

1

2

3

4

4

:

: 41

. 41 12

8

(SIR: signal intensity ratio)

20

, 9

12

14 (34%)

,

12

8

(SIR)가 1.55
가

4 1.70

4

가 4

:

SIR

가

가

(4).

가 (1-3).

가

가

3

1
2
3
4

1998
1999

6

16

1999

9

16

3

41

CT

가

(

), (

가

artery) 6

modified NIH(Natio-

nal Institutes of Health) stroke scale score

15 0-4

가

6F, Y-connector

heparin (5,000 U/L)

Tracker -18 infusion catheter(Target therapeutics,

CA, U.S.A.)

가

1 4

modified NIH stroke scale 4

(recovery), 3

(nerological deficit),

(lethal)

300,000 IU 30ml

100ml

300,000 IU

가

200,000-300,000 IU

1,000,000 IU

CT

CT 100HU(hounsfield unit)

11

(proximal M1) 9

(basilar artery) 9

1 40

가

4

가

14, 3

13

14

(signal intensity ratio: SIR)

9

12

20

3 (region of interest)

MRI 1.5-T(Vision; Siemens,

Erlangen, Germany) single-shot EPI

FOV 23×23cm, TR 0.8ms, TE 123ms,

5mm, 7mm, 128×200matrix, 1 NEX, 10slices

b 1100s/mm², slice-selection

가

12 (Table 4).

Table 1. Comparison of Degree of Recanalization and Clinical Results

Degree of Recanalization	Clinical Results			Total
	R	ND	L	
CR	8	5	7	20
PR	4	1	4	9
NR	2	7	3	12
Total	14	13	14	41

CR: complete recanalization, PR: partial recanalization,
 NR: no recanalization
 R: recovery, ND: Neurological deficit, L: lethal

Table 2. Comparison of Sites of Occlusion and Clinical Results

Sites of Occlusion	Clinical Results			Total
	R	ND	L	
ICA	5	4	3	12
Proximal M1	3	2	4	9
Distal M1	3	5	3	11
Basilar	3	2	4	9
Total	14	13	14	41

ICA: Internal carotid artery, R: recovery,
 ND: Neurological deficit, L: lethal
 Tested by X²-test

8 4 (Fig. 1).
4 SIR 1.55 4 5

SIR 1.70 (Fig. 2). 12 4
SIR

가
SIR
, SIR

Table 3. Comparison of Sites of Occlusion and Degree of Recanalization

Sites of Occlusion	Degree of Recanalization			Total
	CR	PR	NR	
ICA	3	3	6	12
Proximal M1	5	1	3	9
Distal M1	7	2	2	11
Basilar	5	3	1	9
Total	20	9	12	41

CR: complete recanalization, PR: partial recanalization,
NR: no recanalization, ICA: internal carotid artery
Tested by X2-test

Table 4. Clinical Results, Degree of Recanalization, and SIR on Diffusion MRI

Patient No./Age(y)/Sex	Degree of recanalization	Clinical Results	SIR on diffusion MRI	
			Prefibrinolysis	Postfibrinolysis
1/69/F	Complete	L	1.78	2.30
2/60/F	Complete	L	1.77	2.00
3/55/F	Complete	R	1.19	1.18
4/52/M	Complete	L	2.18	2.63
5/61/F	Complete	R	1.20	1.01
6/68/F	Partial	ND	1.15	1.17
7/58/M	No	ND	1.15	2.88
8/65/F	No	ND	1.20	1.52
9/74/F	Complete	L	2.03	-
10/73/F	No	L	1.76	-
11/64/F	Complete	R	1.55	-
12/52/F	Complete	R	1.25	-

R: recovery, ND: Neurological deficit,
L: lethal, -: Not performed
Tested by X2-test

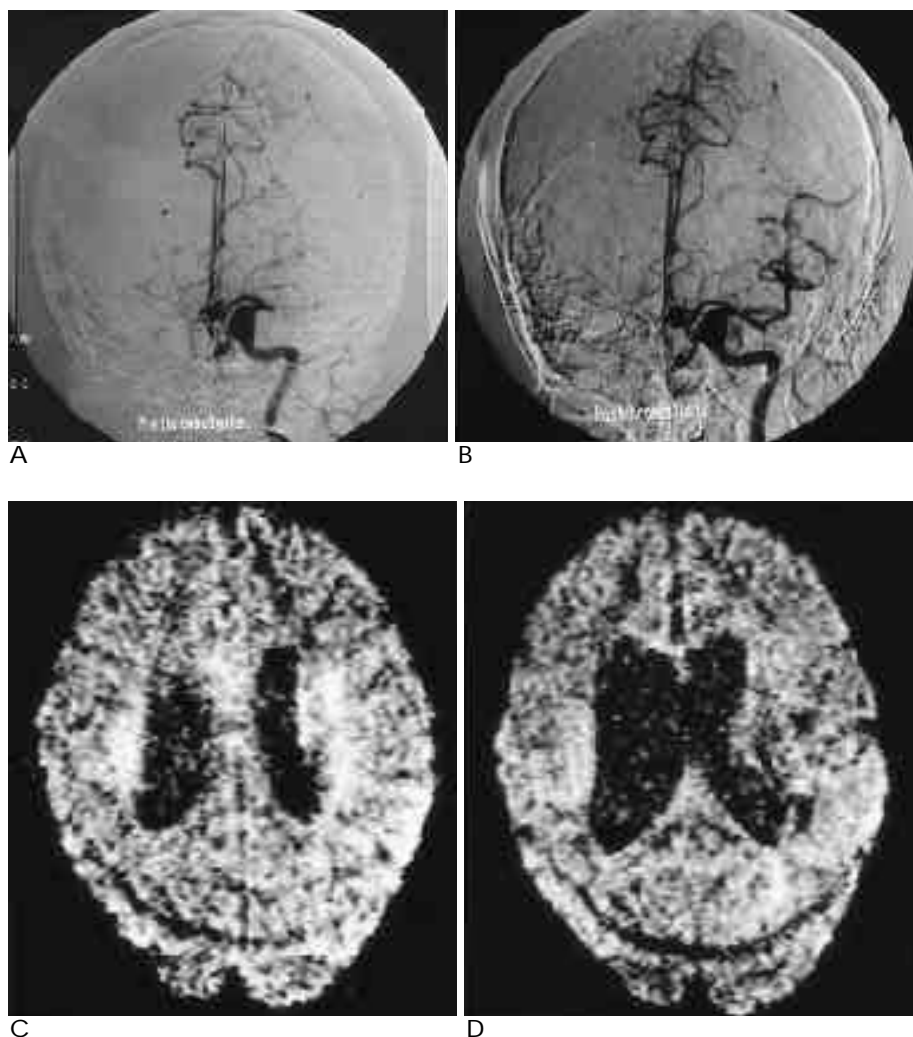


Fig. 1. Patient 5. Occlusion of the left proximal middle cerebral artery with neurologic recovery.

A. Left internal carotid angiogram before thrombolysis shows occlusion of the proximal M1.

B. Post-thrombolytic angiogram demonstrates complete recanalization. Patient completely recovered from neurologic deficit after 2 days.

C. Diffusion weighted image (b=1100) before thrombolysis reveals focal high signal intensity (SIR= 1.20) in the left frontal deep white matter.

D. Follow up diffusion weighted image obtained 24 hours after shows no visible high signal intensity (SIR= 1.01).

Minematsu (rat) 가

가 가 가

2-6 가 (11, 12). 가 (15).

Sasaki 가

4.8 5.8 45 DWI

(13). 6 50% ADC(delta apparent diffusion coefficient) ADC

ADC가 -0.25×10^{-5} 가 (16).

5.5 가 8 6 12

microvascular circulation) 가 (collateral 가 SIR 가

가 SIR 4

가 가 SIR

가 가

70%

34%

6 가 가

6 SIR

7 (17%) 가 (re-

Yuh 가

versible cerebral ischemia) 가 collateral microcirculation

가

mean transit time map blood volume map

가 가 (14).

가

가 가

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Superselective Intra-arterial Fibrinolysis for Acute Cerebral Ischemic Infarct: Usefulness of Diffusion Weighted MR Imaging¹

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Purpose : To evaluate the efficacy of superselective intra-arterial fibrinolysis for acute cerebral stroke and the usefulness of pre- and postfibrinolysis diffusion-weighted MRI (DWI).

Materials and Methods : In 41 patients with acute ischemic stroke whose treatment involved intra-arterial fibrinolysis, the occlusion site, degree of recanalization, and clinical results were compared. In 12 patients, diffusion weighted MRI was performed before fibrinolysis, and eight of these also underwent diffusion-weighted MRI after fibrinolysis. Using diffusion-weighted MRI, neurological outcomes were compared with signal intensity ratio (SIR, or the average signal intensity within the region of interest divided by that in the contralateral, nonischemic, homologous region).

Results : Twenty patients showed complete recanalization, nine partial recanalization, and in twelve there was no recanalization. Fourteen patients (34 %) improved neurologically. No relationship existed between occlusion sites, degree of recanalization, and clinical outcome.

Among 12 patients who underwent DWI before fibrinolysis, complete recanalization was noted in eight. Neurological improvement was seen in four patients with low SIR(1.55), while in four with high SIR(1.7), neurological outcome was poor despite complete recanalization.

Conclusion : Although superselective intra-arterial fibrinolysis for acute cerebral stroke is a good therapeutic method for recanalization, the clinical outcome can be disappointing. We therefore suggest that in cases of acute cerebral ischemic infarct, SIR-as seen on DWI-might be useful for predicting the benefits of recanalization. In such cases, further investigation of the use of DWI prior to fibrinolysis is therefore needed.

Index words : Brain, infarction

Thrombolysis

Cerebral blood vessels, stenosis or obstruction

Magnetic resonance (MR), diffusion study

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