

## Anatomical variations of circle of Willis in an autopsy study in the city of São Paulo

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The circle of Willis (CW) was described in 1664 by Thomas Willis, although innumerable anatomical variations are known. Correlation between these alterations and higher incidence of cerebrovascular disease and aneurysms were described. It was believed that the pattern of CW can be different depending on studied race. The aim of this study is to describe anatomical variations found in an autopsy sample in the city of São Paulo. 221 CW were dissected and conserved in ethyl alcohol 70%. The mean age was  $70.34 \pm 12.05$  years old (50-102 years), 51.58% were male. Classification of CW was divided in anterior and posterior circulation<sup>1</sup>. Anterior portion was normal in 33.94%. The most common anomaly was fusion of the anterior communicating artery (ACA) for a longer distance than expected (33.03%), followed by the various forms of duplication of this artery (15.38%). The posterior circulation was considered normal in 20.36%. Presence of both small posterior communicating arteries (PCA) was the most common alteration (39.37%). Absent PCA at both sides occurred in 8.6%. PCA preserves a large pattern when its diameter is the same of posterior cerebral artery. Similar anomaly was found in 22.62% of cases. Frequency of normal circulation of CW varies from 11% to 58%<sup>1</sup>. Therefore, in our study, anterior and posterior circulation were between these percentages. Prolonged fusion of ACA was the most common variation in anterior circulation. Unlike in another study<sup>1</sup>, ACA's duplication was more frequent. Like described elsewhere<sup>2</sup>, in our sample, hypoplasia of PCA was the most reported variation. This fact is common in advanced age. After middle age, hypoplastic arteries are more frequently observed in the embryonic period. Persistence of fetal pattern of PCA had the same prevalence from previous studies. Limitation from this study is the absence of subjects younger than 50 years old. Its importance includes the large sample evaluated and the fact that subjects came from racially diverse population, like the Brazilian one.

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### References

1. DANDY, WE. The Circle of Willis. In: Intracranial arterial aneurysms. 1st ed. p 67-90. Hafner Publishing Company, London, 1969.
2. EFTEKHAR, B., DADMEHR, M., ANSARI, S., GHODSI, M., NAZPARVAR, B. and KETABCHI, E. Are the distributions of variations of circle of Willis different in different populations? BMC Neurology, 2006, vol. 6, p. 1-9.