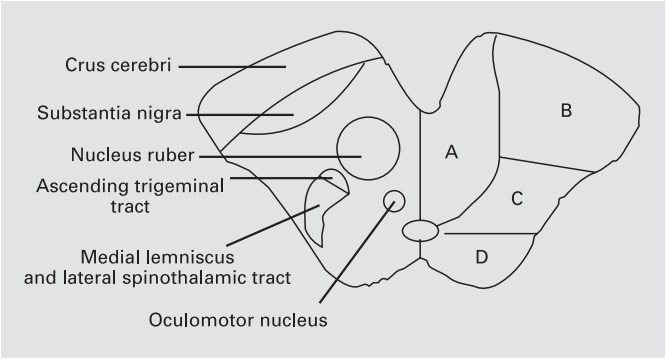

Fig. 2. Axial schematic diagram of midbrain depicting the anatomical structures and the different locations (A, anteromedial, B, anterolateral, C, lateral, D, dorsal) of midbrain infarctions.

Discussion

To our knowledge, no case of isolated dorsal midbrain infarction has been reported previously. The investigators of the Lausanne [3] and the Ege Stroke Registry [4] described 22 and 9 patients with infarct limited to the mesencephalon respectively. More recently, the clinical, radiological and pathophysiological findings of 40 patients with pure midbrain infarction were reported [5]. However, the authors did not observe any subject with lesion restricted to the dorsal midbrain. This territory is supplied by different arteries arising from the collicular artery, which gives rise to a network of small arteries also supplied by branches of the posterior cerebral artery. Sometimes the superior cerebellar artery also participates in the supply of the inferior colliculus. Furthermore, the same authors indicated that according to their experience, infarcts in this area were invariably associated with the concomitant involvement of the cerebellum [5].

In our case, the clinical features were characterised by sensory deficits caused by the involvement of the dorsolaterally located lemniscal and spinothalamic sensory fibres (fig. 2). Although the infarct affected the superior colliculus and the periaqueductal grey matter unilaterally as demonstrated on MRI, these lesions did not correspond to any clinically overt neurological deficit. Pure sensory stroke is most frequently associated with thalamic lacunes [1], or occasionally with lesions located in the lateral pontine tegmentum, involving the medial lemniscus and the lateral spinothalamic tracts in the rostral pons [2]. Two cases of lateral tegmental midbrain haemorrhages limited to the spinothalamic pathways have been described as extremely rare causes of pure sensory stroke [6, 7]. In addition, Kim and Kim [5] identified 2 patients with ischaemic lesions restricted to the lateral midbrain presenting with isolated sensory symptoms. Small vessel disease was the pathogenic mechanism of infarction in 1 case, while atherothrombotic large vessel disease was categorized as the pathogenic aetiology in the other. In the absence of any evidence of stenosis or occlusion of the large vessels and of any emboligenic heart disease, we considered small vessel disease as the most plausible cause of stroke in our patient.

In conclusion, the present report highlights the diversity of the topography of the underlying ischaemic lesions in patients presenting with pure sensory stroke. Therefore, although its incidence is extremely low, isolated posterior midbrain infarction should be considered as an infrequent cause of pure sensory stroke.

References

1 Fisher CM: Pure sensory stroke and allied conditions. Stroke 1982;13:434–447.
2 Kim JS, Bae YH: Pure or predominant sensory stroke due to brainstem lesion. Stroke 1997;28:1761–1764.
3 Bogousslavsky J, Maeder P, Regli F, Meuli R: Pure midbrain infarction: clinical syndromes, MRI, and etiologic patterns. Neurology 1994;44:2032–2040.
4 Kumral E, Bayulkem G, Akyol A, Yunten N, Sirin H, Sagduyu A: Mesencephalic and associated posterior circulation infarcts. Stroke 2002;33:2224–2231.
5 Kim JS, Kim J: Pure midbrain infarction. Clinical, radiologic and pathophysiologic findings. Neurology 2005;64:1227–1232.
6 Ono S, Inoue K: Cheiro-oral syndrome following midbrain haemorrhage. J Neurol 1985;232:304–306.
7 Azouvi P, Tougeron A, Hussonois C, Schouman-Claeys E, Bussel B, Held JP: Pure sensory stroke due to midbrain haemorrhage limited to the spinothalamic pathway. J Neurol Neurosurg Psychiatry 1989;52:1427–1428.

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Beauty Parlor Stroke Syndrome

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A 63-year-old woman visited her beauty parlor to have her hair cut. During shampooing with her head hanging backwards into a hair washbasin she developed sudden dizziness, nausea and started vomiting. The alarmed paramedics assumed a gastrointestinal disorder, and she was initially admitted to the department of gastroenterology. As symptoms persisted for 2 days, neurological advice was sought. The neurological examination revealed nystagmus at forced lateral view bilaterally, slight left-sided ataxia of both limbs and she was prone to fall to the left side in the Romberg test. The vascular risk factors were sufficiently treated diabetes type II and arterial hypertension. In our routine stroke workup which is based on the EUSI guidelines [1], no further pathological findings were detected, in particular no signs of cardioembolism. MRI of the brain showed an ischemic infarction in the territory of the left posterior inferior cerebellar artery (fig. 1a). MR angiography (fig. 1b) showed a smaller lumen of the left vertebral artery compared to the right but without signs of arterial dissection or major arteriosclerosis.

In our patient we diagnosed beauty parlor stroke syndrome, a term proposed by Weintraub in 1993 [2]. Pathophysiologically, acute arterial dissection is considered to be a major cause [3, 4]. In these cases, patients often reported about pain in the neck and a

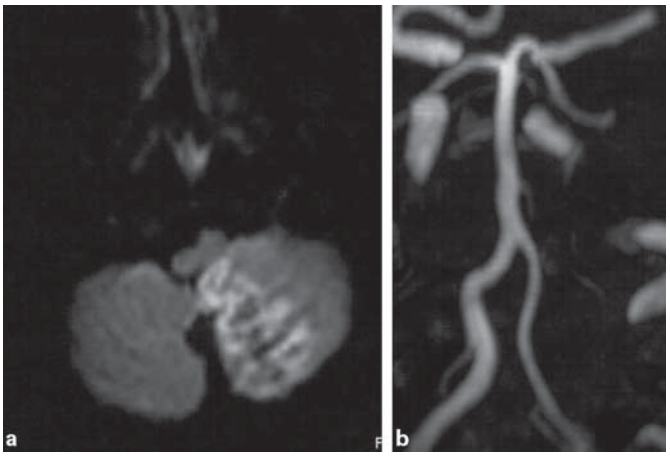

Fig. 1. a Diffusion-weighted MRI demonstrating an ischemic infarction in the territory of the left posterior inferior cerebellar artery. **b** MR angiography showed normal posterior circulation vessels except for a slight hypoplasia of the left vertebral artery.

predisposing intimal-medial weakness has been assumed [5]. Other predisposing vascular factors discussed for this stroke entity are atherosclerosis, impaired collateral blood flow and presence of congenital vascular hypoplasia. However, also speed, applied force and duration of the hair washing definitely contribute [5, 6]. In our case dissection could confidently be excluded by MR angiography and conventional MR sequences. An arterio-arterial embolism, occurring by shearing of an atherosclerotic plaque of the vertebral arteries during hyperextension, seems unlikely due to missing signs of pronounced arteriosclerosis in MR angiography and additional neurosonological examinations. Cardiac embolism was unlikely due to normal ECG and transesophageal echocardiography.

Therefore, we assume a disturbed end organ perfusion mechanism affecting the territory of the left posterior inferior cerebellar artery as the pathophysiological cause, for which the slight left-sided vertebral artery hypoplasia may have been predisposing. The interruption of the blood flow is thought to be caused by mechanical compression of the vertebral artery between the occiput and the vertebral arc of the atlas during the prolonged hyperextension (fig. 2).

This concept is supported by cerebral blood flow studies in symptomatic individuals which demonstrated abnormal findings during hyperextension and rotation of the neck and head and unsuspected hypoplastic vertebral artery in 13% [7]. Thus, it can be speculated that hypoplasia may play a predisposing role, in particular if the vertebral artery with the larger calibre is compromised by the tilting of the neck during barbering.

Taken together, hyperextension combined with hanging the head backwards in a hair washbasin can be seen as a risk factor for posterior circulation ischemia. It probably occurs more often than assumed [8] and a number of patients may report about previous dizziness episodes under the same conditions when asked specifically [9]. It can be prevented by changing the shampoo routine from the hanging head position to a flexed or neutral position [5]. Age can be regarded as a potentially predisposing factor, as our patient and nearly all the patients whose cases were reported in the literature are 50 years and older [2, 8].

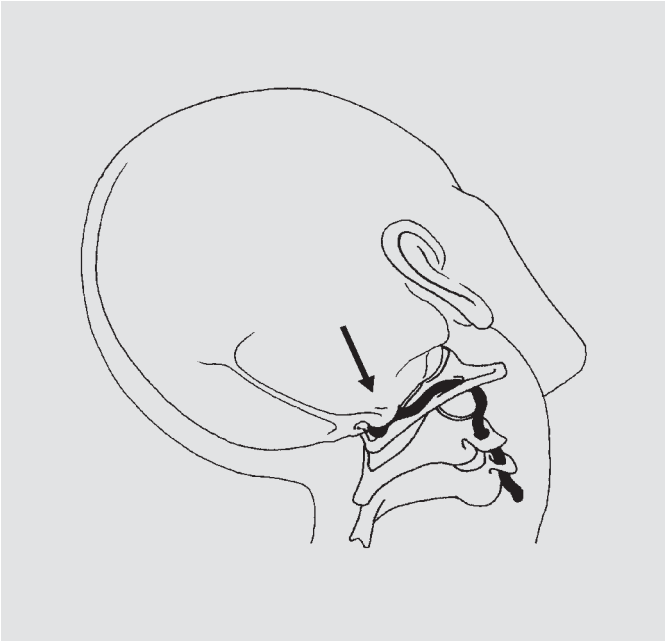

Fig. 2. Schematic drawing of the proposed pathomechanism. Through hyperextension of the neck and head, the vertebral artery (arrow) is compressed between the occiput and the vertebral arc of the atlas in susceptible individuals.

References

1 The European Stroke Initiative Executive Committee and the EUSI Writing Committee: European stroke initiative recommendations for stroke management – Update 2003. Cerebrovasc Dis 2003;16:311–337.
2 Weintraub MI: Beauty parlor stroke syndrome: report of five cases. JAMA 1993;269:2085–2086.
3 Nwokolo N, Batemen DE: Stroke after visit to the hairdresser. Lancet 1997;350:866.
4 Agarwal R, Shukla R, Chandra A, Pant MC: Posterior circulation stroke following manipulation of neck by a barber. J Assoc Physicians India 2004; 52:79–81.
5 Weintraub MI: Stroke after visit to the hairdresser. Lancet 1997;350: 1777–1778.
6 Jeret JS, Bluth M: Stroke following chiropractic manipulation: report of 3 cases and review of the literature. Cerebrovasc Dis 2002;13:210–213.
7 Weintraub MI, Khoury A: Critical neck positions as an independent risk factor for posterior circulation stroke: a magnetic resonance angiographic analysis. J Neuroimaging 1995;5:16–22.
8 Shimura H, Yuzawa K, Nozue M: Stroke after visit to the hairdresser. Lancet 1997;350:1778.
9 Foye PM, Najar MP, Camme A, et al: Pain, dizziness, and central nervous system blood flow in cervical extension: vascular correlations to beauty parlor stroke syndrome and salon sink radiculopathy. Am J Phys Med Rehabil 2002;81:395–399.

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