

Research Article: Clinical Characteristics of Isolated Anterior Cerebral Artery Territory Infarction Due to Arterial Dissection

Yuito Nagamine, MD, Takuya Fukuoka, MD, Takeshi Hayashi, MD, Yuji Kato, MD, Ichiro Deguchi, MD, Hajime Maruyama, MD, Yohsuke Horiuchi, MD, Hiroyasu Sano, MD, Satoko Mizuno, MD, and Norio Tanahashi, MD

Background: Isolated brain infarction in the anterior cerebral artery (ACA) territory is rare, and its etiology has not yet been fully elucidated. Thus, we aimed to determine the etiologic and clinical characteristics of patients with isolated ACA territory infarction due to arterial dissection. *Methods:* Of 2315 patients with acute cerebral infarction admitted to our hospital between April 2007 and September 2013, 34 patients (1.5%; 28 men, 6 women; mean age, 65 ± 15 years) suffered isolated ACA territory infarction. We performed cranial magnetic resonance (MR) imaging and MR angiography for all the patients. Whenever possible, we also performed 3-dimensional computed tomography angiography, digital subtraction angiography, and MR cisternography to diagnose the stroke subtype. *Results:* The stroke subtypes of the 34 patients with isolated ACA territory infarction were atherothrombotic infarction, cardioembolic infarction, arterial dissection, and unclassified in 11 patients (32%), 11 patients (32%), 11 patients (32%), and 1 patient (3%), respectively. The mean ages at onset were 48 ± 9 and 72 ± 11 years in the dissection and nondissection groups, respectively ($P < .001$). Headaches were present at onset in 4 patients (36%) and 1 patient (4%) with and without dissection, respectively ($P = .026$). Blood pressure at onset was significantly higher among patients with dissection (systolic, 179 ± 34 mm Hg; diastolic, 102 ± 17 mm Hg) than among patients without dissection (systolic, 155 ± 30 mm Hg; diastolic, 86 ± 21 mm Hg; $P < .05$), and D-dimer values were significantly lower among patients with dissection ($P = .034$). Favorable clinical outcome (modified Rankin Scale score, 0-2) at discharge was achieved in 9 patients (82%) and 10 patients (43%) with and without dissection, respectively ($P = .035$). *Conclusions:* Patients with isolated ACA territory infarction demonstrated a relatively high frequency of dissection (32%). Patients with dissection were younger, had a higher frequency of headaches, and demonstrated more favorable prognoses than patients without dissection. **Key Words:** Cerebral infarction—arterial dissection—magnetic resonance cisternography.

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Introduction

Isolated brain infarction in the territory of the anterior cerebral artery (ACA) is rare, accounting for only .5%-3% of all cerebral infarctions.¹⁻⁷ In the past, large artery atherosclerosis was reported as a frequent mechanism of onset of isolated ACA territory infarction; however, some previous reports have stated that the cause is unknown in 11%-38% of cases.³⁻⁷ On the other hand, a number of recent reports have stated that arterial dissection is common in isolated ACA territory

From the Department of Neurology, Saitama Medical University International Medical Center, Hidaka, Japan.

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Address correspondence to Yuito Nagamine, MD, Saitama Medical University International Medical Center, 1397-1 Yamane, Hidaka, Saitama 350-1298, Japan. E-mail: yuiton@saitama-med.ac.jp.

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Table 1. Diagnostic criteria for cervicocephalic arterial dissection

Major criteria
1 Double lumen or intimal flap demonstrated on either DSA or MRI or MRA or CTA or duplex ultrasonography
2 Pearl and string sign or string sign demonstrated on DSA
3 Pathologic confirmation of arterial dissection
Minor criteria
4 Pearl sign or tapered occlusion demonstrated on DSA
5 Pearl and string sign, string sign, or tapered occlusion demonstrated on MRA
6 Hyperintense intramural signal (corresponding to intramural hematoma) demonstrated on T1-weighted MRI
Additional criteria
7 Change in arterial shape demonstrated on either DSA or MRI or MRA or CTA or duplex ultrasonography
8 No other causes of arterial abnormalities
Definite dissection
Presence of one or more major criteria, or presence of one or more minor criteria and both of two additional criteria
Probable dissection
Presence of one or more minor criteria

Abbreviations: CTA, computed tomographic angiography; DSA, digital subtraction angiography; MRA, magnetic resonance angiography; MRI, magnetic resonance imaging.

infarction,^{1,8} although this claim has not been sufficiently examined.

In the present study, we aimed to examine the clinical characteristics of isolated ACA territory infarction and to determine the frequencies and characteristics of its subtypes, particularly arterial dissection.

Methods

Between April 2007 and September 2013, 2315 patients with acute cerebral infarction were admitted to our hospital; of these patients, we retrospectively examined those with isolated ACA territory infarction. We performed magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA; 1.5 T or 3.0 T) for all patients with isolated ACA territory infarction.

To determine the presence of dissection, we performed MRA in all patients. When possible, we moreover performed digital subtraction angiography (DSA), computed tomographic angiography (CTA), and magnetic resonance (MR) cisternography. We divided the ACA into 5 segments as previously described.⁹

The clinical data collected included the patient age, sex, and stroke risk factors (past history or history of medication of hypertension, diabetes mellitus and hyperlipidemia, atrial fibrillation, coronary heart disease, and smoking). Furthermore, we also investigated the systemic blood pressure at onset, D-dimer values, and presence of headaches. We classified the time of onset as active, resting, sleeping, or unknown.

We assessed the neurologic deficits using the National Institutes of Health stroke scale (NIHSS) score¹⁰ and assessed prognosis at discharge using the modified Rankin Scale (mRS) score.¹¹

Ischemic stroke subtypes were classified in accordance with the National Institute of Neurological Disorders and Stroke study as atherothrombotic infarction, lacunar

infarction, cardioembolic infarction, or other.¹² Within the category of "other," we diagnosed dissection using the Spontaneous Cervicocephalic Arterial Dissections Study criteria (Table 1).¹ In addition, we divided the patients into dissection and nondissection groups and compared them in terms of clinical characteristics and frequency. Patients with unclassified diagnoses were included in the nondissection group.

Table 2. Clinical characteristics of 34 patients with isolated ACA territory infarction

Age, mean \pm SD (range), y	65 \pm 15 (30-90)
Sex (female), n (%)	6 (18)
Hypertension, n (%)	21 (62)
Diabetes mellitus, n (%)	5 (15)
Hyperlipidemia, n (%)	6 (18)
Atrial fibrillation, n (%)	4 (12)
Coronary heart disease, n (%)	2 (6)
Smoking, n (%)	10 (29)
Systolic BP, mean \pm SD, mm Hg	163 \pm 33
Diastolic BP, mean \pm SD, mm Hg	91 \pm 21
NIHSS score, median (range)	6 (0-30)
Thrombolytic therapy, n (%)	3 (9)
Condition at stroke onset, n (%)	
Active	16 (47)
Resting	9 (26)
Sleeping	8 (24)
Unknown	1 (3)
Stroke subtype, n (%)	
Cardiogenic embolism	11 (32)
Atherothrombosis	11 (32)
Dissection	11 (32)
Others/unclassified	1 (2)

Abbreviations: ACA, anterior cerebral artery; BP, blood pressure; NIHSS, National Institutes of Health Stroke Scale; SD, standard deviation.

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