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EVALUATION OF CEREBRAL PERFUSION RESERVE IN PATIENTS WITH CAROTID-ARTERY OCCLUSION

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Abstract

Regional cerebral blood flow, oxygen utilisation, fractional oxygen extraction, and cerebral blood volume were measured by positron emission tomography in thirty-two patients with internal-carotidartery occlusion. In most cases, any reduction in cerebral blood flow in the territory distal to an occluded carotid artery was matched to diminished cerebral metabolic demands. Cerebral blood flow was inappropriately low in only six patients, in whom regional oxygen utilisation was maintained by a compensatory rise in oxygen extraction ratio. The frequent finding of high cerebral blood volume distal to occluded vessels was consistent with a state of focal vasodilatation in response to diminished cerebral perfusion pressure. Analysis of the relation between cerebral blood flow, blood volume, and oxygen extraction ratio suggested that the reduction in cerebral perfusion pressure, and hence circulatory reserve, could be most reliably predicted by the ratio of cerebral blood flow to blood volume. By identifying those patients with carotid

occlusion who are most compromised on haemodynamic grounds, combined measurement of cerebral blood flow and blood volume should be valuable in selection of candidates for extracranial-intracranial bypass surgery.

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