaneous transluminal angioplasty shows a 40% degree stenosis in the first horizontal segment of the middle cerebral artery. There is no complication and recurrent ischemic attack following 15 months.

M2 가 1 , 10 - 40% .
MCA PTA (Fig. 4). PTA 90% 1 3 × 20 mm
가 9 PTA

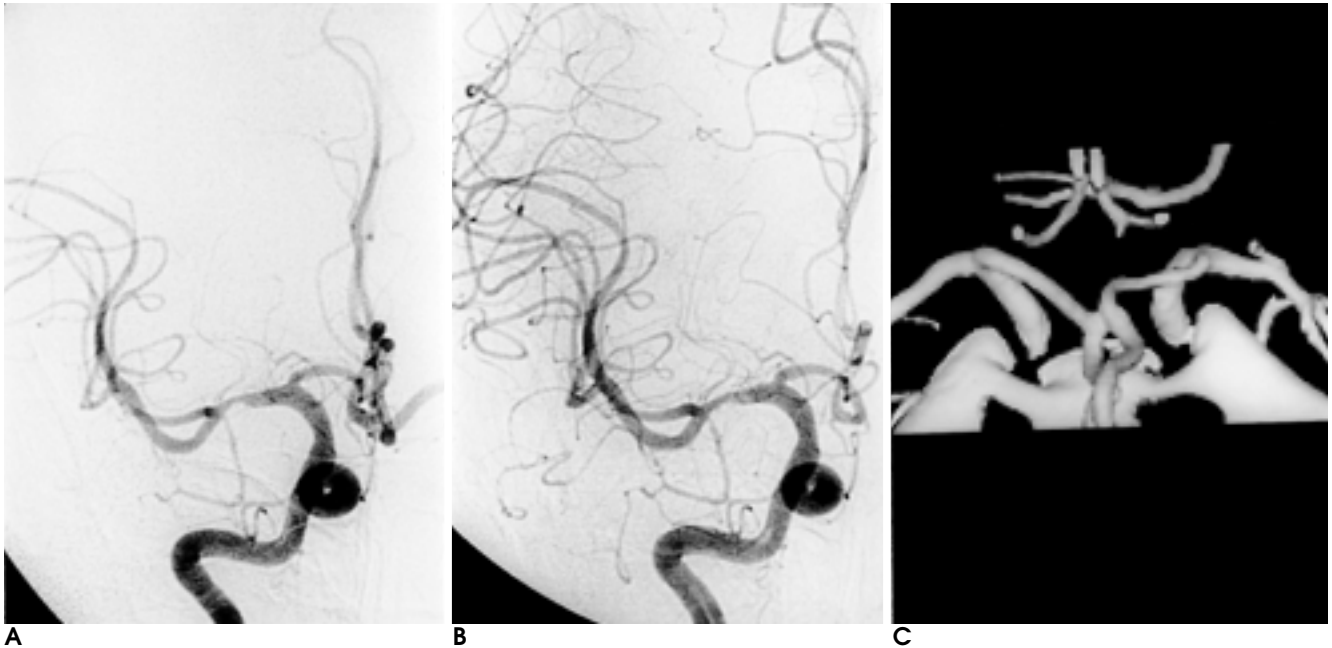


Fig. 2. A 53-year-old man with left motor weakness.
A. Right internal carotid angiogram shows a marked stenosis in the first horizontal segment of the middle cerebral artery.
B, C. Angiogram and CT angiogram after percutaneous transluminal angioplasty show an improved patency of the previous stenotic middle cerebral artery. There is no complication and recurrent ischemic attack following 17 months.

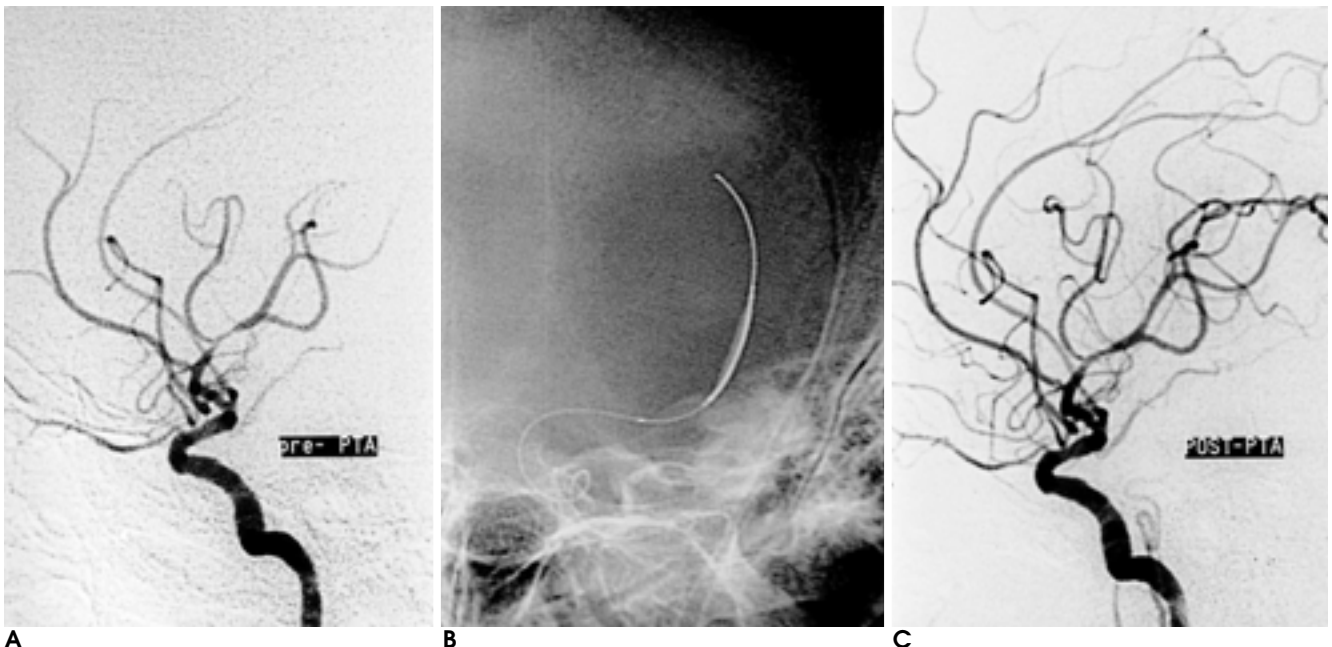


Fig. 3. A 75-year-old woman with right motor weakness and aphasia.
A. Lateral view of left internal carotid angiogram shows a moderate stenosis in the proximal portion of the second ascending segment (M2) of the middle cerebral artery.
B. Anteroposterior view of fluoroscopic image shows an inflated Stealth balloon catheter (2 × 20mm) at the stenotic site.
C. Angiogram after percutaneous transluminal angioplasty shows an improved patency of the previous stenotic middle cerebral artery. There is no peri- or post-angioplasty complication and recurrent ischemic attack following 12 months.

(14). TIA
 (Fig. 4).
 MCA
 (15,
 TIA가
 PTA
 (Aspirin,
 100 - 200 mg/day)
 (Ticlopidine HCL, 250
 mg/day,
 PTA
 MCA
 (carotid endarterec -
 (extracranial - intracranial
 (17, 18).
 (circle of Willis)
 APTT(activated partial thromboplastin time)가
 2 - 3
 APTT가 2 - 3
 가
 (19 -
 22). MCA
 가
 PTA
 MCA
 10
 TIA가
 60 - 90%
 PTA
 PTA Higashida (2)
 (intractable
 TIA vasospasm)
 15 - 30
 35%, 5 - 6%
 1990

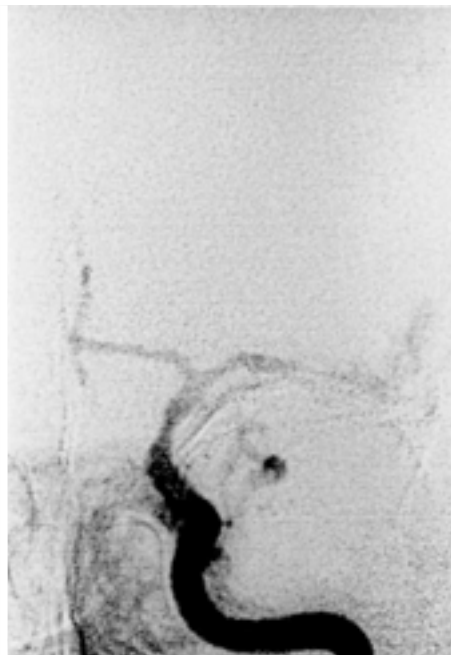
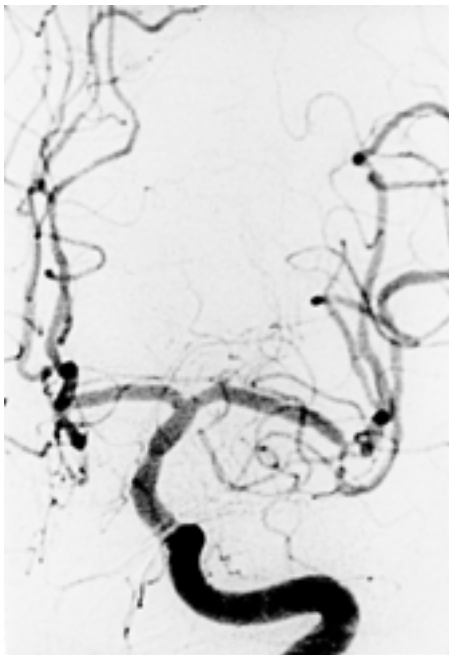


Fig. 4. A 69-year-old woman with right hemiparesis.

A. Left internal carotid angiogram shows a marked stenosis in the genu portion of the middle cerebral artery.

B. Angiogram after percutaneous transluminal angioplasty demonstrates leakage of contrast media and vasospasm at anterior and middle cerebral arteries due to vascular rupture during percutaneous transluminal angioplasty. In this case, diameter of balloon catheter(3 × 20 mm) was larger than that of stenotic middle cerebral artery.

Table 1. Summary of Clinical and Angiographic Findings of 10 Transient Ischemic Attack Patients with Middle Cerebral Artery Stenosis with Percutaneous Transluminal Angioplasty

No	Age(yr)/Sex	Clinical symptoms	Site	% stenosis pre/post-PTA	Pretreatment	Balloon (diameter × length: mm)	Complication	F/U
1	41/M	Lt.hemiparesis	Rt. genu	90/10	UK	2.5 × 10	(-)	SPECT 1mo:increased
2	54/M	Rt.hemiparesis	Lt. M1	70/20	UK, aspirin	2.5 × 10	(-)	
3	71/M	Lt.hemiparesis slurred speech	Rt. M1	70/10	heparin aspirin	2.5 × 10	(-)	MRI 12mo:no change
4	69/F	Rt.hemiparesis	Lt. genu Rt. M2	Lt:90/-	UK	3 × 20	SAH ICH	Death
5	69/M	Rt.motor weakness dysarthria	Lt. M1	70/10	heparin	2 × 20	(-)	TCD pre:82/190 3mo:77/128
6	53/M	Lt.motor weakness	Rt. M1	70/40	aspirin	2 × 20	(-)	
7	74/F	Lt.upper extremity sensory loss	Rt. M1	80/40	heparin	2 × 10	(-)	
8	38/M	Rt.hemiparesis dysarthria	Lt. M1	60/20	heparin	2 × 10	(-)	TCD Pre:60/158 6mo:68/105
9	75/F	Rt.motor weakness aphasia	Lt. M2	60/25	aspirin	2 × 20	(-)	
10	69/F	Rt.hemiparesis dysarthria	Lt. M1	90/40	UK,heparin, aspirin	2 × 20	motor aphasia	TCD pre:102/280 3mo:98/153 6mo:90/160

Rt; right, Lt; left, M1; first horizontal segment of middle cerebral artery, M2; second ascending segment of middle cerebral artery, SAH; subarachnoid hemorrhage, ICH; intracerebral hemorrhage, mo; month(s), UK; urokinase, SPECT; single photon emission CT, MRI; magnetic resonance image, TCD; transcranial Doppler sonography, (Rt)/(Lt) cm/sec

Purdy (3) MCA PTA 2 - 3 MCA
가 MCA
PTA (4 - 12)가
(underdilation) (10).
90% 1
3 mm
9
MCA PTA
20 - 31.3% (9, 12), 가
22%(6), PTA 가 PTA 50%
12 - 33% (5, 6, 9)
Suh (10) 10 PTA
1 (10%) MCA 1)
PTA 9 (adhesion) (aggregation)
PTA 가 (vasoreactivity) 가 2)PTA
(3). (endothelium - derived relaxing factor)
50% 가 가
PTA 50% (23). PTA 가
(5). Nakano (12) 50% 가

- occlusion. *AJNR Am J Neuroradiol* 1998;19:767-772
13. Nakano S, Yokogami K, Ohta H, Goya T, Wakisaka S. Direct percutaneous transluminal angioplasty for acute embolic middle cerebral artery occlusion: report of two cases. *Angiology* 1997;6:254-256
 14. Henry JM, Mohr JP, Bennett MS, et al. *Stroke: Pathophysiology, Diagnosis and Management*. 3rd ed. Philadelphia: Churchill Livingstone, 1998:378-384
 15. Pessin MS, Panis W, Prager RJ, Millan VG, Scott RM. Auscultation of cervical and ocular bruits in extracranial carotid occlusive disease: clinical and angiographic study. *Stroke* 1983;14:246-247
 16. Nishimaru K, Mchenry LC, Toole JF. Cerebral angiographic and clinical difference in carotid system transient ischemic attacks between American caucasian and Japanese patients. *Stroke* 1984;15: 56-59
 17. Roger PS, Michael JA, David AG: *Clinical Neurology*, 1st ed. San Mateo, Appleton & Lange, 1989:221-241
 18. Bougousslavsky J, Barnett HJM, Fox AJ, et al. Atherosclerotic disease of the middle cerebral artery. *Stroke* 1986;17:1112-1120
 19. Zeumer H, Freitag HJ, Zanella F, Thie A, Arning C. Local intraarterial fibrinolytic therapy in patients with stroke: urokinase versus recombinant tissue plasminogen activator(rt-PA). *Neuroradiology* 1993;35:159-162
 20. Mori E, Tabuchi M, Yoshida T, Yamadori A. Intracarotid urokinase with thromboembolic occlusion of the middle cerebral artery. *Stroke* 1988;19:802-812
 21. , , , . CT 1998;16:275-282
 22. , , , . : 1996;35:1-11
 23. El-Tamimi H, Davies GJ, Hackett D, et al. Abnormal vasomotor changes early coronary angioplasty: a quantitative arteriographic study of their time course. *Circulation* 1991;84:1198-1202
 24. Schwarze JJ, Babikian V, Dewitt LD, Sloan MA, et al. Longitudinal monitoring of intracranial artery stenosis with transcranial Doppler ultrasonography. *J Neuroimag* 1994;4:182-187
 25. Sorteberg W, Langmoen IA, Lindegarrd KF, Nornes H. Side-to-side differences and day-to-day variations of transcranial Doppler parameters in normal subjects. *J Ultrasound Med* 1990;9:403-409

J Korean Radiol Soc 2001;44:651 - 657

The Usefulness of Percutaneous Transluminal Angioplasty of the Middle Cerebral Artery Stenosis in Patients with Transient Ischemic Attack¹

Young-Chul Lee, M.D., Hyo-Soon Lim, M.D., Jae Kyu Kim, M.D., Jeong Jin Seo, M.D.,
Gwang Woo Jeong, Ph.D., Heoung Keun Kang, M.D.

¹Department of Radiology, Research Institute of Radiological Medical Imaging Chonnam National University Medical School

Purpose: To determine the effectiveness of percutaneous transluminal angioplasty(PTA) of atherosclerotic middle cerebral artery(MCA) stenosis in patients with transient ischemic attack(TIA).

Materials and Methods: Ten patients with TIA who had undergone PTA were retrospectively investigated. In all ten, angiography revealed stenosis of the MCA. Mechanical dilatation was performed at the stenotic portion, and the angiographic findings after PTA, as well as peri/post-angioplastic complications, were evaluated. Four to 64 (mean, 23.5) months later, neurologic symptoms and the nature and timing of recurrent attacks were also assessed.

Results: The degree of stenosis before PTA was 50 - 75% in six patients and greater than 75% in four. Complete or partial angiographic recanalization of the stenotic segment occurred in nine patients (90%). During follow-up, seven patients recovered without recurrent TIA or cerebral stroke; one reported a tingling sensation and one experienced vertebrobasilar insufficiency. Motor aphasia developed in one patient after PTA, but after systemic heparinization, improved within 24 hours. One patient who suffered intracranial hemorrhage due to vascular rupture during PTA did three days later.

Conclusion: PTA for atherosclerotic MCA stenosis in patients with TIA is an effective therapeutic method.

Index words : Arteriosclerosis

Middle cerebral arteries, transluminal angioplasty

Address reprint requests to : Young-Chul Lee, M.D., Department of Radiology, Chonnam University Medical School
8 Hak-dong, Dong-ku, Kwangju 501-757, Korea.
Tel. 82-62-220-5751-3 Fax. 82-62-226-4380