

Aberrant jugular bulb vein obstructing approach to intracanalicular vestibular schwannoma

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Abstract

In cases of jugular bulb anomalies, such as a high jugular bulb, troublesome bleeding may occur during surgery. We report an unusual case with a vestibular schwannoma, in which we recognized an additional branch arising from the jugular bulb. Three-dimensional computed tomography (3-D CT) revealed this anomaly beforehand, enabling us to avert excessive bleeding upon resection of the tumour. The abnormal vein was thought to be a remnant of the petrosquamosal sinus in the embryonic stage.

Key words: Neuroma, acoustic; Jugular veins; Tomography, X-ray computed, 3-dimensional

Introduction

The anatomy of the jugular bulb exhibits considerable variability. Complications attributed to venous anomalies around the jugular bulb, in surgery for otitis media and vestibular schwannoma, have been reported occasionally (Graham, 1977; Jahrsdoerfer *et al.*, 1981).

The most common anomaly of the jugular bulb is its protrusion into the middle ear cavity (Overton and Ritter, 1973; Subotic, 1979; Kennedy *et al.*, 1986; Moore, 1994; Tsunoda *et al.*, 1995). An extra vein originating from the jugular bulb, however, is rare (Shotton *et al.*, 1989). We experienced this type of jugular bulb anomaly in a patient with a vestibular schwannoma, and were aided in pre-operative assessment by 3-dimensional computed tomography (3-D CT) of the temporal bone (Tsunoda *et al.*, 1996). We will report this case and speculate the origin of the vein.

Case report

A 56-year-old female presented to our clinic with a one-year history of dizziness accompanied by progressive hearing loss and continuous tinnitus of the left side. An audiogram showed a left sensorineural hearing loss of 50 dB with threshold deteriorating at a frequency between 1 kHz to 2 kHz. Auditory brainstem response (ABR) showed an elongation of the interpeak latency of waves I-V of the left side. The right directed spontaneous nystagmus was observed under Frenzel's goggle. A caloric test was performed under an electronic nystagmograph which showed left-sided canal paresis. Existence of a vestibular schwannoma was suspected and magnetic resonance imaging (MRI) was performed, which demonstrated a left vestibular schwannoma (Figure 1). The operation was planned with a middle cranial fossa approach in order to preserve the patient's hearing. As a guide to open the internal auditory meatus (IAM), a 3-D CT image was obtained. It demonstrated an abnormal vessel which seemed to ascend from the jugular bulb,



FIG. 1

MRI demonstrated a left intracanalicular vestibular schwannoma that is in contact with a vessel.

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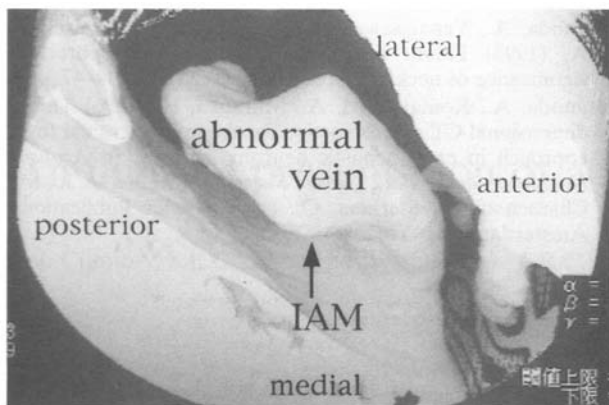


FIG. 2

3-D CT, from an operator's point of view on a middle cranial fossa approach, showed the left abnormal vessel ascending from the jugular bulb, running upward behind the IAM and continuing forward.

running upward behind the IAM and continuing forward above it (Figure 2), although its course ahead was not clear. This vessel seemed to interrupt direct access to the intracanalicular tumour by means of either a middle cranial fossa or a translabyrinthine approach. The operation was performed as planned with a middle cranial fossa approach. During surgery, we succeeded in recognizing and exposing the abnormal vessel above the tumour, penetrating in the petrosal part of the temporal bone, without troublesome bleeding (Figure 3). It had a dark-blue coloured sheer wall without a pulsation, and was confirmed to be a vein. The vein stood in the way of opening the IAM and prevented a direct view of the tumour. Consequently, we carried out a resection with an approach from behind. The tumour was proved to originate from the inferior vestibular nerve, and the facial and cochlear nerves were preserved.

Discussion

Anomalies of the jugular bulb can take various forms. In this case, an abnormal vein was arising from the jugular bulb, ascending and passing over the IAM, penetrating in the petrosal part of the temporal bone. In attempting to resect an acoustic tumour under these circumstances, severe bleeding is apt to occur from the abnormal vein. However, in this case, 3-D CT cautioned us against injuring the vein and such bleeding was averted.

In the early embryonic stage, the primitive ventral metencephalic vein drains posteroinferiorly into the primitive transverse sinus just rostral to the stem of the pro-otic sinus (later the cavernous sinus). In the 60-80 mm stage, otic expansion separates the pro-otic sinus from both the transverse sinus and the stem of the metencephalic vein. The caudal end of the pro-otic sinus, as the result of a secondary anastomosis, comes to empty into the sigmoid by way of the petrosquamosal sinus. Then the middle part of the pro-otic sinus dwindles, meanwhile the new cavernous and inferior petrosal sinuses annex the orbito-ophthalmic veins, of which the pro-otic sinus was formerly the exclusive drainage. The stem of the ventral metencephalic vein comes to communicate with the cavernous sinus, though inconstant, and becomes the future superior petrosal sinus. This process leads to drainage of the superficial and deep telencephalic veins into the superior and inferior petrosal sinus through the cavernous sinus (Padgett, 1957; Huang and Wolf, 1974).

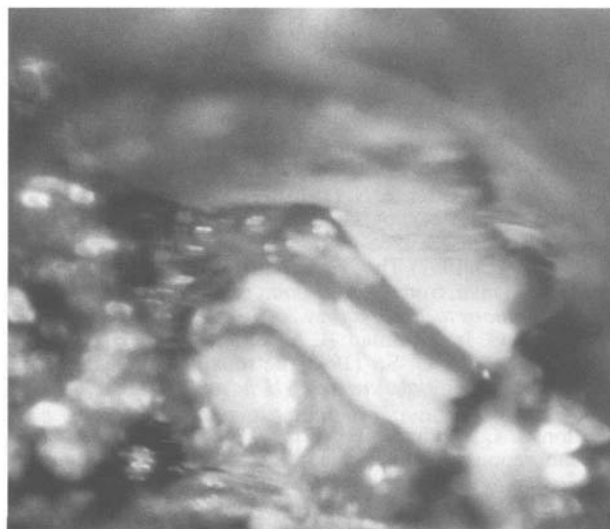


FIG. 3a

At operation, this vein was recognized over the tumour, standing in the way of opening the IAM.

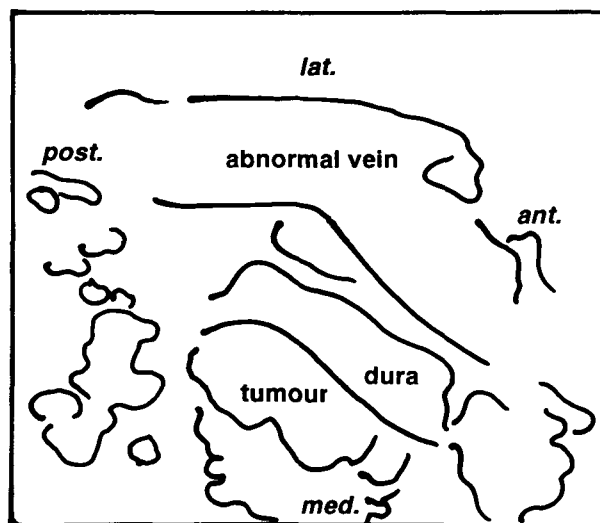


FIG. 3b

A schematic presentation of Figure 3a.

There should be two possible courses beyond the IAM. One terminates in front and turns out a petrous jugular malposition (diverticulum) (Pappas *et al.*, 1993), and the other communicates with the superior petrosal or cavernous sinus. In either case, the abnormal vein, which passes over the IAM, was thought to be a remnant of the petrosquamosal sinus.

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