

BRAIN PERFUSION IN PATIENTS WITH CAROTID STENOSIS AS AN INDICATION FOR SURGERY

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Purpose: To improve diagnostic algorithm for surgical treatment in patients with verified carotid stenosis and cerebral ischemia.

Methods and Materials: From September 2010 to September 2012 in 51 patients with chronic brain ischemia CT perfusion was used to measure the difference in cerebral blood volume (CBV), mean transit time (MTT) and cerebral blood flow (CBF). CT angiography was used to measure the degree of carotid stenosis and configuration of circle of Willis (CoW). Differences in mean CBF, CBV and MTT in ipsi- and contralateral hemispheres between patients with a carotid stenosis of $\leq 40\%$, 41-59%, 60-79%, 80-100% were analyzed.

Results: It was shown that with a gradual increase of severity of carotid stenosis the ipsilateral CBF is decreasing (21.88 ± 0.67 , 20.68 ± 1.7 , 19.18 ± 0.69 , 18.65 ± 0.67 ml/100 g/min, respectively; $p=0.015$), and MTT is increasing (8.79 ± 0.26 , 9.45 ± 0.73 , 9.77 ± 0.5 , 9.97 ± 0.44 s, respectively; $p=0.035$). There was no linear dependence of CBV to the degree of stenosis, but increased CBV was found in patients with the degree of stenosis $>81\%$. The difference between MTT begins from 41% ($p<0.05$), CBF from 61% ($p<0.01$) and CBV from 81% of stenosis ($p<0.01$).

Conclusion: Cerebral perfusion is inversely related to the severity of carotid stenosis. Surgery treatment is indicated for patients with decreased CBF and increased MTT. If CBV is increased in ipsilateral hemisphere, surgery is urgent, because it is a life-threatening condition. If CBV is equal in both hemispheres, surgery is considered in further treatment.