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Original Research Paper

General Medicine

DIFFERENT CHANGES IN ELECTROCARDIOGRAM IN CASES OF ACUTE CEREBROVASCULAR ACCIDENTS

Dr Pothula Rama Rao — MD General Medicine, Associate Professor of Medicine, GMC Kadapa.

Dr Prathap Bingi* — MD General Medicine, Assistant Professor of Medicine, GMC Kadapa
*Corresponding Author

ABSTRACT

INTRODUCTION: Stroke is defined as a "neurological deficit of cerebrovascular cause that persists beyond 24 hours or is interrupted by death within 24 hours"[1] .CVA can be classified into two major categories- ischemic and hemorrhagic strokes.[2] About 87% are ischemic strokes and the rest being hemorrhagic in origin.
studies have demonstrated the fact that primary neurologic abnormalities may produce ECG changes without any myocardial lesion. ECG changes affecting T waves, U wave,ST segment, QT interval and arrhythmias have been reported. These changes may resemble those of myocardial ischemia and myocardial infarction, leading to misinterpretation and delay in operative management of sub arachanoid hemorrhage[3].
There are evidences suggesting, that patients who had ECG changes following CVA had poor prognosis compared to who don't have changes in ECG. Approximately 2-6% of all CVA patients die from cardiac causes in first 3 months after ischemic stroke[4].

KEYWORDS : Cerebrovascular accident(CVA), Electrocardiography

MATERIALS AND METHODS

The present study was conducted in the department of medicine in GGH Kadapa

Inclusion Criteria:

cases of cerebro vascular accident and admitted within 72 hours and patients having ECG changes.

Exclusion Criteria:

Stroke cases which came after 72 hours, The individuals with head injury and known cardiac, hepatic and renal diseases.

A total of 40 cases of cerebrovascular accident were enrolled in the study by using the above mentioned inclusion and exclusion criteria. The diagnosis of CVA was confirmed by using following criteria[5]

1. temporal profile of the clinical syndrome
2. evidence of focal brain damage/disease
3. clinical setting

A 12 Lead Electrocardiogram was taken for all the cases within 24 hours of admission and subsequently repeated on 3rd day, 7th day and 30th day for follow up. CT scan brain was taken and all patients were subjected to investigations like Trop-i or Trop-t, 2d echocardiogram, serum electrolytes, urine analysis, blood sugar, blood urea, lipid profile and relevant serological tests.

detailed analysis and interpretation of ECG changes like sinus arrhythmia, sinus bradycardia, sinus tachycardia, abnormal Q wave, U wave, T wave, right and left ventricular hypertrophy, S-T segment elevation/depression, T wave inversion and prolonged QT interval was done.

RESULTS

Table1 : Distribution according to age, sex and type of CVA

	Variables	No of patients	%
Age	<40 years	2	5
	40-59 years	10	25
	>60 years	28	70
Sex	Male	27	67.5
	Female	13	32.5
Type of CVA	Ischemic	28	70
	SAH	3	7.5
	Intracerebral hemorrhage	9	22.5

Table 2: Distribution according to ECG changes

ECG changes	No of patients	%
Abnormal T wave	17	42.5
QTc prolongation	14	35
ST segment elevation	4	10
ST segment depression	5	12.5
Abnormal U wave	2	5
Pathological Q waves	6	15

Table 3: Distribution of ECG changes according to types of CVA

ECG changes	Ischemic stroke		Intracerebral hemorrhage		SAH	
	No of patients	%	No of patients	%	No of patients	%
Abnormal T waves	10	35.7	3	33.3	0	0
QTc prolongation	8	28.5	2	22.2	2	66
ST segment elevation	3	10.7	1	11.1	1	33
ST segment depression	2	7.1	2	22.2	0	0
Abnormal U wave	2	7.1	0	0	0	0
Pathological Q waves	3	10.7	1	11.1	0	0

DISCUSSION

In the present study we tried to study the electrocardiography findings in acute cerebrovascular diseases. For this purpose we selected 40 cases of acute cerebrovascular diseases. It was observed that majority of the cases were more than 60 years of age. Male predominance was also observed with male: female ratio of 2.07. It was seen that 70% patients were of ischemic stroke followed by intra- cerebral hemorrhage (22.5%) and sub arachnoid hemorrhage (7.5%) was observed.

The most common ECG change observed in the present study was abnormal T wave (42.5%), prolong QTc (35%). Similar findings were also reported by Goldstein DS *et al*, Sommargren CE *et al* and Villa A *et al*.[6,7] The higher incidence of abnormal T wave in ischemic stroke patients with cardiovascular diseases implies the influences of other

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factors on the T wave than the intracranial disorder in this group. Dogan *et al*.[8] found ischemia like ECG changes in 65% of patients, QTc interval prolongation in 26%, and arrhythmias in 44% of them. In the study of Lindgren *et al*[9] transient ST,T changes were found in 54% of patients with ischemic stroke with no primary heart disease. In sub arachnoid hemorrhage patients prolong QTc interval and pathologic Q wave was observed in 50% cases each whereas ST Segment elevation and abnormal T wave was observed in 25% cases each. Similar findings were also reported by Frontera JA *et al*[10], Liman T *et al*[11] and Mayer SA *et al*.[12]
It was seen that in abnormal T wave (33.3%) was the most common abnormal ECG pattern in intra cerebral hemorrhage patients. It was followed by prolong QTc interval (22.2%).

Various authors have made attempt to correlate the ECG abnormalities with the location of the brain lesion but the reported results were divergent. The direct stimulation of many areas of the CNS is known to result in abnormal ECG patterns; while no relationship of the ECG changes, to the site of the bleeding aneurysm, was found by Cropp and Shuster *et al*,[13] Manning *et al*,[14] and Hunt *et al*.[15] In studies focused on the intracranial vascular spasm after SAH and the appearance of ECG abnormalities, Wilkins *et al* showed no relationship, while Stober and Kunze were able to find a correlation between cerebral arteries spasms of the left hemisphere, Twave inversion, and QT prolongation.

CONCLUSION

We conclude that abnormal T wave, prolong QTc interval and arrhythmia were the common ECG findings in patients of cerebrovascular accident. ECG changes in CVA are very similar to changes in myocardial ischemia and are often confused to cardiac disease. A good idea of these changes helps in effective management of CVA cases.

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