Predictive value of neurophysiological monitoring with motor and somatosensory evoked potentials during mechanical endovascular therapy for acute ischemic stroke

Ehab Shiban Dr.; Silke Wunderlich; Kornelia Kreiser; Claus Zimmer; Bernhard Hemmer; Jens Lehmberg MD; Florian Ringel MD; Bernhard Meyer MD

Department od Neurosurgery, Department of Neurology and Department of Neuroradiology, Technische Universität

Introduction

Mechanical endovascular therapy (MET) is a promising adjuvant therapy for acute ischemic stroke caused by occlusion of a large vessel. However, only selected patients will potentially benefit from reperfusion.

Real time monitoring of recanalisation success with regard to functional outcome is not possible because these procedures are usually performed in general anaesthesia.

Herein, we present a novel application for evoked potential for real time monitoring of reperfusion success with respect to functional outcome during MET for acute ischemic stroke.

Methods

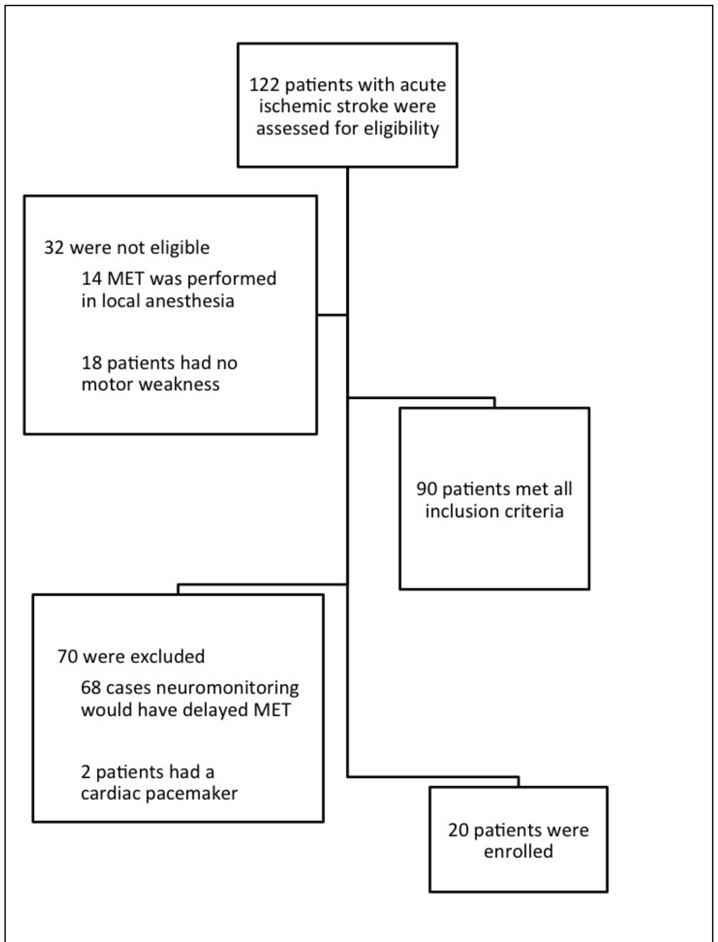
Prospective observational study from 03/12 until 04/2013 of patients presenting with acute ischemic stroke that are eligible for MET. Transcranial motor evoked potentials (MEPs) and somatosensory evoked potentials (SSEPs) were applied during MET. The monitoring data were reviewed independently and related to clinical and radiological outcomes during follow-up. MEPs and SSEPs were measured throughout the intervention. Neurological outcome was assessed by the modified Rankin Scale and National Institutes of Health Stroke Scale at 0, 7 and 90 days following intervention.

Results

MEPs and SSEPs were successful in 19 (95%) and 13 (65%) cases, respectively

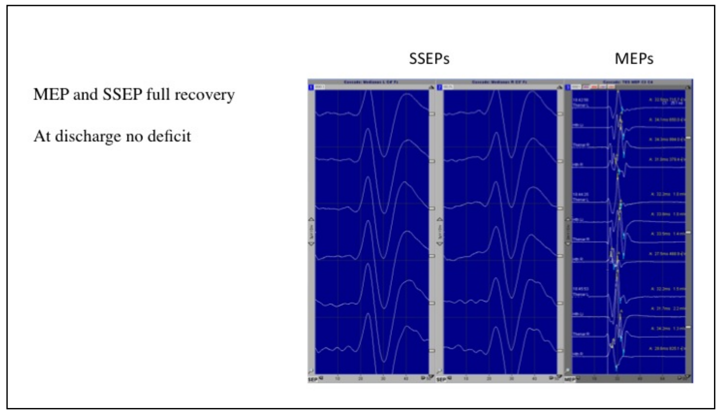
There were 9, 7 and 4 patients with occlusion of the medial cerebral artery, internal carotid artery and basilar artery, respectively

Successful reperfusion was achieved in 16 cases (TICI -Reperfusions-Grad 2b or 3)



Diagnostic test performance

	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
MEP	90%	87%	90%	87%
SSEP	83%	83%	83%	83%
Reperfusion	100%	36%	56%	100%



Conclusions

MEPs and SSEPs are safe and feasible methods of real time monitoring of reperfusion success with respect to functional outcome during MET for acute ischemic stroke. MEPs have higher rates of sensitivity and specificity than SSEP and seem better suited in such a setting in which a rapid setup is crucial