
CORRELATES OF BEHAVIOR AND CEREBRAL HEMODYNAMICS DURING COMPLEX FUNCTIONING IN YOUNG ADULTHOOD

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Background: Functional transcranial Doppler sonography (fTCD) of basal cerebral arteries is a non-invasive technique that allows monitoring of cerebral hemodynamics during cognitive performance with a high temporal resolution. There is ample evidence that age impacts on performance and cerebral hemodynamics. This study investigated those associations between a sample of young adult healthy subjects performing the Trail Making Test (TMT), a means of selective attention and complex cognitive functioning.

Methods: We examined cerebral hemodynamic parameters in the middle cerebral arteries (MCA) using fTCD while healthy subjects (mean age 31.5 years) simultaneously performed the TMT.

Results: There was a significant slowing with older age (age 30 years or older) for both selective attention and complex cognitive functioning, and older age was associated with significantly lower mean cerebral blood flow velocity (MFV) in males during complex functioning. Younger age (younger than 30 years) was associated with initially bilateral and then significantly left sided lateralization, and older age with a bilateral pattern.

Conclusions: These novel results suggest that, in a relatively young age continuum sample, older age results in slowing and decreased brain perfusion, though in a diverse manner. Younger age is associated with alternating pattern of lateralization implying a diverse cognitive style with age as covariate. It adds to the notion that fTCD is a substantial tool to significantly link age related modulation of performance with dedicated parameters of brain perfusion.