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Influence of anatomical variations in the cerebral arterial circuit on the incidence of headache: a systematic review and meta-analysis

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Introduction
Migraine is one of the various manifestations of headache, representing the most prevalent neurological problem in daily medical practice. Some studies point to a relationship between migraine and anatomical variations of the Circle of Willis. The cerebral arterial circuit is the intracranial vascular structure responsible for irrigating the brain.

Objective
To correlate headache with possible anatomical alterations of this vascular network.

Methods
The systematic review was conducted according to the PRISMA and COCHRANE guidelines. The PROSPERO protocol is (CRD42024534927) and the following PCO was generated: Do variations in the cerebral arterial circuit cause migraine? A 95% confidence interval was adopted and $p<0.05$ was used. Five databases were searched, resulting, after excluding articles that did not comply with the study question and the types of studies of interest, in 11 articles.

Results
In total, 2,894 participants were included in the systematic review. After meta-analysis, no statistically significant relationship was found between the presence or absence of anatomical variations of the Circle of Willis and the manifestation of migraine. The relationship with the presence of aura was also not statistically significant. In the Americas, there was an association between the presence of migraine and anatomical variations of the Circle of Willis. In this continent, the presence of structural alterations showed an influence on the presence of aura.

Conclusion
Anatomical variations of the cerebral arterial circuit are not related to migraine, whether with or without aura.

Keywords:
Headache
Anatomical variations
Cerebral arterial circuit

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