

Angular and metric analysis of the neural structures in the cerebellopontine angle

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ABSTRACT

Introduction: The cerebellopontine angle (CPA) is a subarachnoid space in the lateral aspect of the posterior fossa. In this study, we propose a complementary analysis of the CPA from the cerebellopontine fissure.

Methods: We studied 50 hemi-cerebelli in the laboratory of neuroanatomy and included a description of the CPA anatomy from the cerebellopontine fissure and its relationship with the flocculus and the 5th, 6th, 7th, and 8th cranial nerves (CN) origins.

Results: The average distance from the 5th CN to the mid-line (ML) was 19.2 mm, 6th CN to ML was 4.4 mm, 7-8 complex to ML was 15.8 mm, flocculus to ML was 20.5 mm, and flocculus to 5th CN was 11.5 mm, additionally, and the diameter of the flocculus was 9.0 mm. The angle between the vertex in the flocculus and the V CN and the medullary-pontine line was 64.8 degrees.

Discussion: The most common access to the CPA is through the retrosigmoid-suboccipital region and this approach can be done with the help of an endoscope. The anatomy of origins of neural structures tends to be preserved in cases of CPA lesions.

Conclusion: Knowledge of the average distances between the neural structures in the cerebellar-pontine fissure and the angular relationships between these structures facilitates the use of surgical approaches such as microsurgery and endoscopy.

Abbreviations: CPA: Cerebellopontine angle; CN: Cranial nerve; ML: Mid-line

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Introduction

The cerebellopontine angle (CPA) is a subarachnoid space in the lateral aspects of the posterior fossa comprising nerves and blood vessels, and filled with liquor.¹ Anatomically, this space has a relationship with the cerebellopontine fissure, a V-shaped structure with apices in the flocculus, and a base in the petrous surface with the 5th, 7th, and 8th cranial nerves following its upper and lower limits.²

Microsurgery and endoscopy are the two complementary ways to access the CPA through the retrosigmoid approach, which enable the observation of the structures in this region through many angles. Previous studies have analysed the posterior face of the petrous pyramid providing the best angle for the approach of the CPA through microsurgical suboccipital access.³ In this study, we propose a complementary analysis of the CPA from the cerebellopontine fissure and present data including measurements of the neural relations in the CPA.

Methods

We studied 50 hemi-cerebelli, obtained from the São Paulo Hospital's service of death verification, and analysed 26 right hemispheres and 24 left hemispheres in the microsurgery laboratory. The anatomic pieces were studied using surgical microscopy at 3X and 40X magnification. Measurements were made using a

millimetre ruler. The specimens were photographed and the angles were analysed using an open source image software.

In [Figure 1](#), an example of an analysed hemi-cerebellum can be seen in which the structures that were studied are identified. In [Figure 2](#), we identify the variables that were analysed in this study; this is complemented by [Figure 3](#) in which the angles that were analysed are described. Analysis was carried out in the CPA using the flocculus as vertex and the 5th CN and the medullary-pontine line as the extreme points.

Results

To investigate the access to the CPA from the cerebellopontine fissure (data presented in [Table 1](#)), we determined the distance between (1) the 5th CN and the mid-line (ML), (2) the 6th CN and the ML, (3) 7-8th CN complex and the ML, (4) the flocculus and the ML, (5) the flocculus and the 5th CN, (6) the diameter of the flocculus and its middle point identification, and (7) the angle composed by the flocculus, with the 5th CN, and the medullary-pontine line.

The average distance from the 5th CN to the ML was 19.2 mm; the distance between the 6th CN and the ML was 4.4 mm; the distance between the 7-8th CN complex and the ML was 15.8 mm; the distance between the flocculus and the ML was 20.5 mm; and the distance between the flocculus and the 5th CN was 11.5 mm (see [Table 1](#)).