

The Dorsolateral Perforating Zone in the Lemniscal Trigone as a New Landmark for Brainstem Surgery. A micro Anatomical Study

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Introduction

The aim of the presented study is to provide a microsurgical anatomo- topographical definition and a more detailed knowledge concerning the vascularization of the arterial capillary network in the dorso-lateral midbrain perforation zone, their origin and course in the lemniscal trigone, by thorough anatomical dissections of these structures, in order to clarify the microsurgical implications in the clinical practice and to provide better microsurgical approaches to the brain stem.

Results

An origin from the SCA could be found in 77.13% (17 hemispheres), and from PCA in 59.09% (13 hemispheres). In one hemisphere was found an origin from the PChA (4.54%). No perforating branches were found in 9.09% (2 hemispheres).

Methods

Twenty-two alcohol-fixed cadaveric hemispheres (11 brains) without any pathological lesions provided the material for studying the perforating vessels and their origin around the dorso-lateral midbrain using an operating microscope (OPMI 1 FC, Zeiss). This study included 8 men and 3 women with a mean age of 34,3 years (range 20-55 years). For micro-photographs of relevant structures a digital camera (Nikon D1) was used. Measurements of calibres and distances were taken using a digital caliper (Mitutoyo, Digimatic CD-15B).

The brainstem was looked up through a lateral view, after a soft retraction of the temporal lobe and cerebellum, in order to identify, following the basilar artery, firstly the SCA inferiorly, the PCA superiorly, and the trochlear nerve, then the lateral mesencephalic sulcus and the lateral mesencephalic vein. The PCA and the SCA, with her branches, MSCA and LSCA, were dissected to see, if presents, the penetrating branches in the lemniscal trigone and in order to identify their origin.

Conclusions

A profound understanding of the microsurgical anatomy of the perforating arteries in the the lemniscal trigone is a conditio sine qua non for the treatment of aneurysms and vascular malformations/cavernomas in this area.

Learning Objectives

Describe the anatomical importance of perforating vessels in the dorso-lateral midbrain, their role in the lemniscal trigone, and the clinical relevance of occlusion or damage of these vessels during surgery, understanding the microsurgical implications in the clinical practice in order to provide better microsurgical strategies for the brain stem vascular malformations, and identify an effective treatment and the better microsurgical approach for the possible lesions in this area.

References

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