

Electroencephalography findings in patients with acute post coronary artery bypass graft encephalopathy

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ABSTRACT

Objectives: To determine the EEG findings associated with acute post coronary artery bypass graft encephalopathy (aPCE), and to study the demographics and neuroimaging findings.

Methods: We reviewed the EEG in all patients with the diagnosis of PCE between February 2006 and December 2011.

Results: We identified 21 (20 males, and one female) patients with aPCE. The mean age (\pm SD) was 64 (\pm 11.2) years. Thirteen patients had altered level of consciousness, and 8 presented with confusion out of which 3 had acute seizures. The EEG patterns observed were: a) generalized theta plus intermixed diffuse delta in 7 (33%); b) generalized theta with focal epileptiform discharges in 5 (24%); c) generalized triphasic pattern in 3 (14%); d) generalized theta with lateralized delta in 3 (14%); e) generalized theta with periodic lateralized epileptiform discharges (PLEDs), and bilateral synchronous periodic epileptiform discharges (BIPLEDs) in 2 (10%); and f) one patient (5%) with electrographic seizures. On EEG/neuroimaging correlation, the EEGs that showed generalized slowing and generalized triphasic patterns had no acute changes on imaging, while the EEGs that showed lateralized slowing, focal epileptiform discharges, electrographic seizures and PLEDs had fresh infarcts. Patients with BIPLEDs had unremarkable imaging.

Conclusion: The EEG features such as lateralized slowing, PLEDs, and electrographic seizure were associated with acute cerebral insults. An altered level of consciousness was the most common symptomatology in our cohort, and could possibly be related to hypoxic/toxic-metabolic etiology. Electrographic seizure detected by EEG may clinically present as aPCE.

Acute post coronary artery bypass graft encephalopathy (aPCE) varies widely from 8-32% of patients,¹ and can be a major factor for prolonging hospital stay.² Common factors predicting aPCE can vary from old age, history of hypertension, diabetes mellitus, carotid artery disease, and metabolic derangements.³ The aPCE

is usually associated with short term and long term neurocognitive complications,³ so early recognition and appropriate treatment can help in better management of these patients. Electroencephalography (EEG) can ascertain a degree of encephalopathy, and also identify regional and global dysfunction that may help to point toward an underlying etiology. The EEG is most commonly used in patients with encephalopathies. Digital/computer EEG's are perspective tools for mild ischemic brain changes in the postoperative period appearing as cognitive dysfunction.⁴ The aim of this study was to determine EEG findings in delirious patients post coronary artery bypass graft (CABG) in an acute setting.

Methods. We carried out a retrospective observational analysis of patients who developed encephalopathy post CABG. We reviewed the EEG database at the Department of Neurophysiology, National Neurosciences Institute, King Fahad Medical City, Riyadh, Saudi Arabia from February 2006 to December 2011. Our study included all EEG's carried out post CABG in patients who were admitted to the cardiothoracic intensive care units (ICU's), coronary care units (CCU's) and general ICU's. We recorded demographics, day of diagnosis, symptoms of aPCE, encephalopathic features as per DSM-IV criteria (American Psychiatric Association) along with EEG and neuroimaging findings. The DSM-IV criteria for encephalopathy include: 1. Confusion/agitation; 2. Combativeness; 3. Alterations and fluctuations in levels of consciousness; 4. Acute problems in cognition including memory; and 5. Changes in perception including hallucinations.

This work was performed with informed consent of the subjects. Institutional Review Board approval was obtained for conducting and publishing this work.

Results. We identified 21 (20 males and one female) patients with aPCE. The mean age (\pm SD) was 64 (\pm 11.2) years. The aPCE was diagnosed within a mean of 4.7 (range 1-9) days post CABG (Figure 1). Thirteen patients had an altered level of consciousness, and 8 presented with confusion out of which 3 had acute seizures. The EEG patterns observed were: (a) Generalized theta plus intermixed diffuse delta in 7 (33%); (b) Generalized theta with focal epileptic discharges in 5 (24%); (c) Generalized triphasic pattern in 3 (14%); (d) Generalized theta along with lateralized

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findings have to be confirmed by neuroimaging, which reduces its specificity. In our study we did not look at whether patients who develop aPCE had a longer stay in the hospital than those patients who develop acute cerebral insults and seizures, and whether appropriate management dissipated the features of encephalopathy. Further study is required to address these points.

In conclusion, EEG features such as lateralized slowing, PLEDs, and electrographic seizure were associated with acute cerebral insults. An altered level of consciousness was the most common symptomatology in our cohort, and could possibly be related to hypoxic/toxic-metabolic etiology. Electrographic seizure detected by EEG may clinically present as aPCE.

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