TITLE: INTRA-OPERATIVE TcMEPS DESPITE HEMIPLEGIA FOLLOWING ANEURYSM RUPTURE

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THE CASE PRESENTATION:

A 61 year old female presented to the Emergency Department by ambulance with a GCS of 6. CT revealed a subarachnoid hemorrhage. In addition she was found to have severely depressed cardiac function with an ejection fraction of less than 20%. An EVD was placed and inotropic support was instituted. Her GCS improved to 14 enabling a more complete exam. She was found to have a left hemiplegia involving both upper and lower extremities.. At the time of surgery her cardiac status had improved but the hemiplegia remained. The surgeons requested SSEPs, TcMEPs and EEG monitoring.

Figure 1. Initial CT Scan

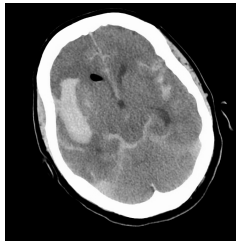
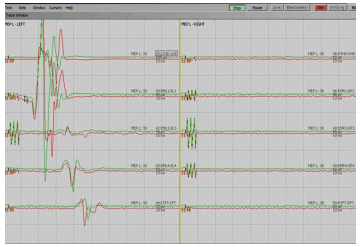


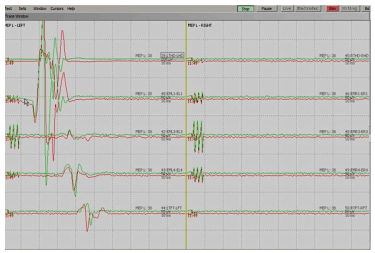
Figure 2. Baseline Somatic Left TcMEP

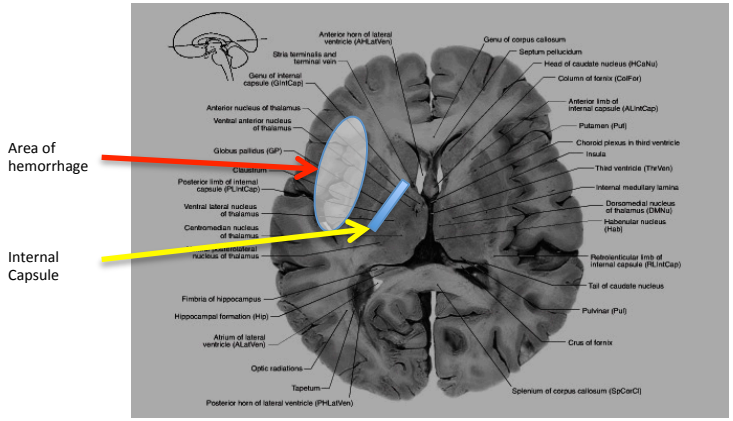


Intra-operative Course: There were no changes in any of the IOM modalities until three minutes after a temporary clip was placed. The somatic leftTcMEPs were noted to have diminished significantly in the upper extremity muscles with no change in the lower extremity muscles (Figure 3). A minute later the MN cortical SSEPs also had diminished amplitudes. The surgeon was alerted to each of these changes. Within 6 minutes of the alert a permanent clip was placed and the temporary removed. The TcMEPs and MN SSEPs reverted to baseline within one minute (Figure 4). No further changes occurred. The patient emerged from anesthesia uneventfully and the pre-operative hemiplegia remained present on emergence.

Figure 3. Somatic Left MEP @ Alert

Figure 4. Somatic Left MEP @ recovery





Discussion Points: The hemorrhage involves the basal ganglia, especially the putamen on the right side of the brain but the IC is spared. The basal ganglia are involved in a diverse array of functions including maintenance of consciousness (1) and planning and execution of volitional movement (2,3). Infarctions involving the lenticular nucleus can manifest as hemiparesis (4). The sparing of the IC and other structures necessary for the formation of MEPs, as we understand them, made it possible to elicit MEP with low levels of stimulation.

The key point illustrated by this case is that lack of volitional movement should not preempt attempting MEPs in patients if the neural pathways necessary for the generation of MEPs remain intact. In this case the intra-operative loss of the MEPS served to alert the surgeon that the temporary clip had compromised the motor system. The fact that only the upper extremity muscle groups were affected suggests this was a cortical effect.

References (1) J Neurosci 30:9095, 2010
(2) J Neurophysioll 79: 1070, 1998
(3) Brain Res Brain Res Rev 31:236, 2000
(4) Arch Neurol 60:351, 2003

Epilogue: At the time of discharge the patient had regained use of left arm and hand but still had significant LE weakness. This also near completely resolved over the next month.