Abstract 9

Dynamic Changes in ECG Predict Poor Outcome After Aneurysmal Subarachnoid Hemorrhage (aSAH)

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Electrocardiographic (ECG) abnormalities following a SAH have been well documented. New evidence suggests that ECG changes and cardiopulmonary dysfunction worsen outcome, but determining which patients are at most risk is unclear and important.

To address this issue, we prospectively studied clinical markers, cardiac abnormalities, and clinical outcome in 20 patients (12 women and 8 men) admitted to the neurosurgical ICU of a large academic hospital within 48 hours of SAH due to ruptured cerebral aneurysm. All patients had ECGs performed prior to surgical clipping, during the clipping surgery, and during the subsequent postoperative period. Their ages ranged between 18 and 70 years (mean = 47.21). The aneurysm was located in the anterior circulation in 17/20 patients (85%) and in the posterior circulation in 3/20 patients (15%). Seven patients (35%) were Hunt and Hess grade I, 5 (25%) were grade II, 2 (10%) were grade III, 3 (15%) were grade IV, and 3 (15%) were grade V. Patients were grouped according to the presence or absence of ECG abnormalities during the study period. Seven patients had normal ECGs and 13 had abnormalities at some time during the study period. Four patients (30.7%) with ECG changes showed dynamic ECG abnormalities (an abnormality that presented and disappeared during the study period or changed in character). A good outcome was achieved in 6/7 patients (86%) who had no ECG abnormalities compared with 8/13 patients (62%) with ECG abnormalities (not statistically significant, $P = .277$). All 4 patients who had fluctuating ECG changes had a poor outcome (100%), which was statistically significantly greater than the 2/8 patients (25%) who had fixed abnormalities ($P = .03$).

In conclusion, the presence of an abnormal ECG alone did not help predict the postoperative neurological outcome, but fluctuating ECG changes did predict a worse outcome. This has implications as a predictor of poor outcome, as well as in defining the pathophysiology of cardiac abnormalities after acute brain injuries. Further research is needed to determine the significance of these dynamic ECG changes and the optimal treatment of cardiac injury in patients with SAH.