Double falx cerebelli, single occipital sinus and an unusually large meningeal artery in the posterior cranial fossa: a case report

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Abstract

Introduction
Abnormalities of the dural folds are very rare. Knowledge about the abnormalities of dural folds is important for neurosurgeons and neuroradiologists as these folds might result in bleeding during the subocipital approach to the brain and also in misinterpretations during the imaging of the posterior cranial fossa. We report the duplication of falx cerebelli and presence of a large meningeal artery in the posterior cranial fossa.

Case Report

During the routine brain removal dissection for the undergraduate medical students, the following variations were noted in the posterior cranial fossa of an adult male cadaver aged approximately 70 years. The right and left falces were of equal length (35 mm). The gap between the two falces was broadest anteriorly and measured 15 mm, whereas the narrowest part of the gap was in the middle and measured 10 mm. The occipital sinus was plexiform and was situated in the midline between the two falces. It terminated by opening into the left sigmoid sinus. Meningeal branch of the right occipital artery was unusually large and it entered the posterior cranial fossa through the right jugular foramen. After a course of about 4 cm in the posterior cranial fossa it divided into the right and left branches. It was accompanied by two venae comitantes.

Conclusion
The knowledge of the variations observed in the current case may be of use in radiological and neurosurgical procedures.

Introduction
The falx cerebrelli is a small sickle-shaped fold situated in the posterior cranial fossa, below the tentorium cerebelli. It extends forward from the internal occipital crest into the posterior cerebellar notch. It contains the occipital sinus in its attached border. Though its variations are very rare, there are reports on its absence, duplication and triplication. Shoja et al. have reported the presence of duplicated occipital sinus along with the duplication of dural folds. Since the dura mater and the sinuses develop concurrently, it is common to have corresponding duplication of the sinuses when there is a duplication of any dural fold containing a sinus. Here, we report a slightly different type of duplication of the falx compared with the previous reports. We also report an unusual meningeal artery in the posterior cranial fossa, the knowledge of which may be very useful for neurosurgeons during the suboccipital approach to the brain.

Case Report

During the routine brain removal dissection for the undergraduate medical students, the following variations were noted in the posterior cranial fossa of an adult male cadaver aged approximately 70 years. The falx cerebelli was doubled (Figures 1 and 2); however, there was no corresponding duplication of the internal occipital crest. The right and left falces were of equal length (35 mm). Posteriorly, they merged with the undersurface of the tentorium cerebelli, whereas anteriorly they diverged laterally and faded on the lateral sides of the foramen magnum. The gap between the two falces was broadest anteriorly and measured 15 mm, whereas the narrowest part of...
the gap was in the middle and measured 10 mm. The cerebellar vermis was situated between the two falces and the falces extended into the vallecular sulci. The occipital sinus was plexiform and was situated in the midline between the two falces. It terminated by opening into the left sigmoid sinus (Figures 1 and 2). It also communicated with the confluence of sinuses posteriorly. Meningeal branch of the right occipital artery was unusually large and it entered the posterior cranial fossa through the right jugular foramen. After a course of about 4 cm in the posterior cranial fossa, it divided into right and left branches. These branches gradually became smaller as they crossed the transverse sulcus. The meningeal artery was accompanied by two venae comitantes.

Discussion

The falx cerebelli is a sickle-shaped fold, which extends from the internal occipital crest into the posterior cerebellar notch. It contains the occipital sinus along its attached margin. In most of the individuals, it is a single midline structure. It may be divided inferiorly to form a vermian fossa. The length of falx cerebelli varies between 28 and 45 mm (ref. 3). In rare cases, the falx cerebelli may be absent, fenestrated, duplicated or triplicated2–5. When the falx cerebelli duplicates, it may be associated with an arachnoid cyst between the two falces or associated with the duplication there may be duplication of the occipital sinus and the internal occipital crest3. In a recent study, the falx cerebelli showed duplication in 15.4% of cases7. The current case is unique because of the wide gap found between the two falces and the presence of a single occipital sinus located in the midline between the two falces. The plexiform nature of the sinus and its drainage into the left sigmoid sinus is also unique. In earlier reports, there was concurrent duplication of the internal occipital crest but in the current case there was no duplication of the crest. The occipital sinus may be totally absent6. Duplication8 and triplication9 of the occipital sinus have been reported.

The dura mater of the posterior cranial fossa is supplied by the meningeal branches of the occipital artery, ascending pharyngeal artery and the vertebral artery. These arteries are very small and are not clearly visible through the dura. In the current case, there was a large meningeal artery in the right half of the posterior cranial fossa. To the best of our knowledge, this is the first report on a posterior meningeal artery accompanied by two venae comitantes. This artery might bleed significantly in fractures of the squamos part of the occipital bone and also might lead to iatrogenic injuries during the suboccipital approaches to posterior cranial fossa. Knowledge of presence of such an artery may be useful to neurosurgeons and neuroradiologists in avoiding iatrogenic injuries and radiological misinterpretations.

Conclusion

The knowledge of the variations reported here may be of great importance to radiologists and neurosurgeons. Ignorance of these variations may result in bleeding during the suboccipital approaches to the posterior cranial fossa.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

References