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Patterns of cortical oxygen saturation changes during CO₂ reactivity testing in the vicinity of cerebral arteriovenous malformations.

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BACKGROUND AND PURPOSE: The aim of this study was to test the hypothesis that patterns of cerebrovascular reactivity (CVR) in the vicinity of cerebral arteriovenous malformations (AVMs) before and after resection are not specific for this disease. **METHODS:** With a microspectrophotometer, cortical oxygen saturation (So₂) was measured under steady-state conditions (Paco₂, 33 mm Hg) before and after removal of 22 AVMs and in 30 control subjects before and after transsylvian amygdalohippocampectomy. Intraoperative vasoreactivity tests were performed by induced changes of end-tidal CO₂ (25, 45, and 25 mm Hg) with simultaneous recording of local So₂ in all patients. CVR patterns were established by linear regression analysis (P<0.05) to define parallel (positive) versus inverse (negative) behavior, and reactivity indexes were calculated to define their degree. **RESULTS:** Cortical oxygenation under steady-state conditions increased significantly (P<0.05) from preoperative to postoperative levels equally in both groups (preoperative AVM, 54.8±10.4%So₂; postoperative AVM, 73.1±10.1%So₂; preoperative control, 52.7±9.1%So₂; postoperative control, 73.6±8.9%So₂). The rate of inverse CVR patterns increased significantly (P<0.05) from before to after resection without showing statistically significant differences between groups. **CONCLUSIONS:** Local CVR patterns on presumably normal human cortex of control subjects are heterogeneous, including inverse behavior, and are similar to those of AVM patients before surgery. After surgery, cortical hyperemia is present in both groups, and a significant increase in inverse reactivity patterns interpreted as microvascular steal is noted. An AVM-specific CVR pattern could not convincingly be proved.

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