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CASE REPORT

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Concomitant completely ossified trigeminal pore and Dorello's canal

M.C. Rusu[1], A.D. Vrapciu[1], P.M. Rădoi[2], C. Toader[2]

[1]*Division of Anatomy, Faculty of Dental Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania*
[2]*Faculty of General Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania*

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Commonly, the trigeminal and abducens nerve course to the middle cranial fossa, beneath the tentorial border (posterior petroclinoid dural ligament) and, respectively, beneath Grüber's petrosphenoidal ligament, in Dorello's canal. It is hereby reported a rare unilateral association of anatomic variants which was found when the brain computed tomography angiography of a 56-year-old male patient was observed. On the left side, the tentorial border was ossified above the petrous apex, resulting in a tentorial bar 1.96 cm long that transformed the trigeminal pore into a completely ossified one. On that side was also found an ossified petrosphenoidal ligament determining a completely ossified Dorello's canal. On the opposite side a 2.9 mm long clinoid bar extended from the posterior clinoid process to the anterior one. Although these bars are not common in humans they should be documented in computed tomography in cases with associated trigeminal neuralgia and abducens nerve palsy. (Folia Morphol 2023; 82, 1: 187–189)

Key words: trigeminal nerve, abducens nerve, trigeminal neuralgia, petrous apex

INTRODUCTION

Commonly, the trigeminal nerve courses from the posterior fossa to the middle fossa through the trigeminal notch on the superior border of the petrous apex. The abducens nerve courses towards the parasellar region through a notch on the lateral border of the dorsum sellae. The tentorial border (posterior petroclinoid dural ligament) over the trigeminal notch transforms it into the porus trigeminus. The petrosphenoidal ligament over the abducens nerve transforms the respective notch into Dorello's canal.

Ossified ligaments of the skull base, such as the posterior petroclinoid and petrosphenoidal ligaments, have been associated with neural impingement syndromes [6]. An ossified ligament becomes an osseous bar, or a bony bridge.

CASE REPORT

A 56-year-old male was evaluated for possible brain vascular malformations by computed tomography (CT) angiography. A 32-slice CT scanner (Siemens Multislice Perspective Scanner) was used, as previously [4]. The anatomical details were observed using the Horos Project software for iOS. The research was conducted in accordance with the Declaration of Helsinki.

The endocranial details of the sphenoid and temporal bones were observed on three-dimensional renderings. The dorsum sellae and petrous apices were identified. On the right side were found the trigeminal notch, on the petrous apex, and the abducens nerve notch, in the infero-lateral angle of the dorsum sellae (Fig. 1). From the right posterior clinoid process

Address for correspondence: M.C. Rusu, MD, PhD (Med.), PhD (Biol.), Dr. hab., Prof., "Carol Davila" University of Medicine and Pharmacy, 8 Eroilor Sanitari Blvd., RO-050474, Bucharest, Romania, tel: +40722363705, e-mail: anatomon@gmail.com

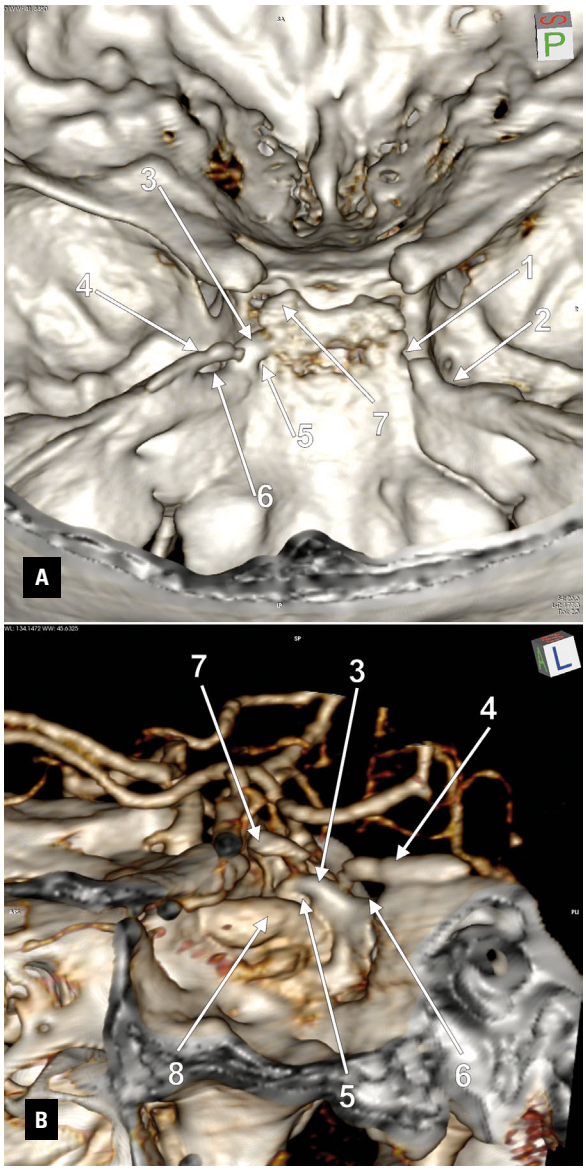

Figure 1. Three-dimensional volume renderings of the cranial fossae depicting the concomitant ipsilateral complete ossification of the left porus trigeminus and Dorello's canal; **A.** Non-contrast, postero-superior view; **B.** Computed tomography angiography, right antero-lateral view; 1 — notch of the right abducens nerve; 2 — trigeminal notch of the right petrous apex; 3 — left ossified petrosphenoidal ligament (petrosphenoidal bar); 4 — left tentorial bar; 5 — ossified left porus trigeminus; 6 — ossified left Dorello's canal; 7 — left posterior clinoid process; 8 — cavernous portion of the left internal carotid artery.

a 2.9 mm long bar extended anteriorly towards the left anterior clinoid process, at 1.9 mm from it. This right clinoid bar was located 3.1 mm inferior to the left posterior communicating artery.

On the opposite side, the passages for the trigeminal and, respectively, abducens nerve, were completely ossified. Above the left petrous apex trigeminal notch a complete tentorial bar of 1.96 cm length and thick of 2.9 mm was found in the upper border of the trigeminal pore. On that side an ossified petrosphenoidal bar thick of 3.9 mm was closing Dorello's canal superiorly. The left superior cerebellar artery was located at 2.2 mm above the petrosphenoidal bar and at 4.1 mm above the tentorial bar, and contacted the right posterior clinoid process. The lateral end of that clinoid process was projected at 1.9 mm above the petrosphenoidal bar.

DISCUSSION

The tentorial and, respectively, petrosphenoidal bars, are scarcely presented in the anatomical literature. To the best of the authors' knowledge these were not reported to occur concomitantly, such as in the hereby reported case.

The tentorial bar

The porus trigeminus allows passage of the trigeminal nerve above the petrous apex, from the posterior fossa to the middle one. The trigeminal nerve passes beneath the posterior petroclinoid dural fold (ligament, PPCL) [2]. Completely ossified PPCLs were found in 20% of 15 adult microdissected head halves [2]. Such ossified PPCLs transform the osteofibrous trigeminal pore into a bony foramen [2] that is occasionally found in dry skulls [7]. Bony lamellae within the tentorial border and the PPCS were found in close contact with the oculomotor, trochlear, trigeminal and abducens nerves [5]. According to Bergman, Afifi and Miyauchi, "A bar of bone in the dura over the trigeminal nerve has been interpreted as a vestige of the primitive cranial wall as present in reptilia" [1]. The tentorial bar has a dural origin [6].

The petrosphenoidal bar

Dorello's canal is an osteofibrous canal located at the inferior angle of the sellar dorsum. It is traversed by the abducens nerve, the inferior petrosal sinus, and a branch of the meningohypophyseal trunk [8]. Dorello's canal is bounded superiorly by the petrosphenoidal ligament (PSL), or the ligament of Grüber [8]. The PSL is amongst the least commonly mineralised skull base ligaments, with a published prevalence of 5–25%, as documented by Tubbs et al. [6]. The ossified canal of Dorello is found in nonhuman primates [3]. The prevalence of ossification of the PSL for each side was found 6.5% in the right side and 5.1% in the left side [3]. In 31/523 (5.9%) cases the petrosphenoidal bar was unilateral, and in 15/523 (2.8%) cases it was bilateral [3].

CONCLUSIONS

Commonly, trigeminal neuralgia is determined by different skull base masses, or after neurovascular conflicts. This is equally true for the abducens nerve palsy. However, concomitant trigeminal and abducens deficits could be just the result of concomitantly occurring tentorial and petrosphenoidal bars. A computed tomographic anatomic evaluation of the skull base is of help to elucidate the neuropathic picture, or to guide a narrow neurosurgical approach.

Conflict of interest: None declared

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