



:
 (2D PC MRA)
 : T2 , 2D PC MRA
 72 42 2D PC MRA
 , ,
 가 T2
 가 가
 : 42 2D PC MRA , 15 (35.7%)
 , 13 (31%) 14 (33.3%) 27 (64.3%)
 . T2 6 (14.3%) 가 , 36 (85.7%)
 . T2 6
 12 1 2D PC MRA
 5 (1) (4)
 : 2D PC MRA
 , T2 가
 routine MRI 가

(1).

. (Magnetic resonance imaging, 가
 MRI) MRI 가
 12
 (2-6),
 penumbra (5). 가
 (Echo Planar Image, EPI) CTA)
 (Computed tomography angiography,
) (Magnetic resonance angiography, MRA
 가 (7-12).
 MRA Multiple Overlapping Thin Slab Acquisition(MOTSA) 가 3D Time of Flight(TOF
) 3D TOF
 (9-15), 10 15
 MRI

가
2

1999 가
 1999 3 5 1999 7 30

(routine)

2D PC MRA 3D TOF MRA

TR/TE 4500/96ms, echo-train length 7, 6mm, 1.2mm, field of view 210×210, matrix size 252×256, 1 19

single shot EPI b-value 1000 s/mm², TR 4900-5400 ms, TE 103ms/4, TD 20ms, 6mm, field of view 230×230, matrix 96×128, 1 T2 19

2D PC MRA 50mm (slab thickness), encoding velocity 30cm/sec, TR/TE 83/9ms, 4, field of view 260mm, matrix 256×256 1 27

T2

1996 10 1998 10 2 3 T2

2D PC M-

RA 42

42

2

(Comupted

Tomography, CT) MRI

19 86 61.79

20 22 MRI 2 가

72 , 36.79 , 12

10

MRI 1.5 T (Magnetom Vision, Sie-mens, Erlangen, Germany) T2

12 10

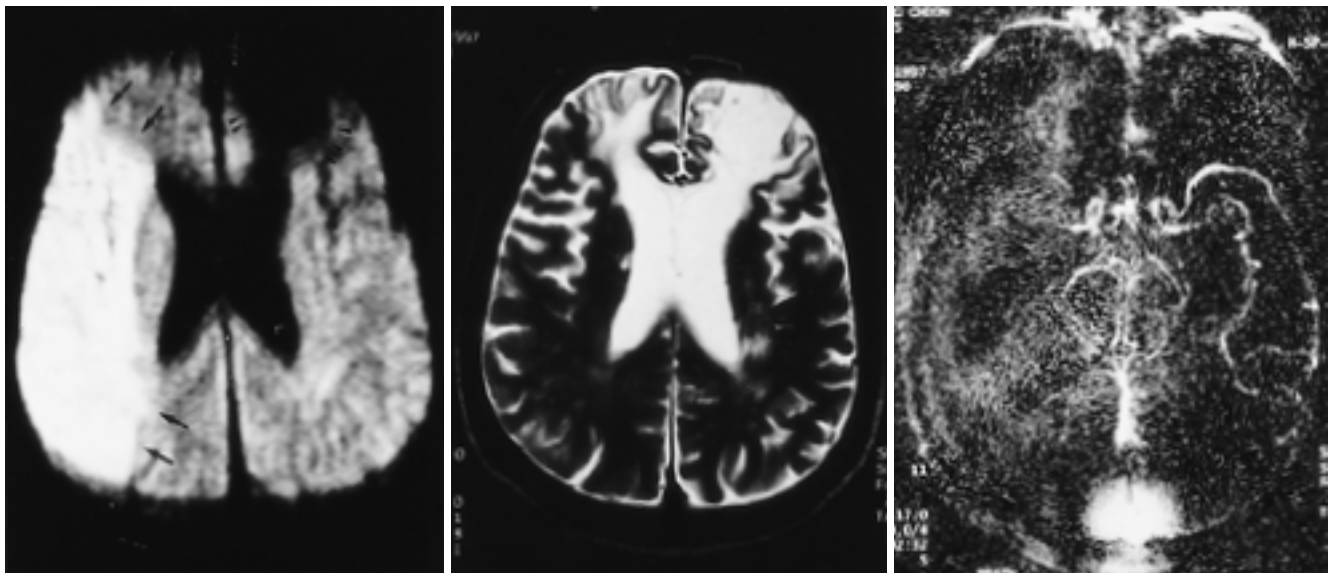


Fig. 1. Two hours old infarct.

A. Diffusion weighted image(DWI) demonstrates a large high signal lesion in the right middle cerebral artery territory(arrows). Low signal intensity lesion indicating chronic infarct is seen in the left frontal lobe(arrow heads).

B. T2-weighted image(T2WI) shows no discernable signal change in the right MCA territory.

C. Axial 2D PC MRA demonstrates loss of signal in the right middle cerebral artery.

26
T2
(14.3%) , 36 (85.7%)
2D PC MRA 13 14
27 (64.3%)
1). T2
2D PC MRA
1 4 (Fig. 1)
MRA T2
가 2D PC MRA
14 (Fig. 2). T2
2D PC MRA
T2
22 (Fig. 3)
6
- 12 , 7.4) MRI
10
4 (40%) 가 2D PC MRA
7 (70%) 5 T2

3 MRI 42
28 (hemiparesis), 9
(dysarthria), 6 (aphasia), 5
(drowsy mentality), 2
(seizure)
, 2 , 1 , T2
, 27 가
7 , 3 ,
2 , 2 ,
가 1 . 17
() , 4 , 3
가 5 , 6 ,
, 2 . 2
1 , 2
2cm

Table 1. Comparison of T2-weighted Images and 2D PC MRA in Acute Cerebral Infarctions (less than 72 hours)

		2D PC MRA			
		normal	stenosis	occlusion	total
SI on	no change	1	1	4	6
T2WI	high	14	12	10	36
total		15	13	14	42

SI : signal intensity

Table 2. Comparison of T2-weighted Images and 2D PC MRA in Hyperacute Cerebral Infarctions (less than 12 hours)

		2D PC MRA			
		normal	stenosis	occlusion	total
SI on	no change	1	1	4	6
T2WI	high	2	1	1	4
total		3	2	5	10

SI : signal intensity

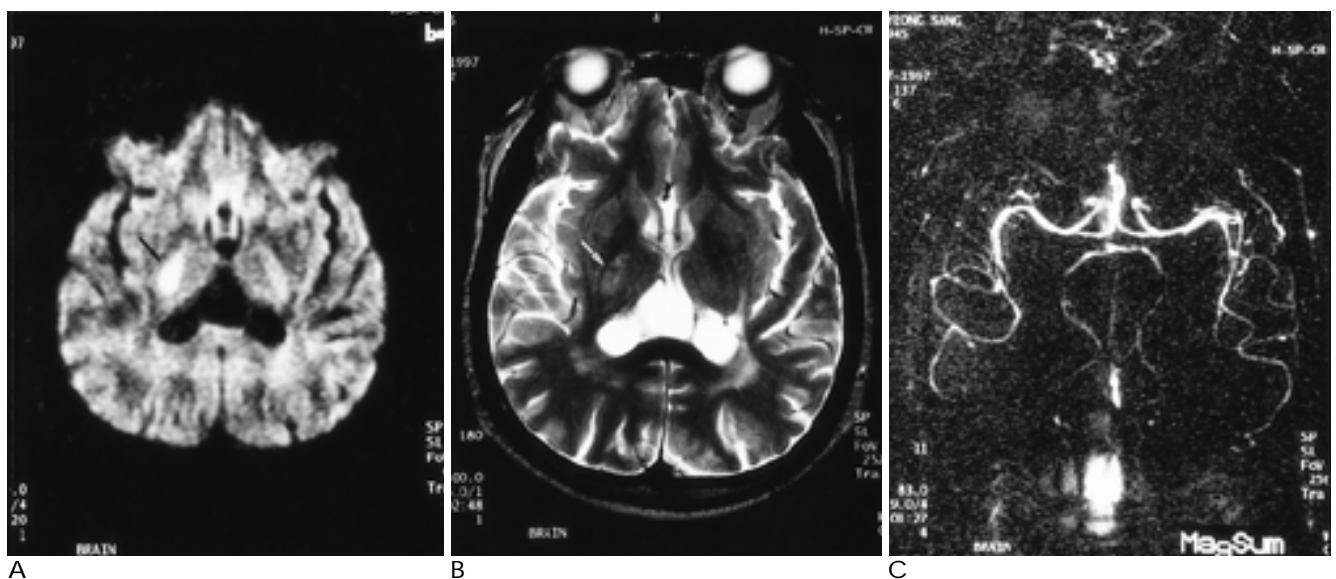


Fig. 2. One-day old infarct.

A. DWI demonstrates small ovoid high signal intensity lesion in the right capsulothalamic region (arrow).

B. T2WI shows subtle increased signal change in the same region.

C. 2D PC MRA shows symmetric middle cerebral arteries with no abnormality.

(19).
 30cm/sec, 45 cm/sec,
 60cm/sec, 80cm/sec
 2D PC MRA
 Sorenson
 1 (M1)
 , 30cm/sec
 2 (M2)
 30cm/sec encoding velocity
 72 42 27 ()
 64.3 %) 2D PC MRA
 Warach (8) 48 24
 16 3D TOF MRA
 12
 10 7 (70%) , 5 T2
 , T2 4
 (40%) 가 T2 가
 가
 15 (35.7%) 2D PC MRA
 3 12 12 12
 72 , 15
 11 가 2cm Warach (8) (8)
 ,
 2 2D PC MRA
 2D PC MRA slap
 slap
 2D PC MRA 가
 , EPI가
 , T2 가
 , 3D TOF
 MRI
 2cm
 ,

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Usefulness of 2D PC MRA of the Circle of Willis in the Evaluation of Acute Cerebral Infarction¹

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Purpose : To evaluate the usefulness of axial 2-D PC MRA of the circle of Willis in the evaluation of acute cerebral infarction

Materials and Methods : We evaluated 42 patients with acute cerebral infarction who had undergone T2 weighted and diffusion weighted MR imaging (T2WI, DWI) and 2-D PC MRA of the circle of Willis within 72 hours of the onset of symptoms. In conjunction with high-signal lesions on DWI, the findings of 2-D PC MRA were classified as normal, stenotic, or indicative of arterial occlusion; negative 2-D PC MRA was not considered useful. In addition, the signal intensity of T2WI and DWI was compared.

Results : (The findings of 2-D PC MRA showed that 15 cases(35.7%) were normal, 13(31%) were stenotic, and that in 14 (33.3 %), occlusion was present). Thus, 2-D PC MRA detected vascular abnormality in 27 cases(64.3 %). On T2WI, six cases (14.3 %) showed no signal change and 36 (85.7 %) showed high signal change. In six cases without signal change, MR images were obtained within 12 hours of ictus; in one of these patients MRA findings were normal, one had stenosis, and in four, occlusion was noted.

Conclusion : 2-D PC MRA is a useful modality for the detection of vascular abnormality in patients with acute cerebral infarct.

Index words : Brain, infarction

Brain, MR

Magnetic resonance(MR), vascular studies

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