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Introduction:

Cardiac complications are frequently seen in patients with subarachnoid hemorrhage (SAH). Previous studies that examined the relation between electrocardiographic and echocardiographic (echo) changes in SAH patients and patient outcomes were conflicting. [1,2]

Methods:

In this single-center retrospective cohort study, data was collected from ICU patients with an aneurysmal SAH between 01/06/2017 and 31/12/2020. We reviewed electrocardiogram (ECG) on admission and defined an abnormal ECG as either a significant ST-elevation or depression, a significant T-wave inversion or an abnormal QTc (> 440 ms for men, > 460 ms for women). We collected echo findings (left ventricular ejection fraction, EF) when available. Univariate regression analysis or Chi-square testing was used wherever applicable.

Results:

A total of 150 SAH patients were identified (patient characteristics table 1). 74 patients had a normal ECG (group 1), in 71 patients ECG changes were found (group 2), 5 patients had no ECG on admission and were excluded. A prolonged QTc was found in 66%, ST-T changes in 12%, both in 21%. A total of 7 patients received an echo in group 1 (9%) compared to 18 in group 2 (25%). Overall, 10 echoes showed reduced EF (0% in group 1 vs 55% in group 2). Mean ICU length of stay (LOS) was lower in group 1 compared to group 2 (7,7 days vs 12,2 days resp, $P = 0,003$). Hospital mortality was lower in group 1 (6,7% vs 20,0 %, $P = 0,021$). Reduced EF was not associated with higher mortality.

Conclusion:

ECG changes in SAH patients are associated with longer ICU LOS and higher hospital mortality. Echocardiography was performed only in 25% of patients with ECG changes. Since more than 50% of echoes in patients with SAH having an abnormal ECG showed reduced left ventricular function, an abnormal ECG on admission in patients with SAH should trigger to perform an echocardiography to detect cardiac complications.

References:

1. Sakr et al. Int J Cardiol 96: 369 – 373, 2004.
2. Zhang et al. J. Stroke Cerebrovasc Dis 25: 2653–2659, 2016.

Table:

	Normal ECG (n = 74)	Abnormal ECG (n = 71)	p-value
Age (median, years)	54 [IQR 20]	57 [IQR 20]	p = 0,159
Female gender	59%	62%	p = 0,757
Active smoking	36%	38%	p = 0,848
Arterial hypertension	15%	30%	p = 0,033
Cardiovascular disease (stroke, PAD, CAD)	5%	13%	p = 0,126

PAD = Peripheral Artery Disease

CAD = Coronary Artery Disease