



Real-Time Evaluation of Anterior Choroidal Artery Patency During Aneurysm Clipping

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Introduction

Inadvertant occlusion of the anterior choroidal artery during aneurysm clipping can cause a disabling stroke in minutes. Electrophysiologic monitoring during aneurysm surgery typically utilizes somatosensory evoked potentials and the electroencephalogram, neither of which would detect occlusion of the anterior choroidal artery. The addition of direct cortical motor evoked potential (MEP) monitoring may assist in the detection of anterior choroidal artery compromise[1]. We evaluate the clinical utility of direct cortical motor evoked potential (MEP) monitoring during aneurysm clipping as a real-time assessment of arterial patency, prior to performing indocyanine green videoangiography.

Learning Objectives

explore the utility of direct cortical motor evoked potentials in aneurysm clipping surgery.

Methods

Direct cortical MEPs were recorded in 3 patients undergoing surgery for aneurysms that involved or abutted the anterior choroidal artery. One patient had both a posterior communicating artery aneurysm and an anterior choroidal artery aneurysm; the other two patients had posterior communicating artery aneurysms. After the dural opening, a subdural 8-electrode strip was passed under the posterior cranial edge to overly the primary motor cortex. Serial MEP recordings were performed during the intradural dissection, aneurysm exposure, and clip placement. A significant change in MEPs after clip placement would prompt immediate inspection, and removal or repositioning of the clip. If clip placement appeared satisfactory and MEP recordings were stable, then an intraoperative indocyanine green videoangiogram was performed, to confirm obliteration of the aneurysm and patency of arteries.

Results

Three patients underwent successful clipping of posterior communicating artery aneurysms and an anterior choroidal aneurysm with direct cortical MEP monitoring, with good clinical and radiographic outcomes. In two patients, no changes in MEP amplitudes were observed following permanent clip placement. In one patient, a profound decrease in MEP amplitude occurred 220 seconds after placement of a permanent clip on a large posterior communicating aneurysm. Inspection revealed that the anterior choroidal artery was kinked. The clip was immediately removed, and MEP signals returned to baseline shortly thereafter. A clip was then optimally placed, and the patient awoke without neurologic deficit.

Conclusions

Direct cortical MEPs are a useful adjunct to standard electrophysiologic monitoring in aneurysm surgery, particularly when the anterior choroidal artery or lenticulostriate arteries are at risk. When these arteries are occluded, infarction may occur before the occlusion is detected by indocyanine green videoangiography or intraoperative angiography. The use of MEPs allows real-time detection of ischemia to subcortical motor pathways

References

1.Motoyama Y, Kawaguchi M, Yamada S, et al: Evaulation of Combined Use of Transcranial and Direct Cortical Motor Evoked Potential Monitoring During Unruptured Aneurysm Surgery. Neurol Med Chir (Tokyo) 51: 15-22, 2011