The middle perforated substance of the diencephalon

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The diencephalon, upper brain stem and other basal brain structures are supplied chiefly by penetrating branches of the cerebral arteries. We examined the retrochiasmatic space between the superior border of the pons and posterior edge of the optic chiasm in six randomly selected adult fresh brain specimens. Lateral or anterolateral to the mamillary bodies, two small quadrangular spaces (2.5 × 3.5 mm) were found that were limited laterally by the junction of the optic tract and crus cerebri. These spaces were pierced on each side by 1 to 5 small penetrating branches (pre-mamillary arterial complex) of the posterior communicating artery. A single, large and obliquely oriented penetrating branch of the posterior communicating artery (the so-called premamillary, thalamotuberal or mamillothalamic artery) was found to pierce this area in all specimens. Based on our findings, the above-mentioned vessels of this perforating substance supply the floor of third ventricle, hypothalamus and ventral thalamic nuclei. Hence, special attentions should be made during surgery in this area such as third ventriculostomy for hydrocephalus.

INTRODUCTION

The penetrating branches of the cerebral arteries, which pass through the so-called perforating substances, mainly supply the diencephalon, upper brain stem and other basal brain structures. Damage to these delicate arteries from their origin superiorly to their entrance into their perforating substances may result in varying clinical scenarios ranging from sensorimotor disturbances and behavioral changes to severe amnesia and coma (Pedroza et al., 1986; Saeki and Rhoton, 1977). Of