

Clinical Study of Medial Area Infarction in the Region of Posterior Inferior Cerebellar Artery

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Our objective is to study the neurological characteristics of medial area infarction in the caudal cerebellum. Medial area of the caudal cerebellum is supplied with 2 branches of the posterior inferior cerebellar artery (PICA). The medial hemispheric branch of the PICA distributes to the medial area of the caudal cerebellar hemisphere. The medial branch of the PICA (mPICA) distributes to the inferior vermis. We studied the neurological characteristics of 18 patients with medial area infarction of the caudal cerebellum. The infarction was located in the medial area of the cerebellar hemisphere and vermis (medial ch/vermis) in 11 patients and in the medial area of the cerebellar hemisphere (medial ch) in 7 patients. All the 18 patients showed acute vertigo and disturbance of standing and gait at onset. On admission, the lateropulsion and wide-based gait were present in 13 patients, respectively. Mild ataxia of the extremities was shown in 7 patients. Acute vertigo and unsteadiness were prominent at onset in the 18 patients, although their ataxia of the extremities was mild or none. This result was consistent with the characteristics of medial area infarction of the caudal cerebellum. Comparing the neurological symptoms between the medial ch/vermis group and medial ch group, both lateropulsion and wide-based gait were significantly infrequent in medial ch group. This result indicated that the vermis was spared because the mPICA was not involved in the medial ch group. It is necessary to make a careful diagnosis when we encounter patients who present acute vertigo because truncal and gait ataxia are unremarkable on admission in patients with the medial area infarction of the caudal cerebellum without vermis involvement. **Key Words:** Medial area infarction—posterior inferior cerebellar artery—medial hemispheric branch—medial branch—acute vertigo—lateropulsion—wide-based gait.

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The caudal cerebellum is supplied with the posterior inferior cerebellar artery (PICA).¹ PICA diverges into 2 branches consisting of the lateral branch and medial branch, according to previous reports.¹⁻³ Lateral branch

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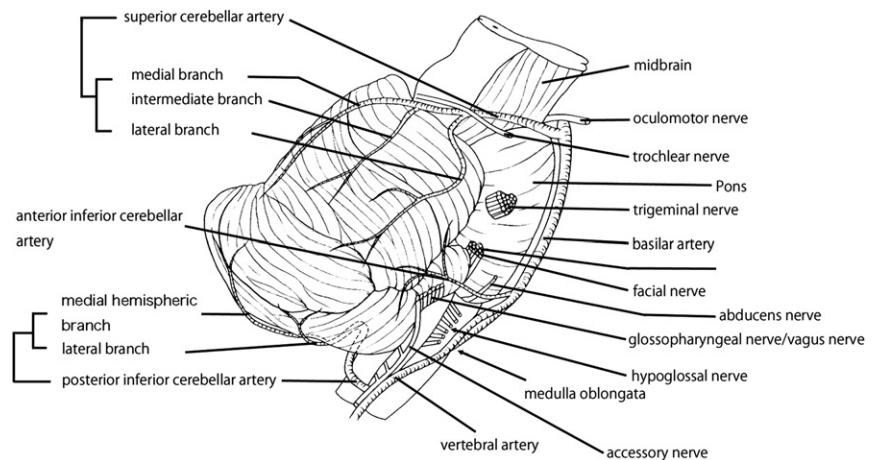
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of PICA (IPICA) distributes to the lateral area of the caudal cerebellar hemisphere.¹ Medial branch of PICA (mPICA) supplies blood to the inferior vermis (nodulus, uvula, pyramis, tuber, and sometimes clivus) and internal parts of the lobulus semilunaris inferior, lobulus gracilis, and tonsils.^{1,2} The neurological findings of medial area infarction in the PICA region are characterized by vestibular signs, dizziness, vertigo, truncal ataxia, axial lateropulsion, and nystagmus, although ataxia of the extremities is slight or none.^{1,2,4-7} Axial lateropulsion is the most prominent feature in the neurological findings of infarction in this area in previous reports.^{2,7}

Goto⁸ studied the arterial distribution of the caudal cerebellum to which PICA supplies blood and identified the presence of the intermediate branch of PICA (iPICA) other than mPICA and IPICA. According to the study of

Figure 1. Schema of the arterial supply to the brainstem and cerebellum from the lateral view (modified from the original figure by Goto⁸). Medial hemispheric branch (intermediate branch⁸) and lateral branch diverge from the PICA and distribute to the caudal cerebellum (medial branch of the PICA is not shown in this figure). Superior cerebellar artery diverges into 3 branches: the lateral branch, intermediate branch, and medial branch. Abbreviation: PICA, posterior inferior cerebellar artery.



Goto,⁸ mPICA supplied the inferior vermis alone, and iPICA supplied the medial area of the caudal cerebellar hemisphere (Figs 1, 2). IPICA supplied the lateral part of the caudal cerebellar hemisphere (Figs 1, 2). Rhoton⁹ also studied the distribution of cerebellar arteries. According to the study of Rhoton,⁹ 2 branches of PICA supplied the medial area of the caudal cerebellum (Figs 1, 2). The medial trunk of PICA distributed to the inferior vermis. Another branch was medial hemispheric branch of PICA (mHePICA), which distributed to the medial area of the caudal cerebellar hemisphere.⁹ We reviewed 18 patients in whom vestibular signs were the prominent feature, caused by medial area infarction of the caudal cerebellum. We studied their clinical characteristics, based on the distribution of each supplying artery in the caudal cerebellum.^{8,9}

Patients and Methods

Characteristics of the Enrolled Patients

We studied the neurological and radiological findings of 18 patients with medial area infarction of the caudal cerebellum, who were admitted to our hospital between 2002 and 2010 (Table 1). The ischemic lesions of the 18 patients were limited in the medial area of the caudal cerebellum. The patients in whom ischemic lesions were also located in the brainstem in addition to the caudal cerebellum were excluded in this study. The ischemic lesions of each patient were identified with computed tomography in 1 patient (patient 3) and with magnetic resonance imaging in the other 17 patients. The time between the onset of initial symptoms and the radiological study ranged from 14 hours to 7 days.

Location of the Infarction

We subdivided the locations of the infarcts in each patient into 2 groups that comprised (1) the medial area of the cerebellar hemisphere and vermis (medial ch/vermis) group and (2) the medial area of the cerebellar hemisphere

(medial ch) group without vermis involvement (Fig 2), based on the radiological findings of each patient.

Clinical Findings of the 18 Patients

The medical charts of each patient were reviewed to identify the neurological findings and radiological findings. Initial symptoms and neurological symptoms on admission were analyzed. We compared the frequencies of each neurological symptom on admission between the medial ch/vermis group and medial ch group, using Fisher exact test (Table 2). Significance was assessed at a value of *P* less than .05.

Results

Locations of the Ischemic Lesions

The ischemic lesions were located in the medial ch/vermis in 11 patients (patients 1-11) and in the medial ch in

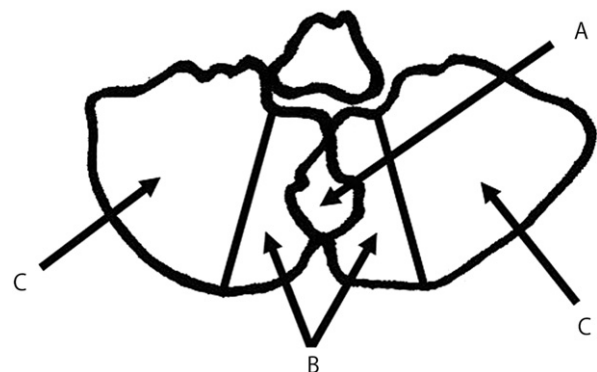


Figure 2. Classification of the caudal cerebellum based on the distribution of the branch of the PICA, according to the study of Goto⁸ and Rhoton.⁹ Medial branch of the PICA distributes to the inferior vermis (A). Medial hemispheric branch (intermediate branch⁸) of the PICA supplies the medial part of the caudal cerebellar hemisphere (B). Lateral branch of the PICA supplies the lateral part of the caudal cerebellar hemisphere (C). Abbreviation: PICA, posterior inferior cerebellar artery.

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