

# Teaching NeuroImage: Reinhold Hemimedullary Syndrome

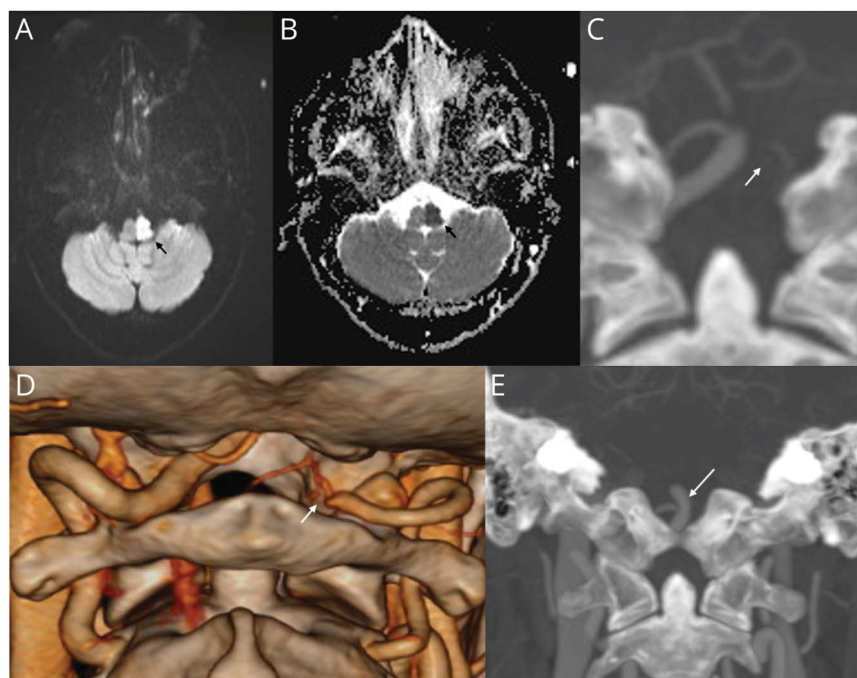
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**Figure** Classical Hemimedullary Syndrome of Reinhold



Noncontrast brain MRI showing hyperintense signal involving the left hemimedulla on diffusion-weighted imaging (A; black arrow) with corresponding hypointensity on apparent diffusion coefficient sequences (B; black arrow), suggestive of acute infarct. Coronal section of CT cerebral angiogram demonstrating nonvisualization of the left vertebral artery V4 segment (C; white arrow) and intact basilar artery flow distally (E; white arrow). Abrupt occlusion of the left vertebral artery V4 segment shown on the three-dimensional shaded surface display volume rendering (SS-VRT) reconstructed images (D; white arrow).

A 32-year-old man without vascular risk factors presented with acute onset vertigo, swallowing dysfunction, and right-sided weakness. Physical examination revealed the following signs on the left side: Horner syndrome; lower motor neuron 9th, 10th, and 12th cranial nerve palsies; cerebellar limb ataxia; loss of pain and temperature on the face; and loss of fine touch and proprioception on the face, trunk, and limbs. On the right side, he had hemiplegia with loss of pain and temperature on the trunk and limbs. Brain MRI revealed acute infarct involving the left half of the medulla (Figure, A and B). CT angiogram of the head and neck vessels showed occlusion of the left vertebral artery V4 segment (Figure, C, D, and E). A diagnosis of Reinhold complete hemimedullary syndrome was made (Table).<sup>1-3</sup> The almost similar incomplete hemimedullary syndrome of Babinski-Nageotte lacks ipsilateral hypoglossal nerve palsy.<sup>2</sup> Workup for stroke etiology revealed normal glycosylated hemoglobin, lipid profile, and negative hypercoagulable, autoimmune, and vasculitis panels. Echocardiogram was normal with prolonged cardiac telemetry revealing no cardiac arrhythmias.

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**Table** Description of the Medullary Vascular Syndromes

Stroke syndrome	Location in the medulla	Structures affected	Clinical features
<b>Dejerine syndrome</b>	Medial medulla	Hypoglossal nerve nucleus	Ipsilateral tongue paralysis
		Medial lemniscus	Contralateral loss in the trunk/limbs of fine touch and proprioception
		Pyramidal tract	Contralateral hemiplegia
<b>Wallenberg syndrome</b>	Lateral medulla	Descending tract or nucleus of the V nerve	Ipsilateral loss of pain and temperature—face
		Descending sympathetic fibers	Horner syndrome
		Spinocerebellar fibers/restiform body	Ataxia/dysmetria
		Nucleus ambiguus	9th, 10th cranial nerve palsies
		Vestibular nucleus	Nystagmus
		Lateral spinothalamic tract	Contralateral loss of pain and temperature (trunk/limbs)
<b>Babinski-Nageotte syndrome</b>	Lateral medulla with ventral extension	All components of Wallenberg syndrome with involvement of the pyramidal tract	All components of Wallenberg syndrome with contralateral hemiplegia
<b>Cestan-Chenais syndrome</b>	Lateral medulla with ventral extension	All components of Wallenberg syndrome except spinocerebellar fibers/restiform body but with involvement of the pyramidal tract	All components of Wallenberg syndrome except ipsilateral cerebellar ataxia but with contralateral hemiplegia
<b>Reinhold syndrome</b>	Hemimedulla	All components of Dejerine and Wallenberg syndrome	All components of Dejerine and Wallenberg syndrome

He was maintained on acetylsalicylic acid 100 mg once daily and atorvastatin 40 mg at nighttime for secondary stroke prophylaxis.

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### Appendix Authors

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### Appendix (continued)

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### References

1. Mossuto-Agatiello L, Kniahynicki C. The hemimedullary syndrome: case report and review of the literature. *J Neurol*. 1990; 237(3):208-212. doi: 10.1007/bf00314596
2. Krasnianski M, Neudecker S, Schluter A, Zierz S. Babinski-Nageotte's syndrome and Hemimedullary (Reinhold's) syndrome are clinically and morphologically distinct conditions. *J Neurol*. 2003; 250(8):938-942. doi: 10.1007/s00415-003-1118-9
3. Gan R, Noronha A. The medullary vascular syndromes revisited. *J Neurol*. 1995; 242(4):195-202. doi: 10.1007/bf00919591

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