

# Cerebrospinal fluid exchange in the optic nerve in normal-tension glaucoma

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**AIM:** To report on the cerebrospinal fluid (CSF) exchange between the intracranial spaces (ie, basal cisterns) and the subarachnoid space (SAS) of the optic nerve (ON) in subjects with normal-tension glaucoma (NTG) compared with control subjects without NTG or other forms of glaucoma.

**METHODS:** CT cisternography of the brain and orbits was performed in 18 patients with NTG (7 women, 11 men; mean age  $64.9 \pm 8.9$  years) and in four patients without glaucoma or intracranial disease (4 women; mean age  $62.8 \pm 18.4$  years). The density of contrast-loaded cerebrospinal fluid (CLCSF) in the intracranial spaces and in the SAS surrounding the ONs was measured in Hounsfield units.

**STUDY DESIGN:** Unmasked, prospective series. Statistical analysis was performed using an independent two-tailed t test and the non-parametric Spearman correlation test.

**RESULTS:** The density of CLCSF in the SAS surrounding the ONs in the NTG group was significantly reduced compared with its density in the intracranial CSF spaces and in the SAS of ONs measured in the control group ( $p=0.006$ ). There were no significant differences between men and women within the NTG group ( $p>0.35$ ).

**CONCLUSIONS:** The finding of a difference in the concentration gradients between the CLCSF within the intracranial spaces and the SAS of the ONs in this group of NTG patients compared with control subjects supports the hypothesis of a disturbed CSF exchange between the CSF in the intracranial spaces and the CSF in the SAS surrounding the ONs. The disturbance of CSF dynamics in this specific CSF pathway can be explained by ON compartmentation. The clinical importance of this finding warrants further investigation.

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