

ORIGINAL RESEARCH

To Study The Electrocardiographic (Ecg) Changes In Patients Of Cerebrovascular Accidents

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ABSTRACT

Introduction: Cerebrovascular accident (CVA) or stroke is defined as an abrupt onset of a neurologic deficit that is attributable to a focal vascular cause. Cerebrovascular accidents (CVA) can be classified into two major categories: about 87% of strokes are ischemic, the rest being haemorrhagic. Studies have demonstrated the fact that primary neurologic abnormalities may produce ECG changes without any myocardial lesion.

Aim: To study the various types of ECG changes in patients of cerebrovascular accidents. To compare the ECG changes in patients of haemorrhagic and ischemic cerebrovascular accidents.

Material and methods: This present study was carried out in 50 cases diagnosed as CVA admitted in the Department of Medicine in a tertiary care hospital of Punjab (North India) after obtaining their informed consent. All patients with CVA of less than 10 days duration admitted in the Department of Medicine were included in this study. A detailed history was taken and patients were selected as per inclusion and exclusion criteria. Along with other investigations 12 lead ECG tracing on admission and after 72 hours of stroke onset was performed. The ECGs were analysed for the occurrence of arrhythmias, ST-T segment changes, changes in various intervals and ectopic beats.

Results: In our study population of 50 patients, 38 (76%) patients were having ischemic stroke and 12 (24%) patients were having haemorrhagic stroke. In our study, prolonged QTc was the most common ECG abnormality. In our study, ST segment changes were most commonly noted in ischemic stroke. 12% of patients with ischemic stroke had ST depression and 2% had ST elevation. In our study, sinus tachycardia was the most common rhythm change observed in both ischemic CVA (26%) and haemorrhagic CVA (36%) followed by sinus bradycardia.

Conclusion: This study showed male predominance in stroke cases. Cerebral infarction was more than haemorrhage. ECG changes were more commonly associated with ischemic stroke as compared to haemorrhagic stroke. Cardiac disturbances are diverse and frequent in the setting of acute neurological injury. Understanding of these ECG changes occurring in patients with CVA is important because it may lead to erroneous

judgment of assigning these patients as CAD. These patient should be evaluated for cardiac injury and treated only if necessary.

Key words: CVA, Ischemic Stroke, Haemorrhagic Stroke, ECG, Arrhythmias

INTRODUCTION

Cerebrovascular accident (CVA) or stroke is defined as an abrupt onset of a neurologic deficit that is attributable to a focal vascular cause.¹ Cerebrovascular accidents (CVA) can be classified into two major categories: about 87% of strokes are ischemic, the rest being haemorrhagic. It is difficult to be sure clinically about the type of stroke (haemorrhagic or ischemic) in majority of cases as there is no absolute differentiating feature.²

There is a very considerable heterogeneity in how electrocardiographic (ECG) changes in stroke patients are presented in the literature.^{3,4,5,6,7,8} This electrocardiographic spectrum seems to be related to the type of cerebrovascular disease and its localization.

Studies have demonstrated the fact that primary neurologic abnormalities may produce ECG changes without any myocardial lesion.⁹ ECG changes affecting T wave, U wave, S-T segment, QT segment and arrhythmias have been reported. These changes may resemble those of myocardial ischemia and acute myocardial infarction, leading to misinterpretation and delay in management.

AIMS AND OBJECTIVES

To study the various types of ECG changes in patients of cerebrovascular accidents. To compare the ECG changes in patients of haemorrhagic and ischemic cerebrovascular accidents.

MATERIAL AND METHODS

This present study was carried out in 50 cases diagnosed as CVA admitted in the Department of Medicine in a tertiary care hospital of Punjab, North India after obtaining their informed consent. All patients with CVA of less than 10 days duration admitted in the Department of Medicine were included in this study. A detailed history was taken and patients not fulfilling the below mentioned inclusion criteria and those having the points mentioned in the exclusion criteria were excluded from the study. Routine blood investigations like CBC, ESR, RFT, LFT, S. Electrolytes, RBS and with FBS were sent. Chest X-ray, CT-Scan and/or MRI of the brain were also done to make the accurate diagnosis. The above mentioned investigations were done along with the 12 lead ECG tracing reflecting atleast 3 QRS complexes per lead on admission and after 72 hours of stroke onset was performed. The ECGs were analysed for the occurrence of arrhythmias, ST-T segment changes, changes in various intervals and ectopic beats.

A heart rate of 100 beats per minute and above was considered as sinus tachycardia for the purposes of comparison with other studies, 60 and below per minute as sinus bradycardia. ST segment was considered depressed if it was ≥ 1 mm, T wave changes were recorded if present in one or more leads.

INCLUSION CRITERIA

1. Patients in the age group of 40-80 years of age.
2. Patients diagnosed with acute CVA evident on CT scan or MRI of the brain of duration of less than 10 days.

EXCLUSION CRITERIA:

1. CVA of more than 10 days duration on presentation.
2. History of hypertension and history of any hypertensive medications.
3. History of cardiac disease.

4. Patient with symptoms of acute CVA but without CT scan or MRI evidence even after 24 hours of stroke onset.
5. Patients diagnosed with emphysema, Left sided or bilateral pleural effusion, left sided pneumothorax as it may anatomically bring about a shift in the position of the heart giving rise to ECG changes.
6. Patients on cancer chemotherapy as some agents give rise to ECG changes.
7. Patients with electrolyte abnormalities known to produce ECG changes.
8. Patients with tubercular meningitis or other diseases known to cause vasculitis of intracerebral arteries.

STATISTICAL ANALYSIS

The data was systematically collected and tabulated. The data thus obtained was analysed statistically.

OBSERVATIONS AND RESULTS

Table 1: Age wise distribution of study population

Age(Years)	Ischemic Stroke		Haemorrhagic Stroke		Total	
	N	%age	N	%age	N	%age
40-50	11	22.00	3	6.00	14	28.00
51-60	16	32.00	6	12.00	22	44.00
61-70	5	10.00	1	2.00	6	12.00
>70	6	12.00	2	4.00	8	16.00
Total	38	76.00	12	24.00	50	100.00
	57.45±10.36		58.83±9.40		57.78±10.06	

Table 2: Sex wise distribution of study population

Sex	Ischemic Stroke		Haemorrhagic Stroke		Total	
	N	%age	N	%age	N	%age
Female	19	38.00	5	10.00	24	48.00
Male	19	38.00	7	14.00	26	52.00
Total	38	76.00	12	24.00	50	100.00

Graph 1: Graph showing distribution according to type of cerebrovascular accidents

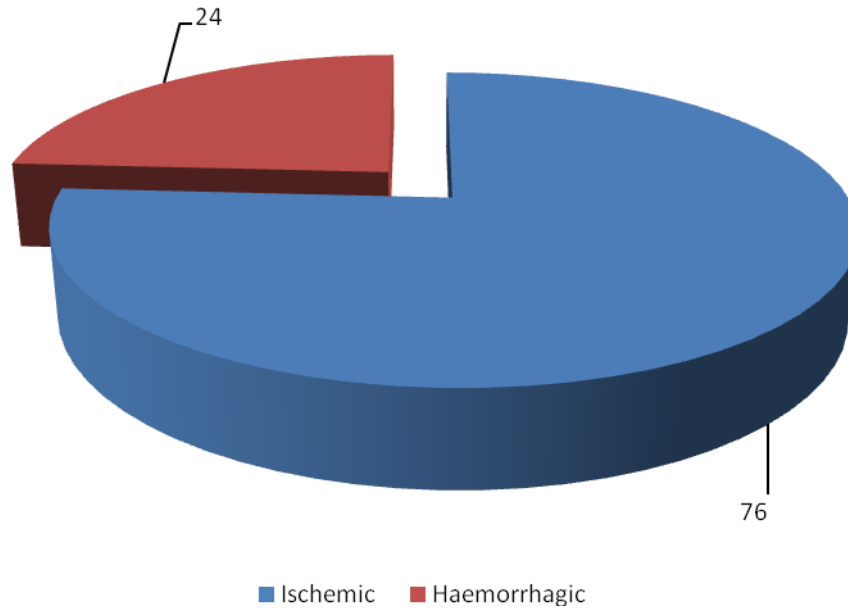


Table 3: St-segment changes in cerebrovascular accidents

ST-segment Changes	Ischemic Stroke		Haemorrhagic Stroke		Total	
	N	% age	N	% age	N	% age
ST Elevation	2	4.00	0	0.00	2	4.00
ST Depression	6	12.00	0	0.00	6	12.00
Normal ST segment	30	60.00	12	24.00	42	84.00
Total	38	76.00	12	24.00	50	100.00

Graph 2: Ecg rhythm changes in cerebrovascular accidents

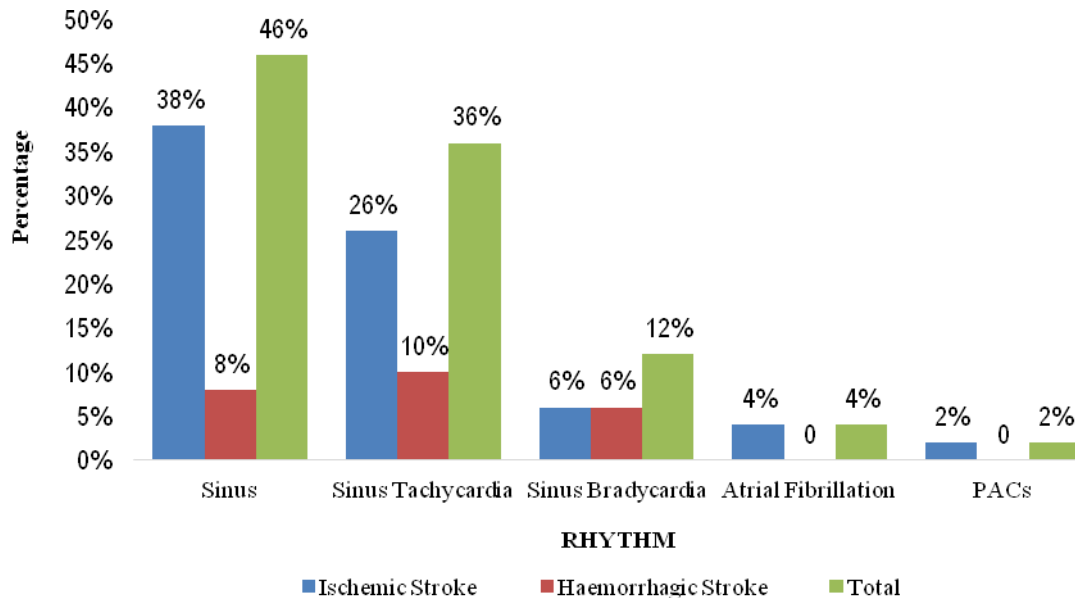


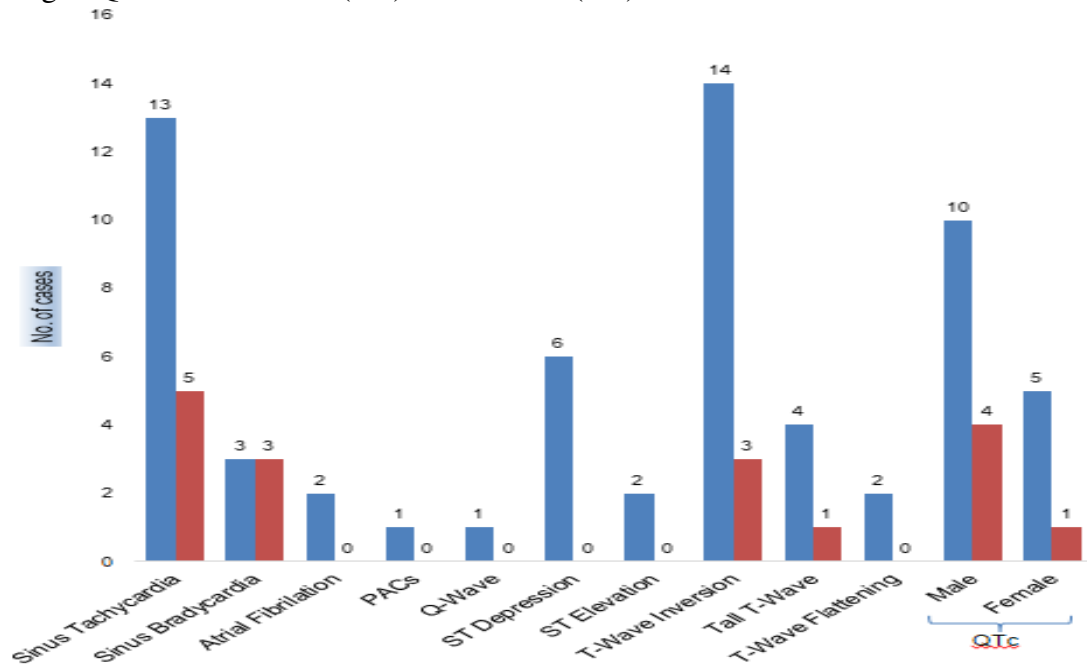
Table 4: T-wave changes in cerebrovascular accidents

T Wave Changes	Ischemic Stroke		Haemorrhagic Stroke		Total	
	N	% age	N	% age	N	% age
Tall T wave	4	8.00	1	2.00	5	10.00

T wave Inversion	14	28.00	3	6.00	17	34.00
T wave Flattening	2	4.00	0	0.00	2	4.00
Normal T Wave	18	36.00	8	16.00	26	52.00
Total	38	76.00	12	24.00	50	100.00

In ischemic stroke, pathological Q-wave was seen in 1 (2.00%) case. In haemorrhagic stroke no pathological Q-wave was seen.

Out of 50 cases, 20 (40%) showed prolonged QTc interval. In ischemic stroke QTc prolongation was seen in 10 (20%) males and 5 (10%) females. In haemorrhagic stroke prolonged QTc was seen in 4 (8%) males and 1 (2%) in female.



DISCUSSION

In our study population of 50 patients, 38 (76%) patients were having ischemic stroke and 12 (24%) patients were having haemorrhagic stroke (graph 1). Mohr JP¹⁰ observed an 84% incidence of strokes due to thromboembolism and 16% due to haemorrhage.

In our study, sinus tachycardia was the most common rhythm change observed in both ischemic CVA (26%) and haemorrhagic CVA (36%) followed by sinus bradycardia.

In a study done by Cabrera-Rego JO et al¹¹, in 166 patients admitted with the diagnosis of cerebrovascular disease of any etiology and form of presentation, electrocardiographic findings were present in 32.5% of patients, mainly sinus tachycardia (27.7%), T wave inversion and premature atrial contractions (13.3% each). These findings were consistent with our study.

In our study, ST segment changes were most commonly noted in ischemic stroke. 12% of patients with ischemic stroke had ST depression and 2% had ST elevation. There was no ST segment changes in haemorrhagic CVA (TABLE III). In 28 patient with strokes, Lindgren A et al¹² observed transient ST changes in lateral leads and less often in inferior or anterior leads which were seen in 9 cases of ischemic stroke and 1 case of haemorrhagic stroke.

In our study, prolonged QTc was the most common ECG abnormality.

CONCLUSION

India like other developing countries is in the midst of a stroke epidemic. There is a huge burden of stroke with significant regional variations of stroke in our country. This study

showed male predominance in stroke cases. Cerebral infarction was more than haemorrhage. Males and females were equally affected in ischemic stroke and there was male predominance in haemorrhagic stroke. ECG changes were more commonly associated with ischemic stroke as compared to haemorrhagic stroke. In our study, the commonly observed ECG changes in ischemic stroke were prolonged QTc interval and T-wave inversion. In haemorrhagic stroke, the most common ECG changes were sinus tachycardia and prolonged QTc interval. Stroke involving cortical area showed a higher incidence of abnormal ECG changes as compared to stroke of other regions

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