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Functional Anatomy of the Telencephalic Perforators Based on High-Resolution Cone Beam CT

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Purpose:

This study aimed to comprehensively investigate the functional anatomy of the telencephalic perforators using high-resolution cone beam computed tomography (CBCT). Understanding the intricate vascular networks of the telencephalic perforators is essential for improving diagnostic and therapeutic approaches in neurosurgery.

Methods:

We conducted a cross-sectional study involving 80 adult patients who underwent high-resolution CBCT imaging of the brain. Image data were processed and analyzed using advanced imaging software on the workstation. Detailed measurements and assessments of the telencephalic perforators, including their origins, courses, branching patterns, and relationships with adjacent structures, were conducted.

Results:

The high-resolution CBCT imaging provided unprecedented insights into the functional anatomy of the telencephalic perforators. We observed a wide variation in the origins and courses of these vessels, with distinct patterns emerging in different individuals. The perforators displayed intricate connections with major cerebral arteries, and their distribution throughout the brain was heterogenous. Furthermore, we identified key variations in the vasculature that have clinical implications, such as potential sites for intracranial hemorrhage and ischemic events. Most of the lenticulo-striate arteries which were around 50μm in diameter could be identified.

Conclusions:

The results of this study shed light on the intricate functional anatomy of the telencephalic perforators as revealed by high-resolution CBCT imaging. This knowledge is invaluable for neurointervention and neurosurgery, as it enhances our understanding of the complex vascular networks within the brain. The findings have significant implications for the diagnosis and treatment of cerebrovascular diseases, including the planning of surgical interventions and minimally invasive procedures. Overall, this research contributes to advancing our knowledge of neuroanatomy and has the potential to improve patient care and outcomes in the field of neurointervention and neurosurgery.