

## Complications of Diagnostic Intra-arterial Cerebral Angiography in Ischemic Cerebrovascular Diseases

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**Background** : Intra-arterial cerebral angiography, which is a prerequisite for carotid endarterectomy and angioplasty, carries some risks but provides the best visualization of the cerebral vasculatures. We attempted to examine the incidence of complications associated with cerebral angiography in patients with ischemic stroke. **Methods** : We retrospectively reviewed the medical records of patients with ischemic stroke or transient ischemic attack (TIA) who underwent the digital subtraction cerebral angiography. Four hundred nineteen procedures were performed between October 1994 and August 1999. The systemic, local, and neurologic complications were evaluated. The neurologic complications were defined as occurrences of any new focal neurologic deficits or progressions of the preexisting neurologic deficits during or within 24 hours after the procedure. **Results** : There were 5 systemic (1.2%), 17 local (4.1%), and 10 neurologic (2.4%) complications. The neurologic complications were reversible within 7 days in 6 (1.4%) and were persistent after 7 days in 4 (1.0%). Six out of 10 patients with neurologic complications had previous stroke or TIA. The angiographic studies revealed the stenosis or obstruction of the relevant arteries in 7 patients. **Conclusions** : Cerebral angiography in patients with ischemic stroke was associated with 1.4 % reversible and 1.0% persistent neurologic complications, all of which developed after the angiographic procedure. The history of previous stroke or TIA and the presence of severe stenosis or occlusion of the symptomatic arteries may carry a high risk of neurologic complications.

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**Key Words** : Cerebral ischemia, Cerebral angiography, Complication

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NASCET<sup>1</sup>

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ECST<sup>2</sup>

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\* 1995 1996 ( HMP-96-M-2-0015)

24

1994 10 1999 8

24

(transient), 1  
(reversible), 1  
(persistent)

가  
(persistent)

Yonsei Stroke Registry,

419 가 289 , 가 130  
57.2 ± 11.1 (20~82 )

SPSS for Windows, ver 9.0

(TIA) 가 42 , 가 377  
105 ,

t-test

Chi-

57 , 132 ,  
가 75 , 8

square test

digital subtraction angiography

419

Seldinger

5 (1.2%)

. 4

4 vessel-study

1

3

24

. 4

1

24

(cardiac arrhythmia)

**Table 1.** Summary of neurologic complications after digital subtraction cerebral angiography

Patient	Age/Sex	Complications	Interval (hr)	History of previous stroke or TIA	Angiographic findings
<b>With persistent complications</b>					
1	44/M	Left sided weakness developed progressive	22		Right cervical ICA occlusion left cavernous ICA, VA severe stenosis
2	78/M	Left sided weakness aggravated	2	Yes	Right cervical ICA occlusion
3	63/M	Right sided weakness developed progressive	24	Yes	Right proximal MCA moderate stenosis left cervical ICA severe stenosis
4	67/M	Right sided weakness developed	12		Bilateral cavernous ICA mild stenosis
<b>With reversible complications</b>					
5	55/F	Aphasia aggravated	4		Left cavernous ICA severe stenosis
6	64/F	Right sided weakness aggravated	1	Yes	Normal
7	54/M	Diplopia and left sided clumsiness developed	17	Yes	Left ICA total occlusion
8	65/M	Dysarthria and right sided weakness developed	14		Right cavernous ICA severe stenosis left MCA moderate stenosis
9	61/F	Sensory aphasia developed	3	Yes	Left MCA moderate stenosis bilateral PCA moderate stenosis
10	56/F	Right sided weakness developed	8	Yes	Left MCA moderate stenosis

TIA: transient ischemic attack, ICA: internal carotid artery, MCA: middle cerebral artery, VA: vertebral artery

PCA: posterior cerebral artery, mild: 30-50 % stenosis, moderate: 51-70% stenosis, severe: 71-99 % stenosis

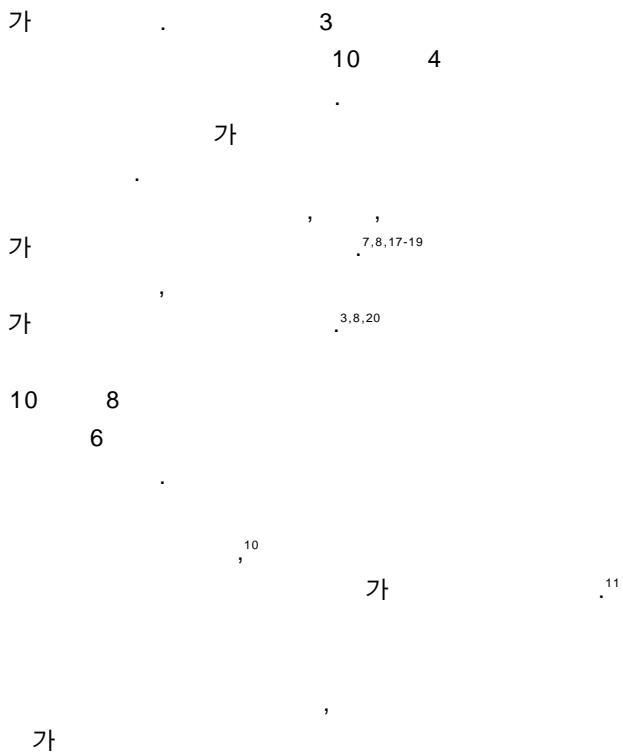
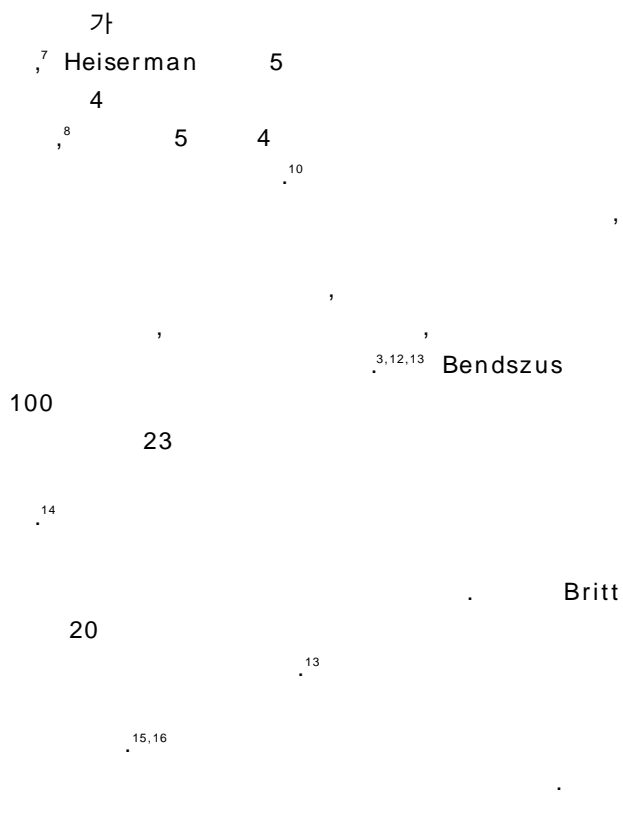
Interval means the time lapse to the onset of neurologic signs after the end of the angiographic procedure

**Table 2.** Neurologic complications associated with cerebral angiography in the literatures

Studies	Number of patients	Neurologic complications (%)		Note
		Total	Permanent	
Dion et al <sup>3</sup>	724	1.3	0.1	
Hankey et al <sup>4</sup>	382	2.6	1.3	S
Grzyska et al <sup>5</sup>	1095	0.54	0.09	D
Waugh et al <sup>6</sup>	939	0.9	0.3	D
Warnock et al <sup>7</sup>	395	3.89	0.52	D,S
Heiserman et al <sup>8</sup>	688	1.0	0.5	
Leffers et al <sup>9</sup>	454	2.3	0.4	D
Choi et al <sup>10</sup>	171	4.6	1.8	D
Present study	419	2.4	1.0	D,S

D: Digital subtraction cerebral angiographic study, S: only patients with ischemic cerebrovascular diseases

17 (4.1%) (p<0.01).  
 2 (pseudoaneurysm)가  
 7 (1-3, 5, 8-10)  
 15 , 1 (4)  
 17 가 가 2 24  
 가 (arterial 1 (1)  
 fistula) , 1 (2)  
 10 (2.4%)  
 60.7 419  
 (44~78 )  
 (57.1 )  
 3 가  
 0.5~4.7%  
 (Table 2).<sup>3-10</sup>  
 24 (1~24 , 10.7  
 ) 3  
 4 가  
 7 5 12  
 (Table 1). 10 6 (1.4  
 %) 7 가  
 4 (1.0%) 7 가 ,  
 가  
 2 가 3,5,8,12  
 (progressive stroke) 2.4%  
 24 1.0%  
 5  
 1 1.0% 가  
 2.5% .<sup>11</sup>  
 409  
 47 . Warnock



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