

TCD and Parkinson Disease

Background:

Orthostatic hypotension (OH) is one of the many autonomic disturbances observed in Parkinson's disease (PD). It has been debated whether an additional impairment of cerebral autoregulation (CA) in PD patients may exacerbate the consequences of OH upon brain perfusion.

Literature:

Evaluation of cerebral vasomotor reactivity in Parkinson's disease: is there any association with orthostatic hypotension?

Author	(Zamani u. a., 2011)
Content/Summary	OH was presented in 12 (27.3%) Parkinson's patients. The average resting blood flow velocity (BFV) in the MCA was 30.20 (SD=9.58)cms(-1) which significantly increased to 46.25 (SD=16.23)cms(-1) after carbon dioxide test (P<0.001). Impaired VMR was observed in 15 (34.1%) of the subjects, while it was not associated with the presence of OH (P=0.770).
Comment	44 patients with PD. Assessment of cerebral VMR was performed by means of transcranial Doppler (TCD) of middle cerebral artery (MCA) before and after a vasodilatory stimulus, carbon dioxide test.
Doppler-device	Multi-Dop X, DWL
Quantification	Evaluation of VMR in patients affected by PD, could assist in early diagnosis of cerebral autonomic dysfunction and prevent its serious consequences prior and more valid to OH.

Transcranial Doppler monitoring in Parkinson's disease: cerebrovascular compensation of orthostatic hypotension.

Author	(Haubrich u. a., 2010)
Content/Summary	
Comment	Patients with PD and OH (18 asymptomatic; 8 symptomatic).
Doppler-device	Not known
Quantification	Results showed a normal autoregulatory response to downward blood pressure shifts in PD. Moreover, orthostatic blood pressure instability is compensated equally sufficient in anterior and posterior parts of cerebral circulation. Whether in PD patients, OH becomes symptomatic rather seems to depend on blood pressure falling below the autoregulated range.

Impairment of cerebral hemodynamic response to the cold pressor test in patients with Parkinson's disease.

Author	(Tsai u. a., 2009)
Content/Summary	Baseline values for control and PD subjects showed no statistical difference. CPT induced a significant increase in MAP, HR, and Vm in both groups. Pulsatility index (PI) and CVR were decreased in both groups during CPT (cold pressure test). Percent increases of Vm (P<0.001) and MAP (middle arterial pressure) (P=0.011) were significantly higher while the percent decreases of PI (P=0.002) and CVR (P=0.007) were significantly decreased more in the non-PD group.
Comment	49 patients with PD and 49 sex- and age-matched non-PD subjects were evaluated.
Doppler-device	Not known
Quantification	This study indirectly shows that ANS-mediated cerebrovascular reactivity is impaired in patients with PD. Further investigations are needed to confirm the hypothesis that using the cold pressor test to evaluate cerebrovascular reactivity might be beneficial in early diagnosis of impairment of ANS (autonomic nervous system)-mediated cerebrovascular autoregulation in patients with PD.

Is cerebral autoregulation impaired in Parkinson's disease? A transcranial Doppler study.

Author	(Vokatch u. a., 2007)
Content/Summary	In comparison with PD patients, control subjects (CS) presented a significantly higher increase of the mean cerebral blood flow velocities in the MCA after the blood pressure drop. Mean velocities were increased above the initial values in all CS, whereas a flattened curve was observed in PD patients.
Comment	We assessed CA (cerebral autoregulation) in 14 PD patients and the potential influence of dopaminergic agents.
Doppler-device	DWL Multi-Dop X
Quantification	These results provide evidence of an impaired cerebral autoregulation in PD patients which appears independent of dopaminergic treatment.

Cerebral vasomotor reactivity in Parkinson's disease (PD), multiple system atrophy (MSA) and pure autonomic failure (PAF).

Author	(Gurevich u. a., 2006)
Content/Summary	The mean MCA and VA blood flow velocities were similar in the three disorders and within normal limits for our laboratory.
Comment	Twenty-four patients (9 with PD, 10 with MSA and 5 with PAF)
Doppler-device	Rimed, Trans-link 9900 TCD, Herzliya, Israel
Quantification	We conclude that BFV is normal in PD, MSA and PAF and that the VMR, as investigated by TCD and the Diamox test, did not disclose differences in cerebral vasomotor responses between these conditions.

Summary:

TCD, due to assessment of VMR, may help to detect PD patients, who are suffering from OH, but there is a study which suggests that VMR is not impaired in PD patients.

TCD cannot discriminate between the subtypes of PD.

Experts:

No one in particular

Literature

Gurevich T, Gur AY, Bornstein NM, Giladi N, Korczyn AD. Cerebral vasomotor reactivity in Parkinson's disease, multiple system atrophy and pure autonomic failure. *J. Neurol. Sci.* 2006; 243: 57-60.[zitiert 2011 Dez 10]

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Tsai S-J, Chen S-C, Leu T-M, Chen C-M, Chou H-H, Peng H-Y, u. a. Impairment of cerebral hemodynamic response to the cold pressor test in patients with Parkinson's disease. *Parkinsonism Relat. Disord.* 2009; 15: 94-100.[zitiert 2011 Dez 10]

Vokatch N, Grötzsch H, Mermillod B, Burkhard PR, Sztajzel R. Is cerebral autoregulation impaired in Parkinson's disease? A transcranial Doppler study. *J. Neurol. Sci.* 2007; 254: 49-53.[zitiert 2011 Nov 14]

Zamani B, Mehrabani M, Fereshtehnejad S-M, Rohani M. Evaluation of cerebral vasomotor reactivity in Parkinson's disease: is there any association with orthostatic hypotension? *Clin Neurol Neurosurg* 2011; 113: 368-372.[zitiert 2011 Dez 9]