ORIGINAL RESEARCH

Assessment of electrocardiographic changes in acute cerebrovascular accidents

[1]Dr. Shivani Saini, [2]Dr. VishaliSumberia

[1]Assistant Professor, Department of Medicine, MMIMSR, Mullana, Ambala, Haryana, India
[2]Assistant Professor, MMIMSR, Mullana, Ambala, Haryana, India

Corresponding Author
Dr. Shivani Saini
Assistant Professor, Department of Medicine, MMIMSR, Mullana, Ambala, Haryana, India

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ABSTRACT

Background: An acute cerebrovascular accident (CVA), commonly known as a stroke, occurs when there is a sudden disruption of blood flow to the brain, leading to damage of brain tissue. The present study was conducted to assess electrocardiographic changes in acute cerebrovascular accidents.**Materials & Methods:**60 patients of acute cerebrovascular accidents of both genders were enrolled. A complete blood count, serum electrolyte levels, a CT scan, fasting blood sugar levels, a fasting lipid profile, and an ECG recording within 24 hours of admission were recorded.**Results:** Out of 60 patients, males were 32 and females were 28.The type of events was cerebral thrombosis in 34 and cerebral hemorrhage in 26 patients. Types of ECG changes were QT prolongation in 14, ST depression in 12, T wave inversion in 8, prolonged PR interval in 7, sinus tachycardia in 5, sinus bradycardia in 8, atrial fibrillation in 5 and sinus arrhythmia1patients. The difference was significant (P< 0.05).**Conclusion:** ECG abnormalities are frequently observed in acute cerebrovascular accident patients.

Keywords: acute cerebrovascular accident, Thrombotic stroke, Subarachnoidhaemorrhage.

INTRODUCTION

An acute cerebrovascular accident (CVA), commonly known as a stroke, occurs when there is a sudden disruption of blood flow to the brain, leading to damage of brain tissue.[1] Strokes can be classified into two main types: ischemic and hemorrhagic.[2] Thrombotic stroke is caused by a blood clot (thrombus) forming in one of the arteries that supply blood to the brain.[3] Embolic stroke is caused by an embolus (a traveling blood clot) that lodges in a blood vessel and blocks the blood flow to the brain. Intracerebral hemorrhage results from bleeding within the brain tissue, usually due to the rupture of a blood vessel. Subarachnoid hemorrhage involves bleeding into the space between the brain and the thin tissues that cover it (subarachnoid space).[4]

Abnormalities of the electrocardiogram (ECG) are extremely useful in the recognition of heart disease, but they also occur in a variety of states in which the primary pathology is non-cardiac.[5] Numerous neurologic conditions, such as meningitis, trauma, Guillain-Barre syndrome, epilepsy, cerebrovascular diseases, tumors, etc., have been linked to alterations in electrocardiograms.[6,7] The present study was conducted to assess electrocardiographic changes in acute cerebrovascular accidents.

MATERIALS & METHODS

The present study consisted of 60 patients of acute cerebrovascular accidents of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. A thorough medical history was obtained to determine the clinical profile of stroke, including risk factors such as smoking, diabetes mellitus, dyslipidemia, hypertension, and a history of heart problems. A thorough neurological examination was performed on each patient, including a complete blood count, serum electrolyte levels, a CT scan of the brain, fasting blood sugar levels, a fasting lipid profile, and an ECG recording within 24 hours of admission. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 60		
Gender	**Male**	**Female**
Number	32	28

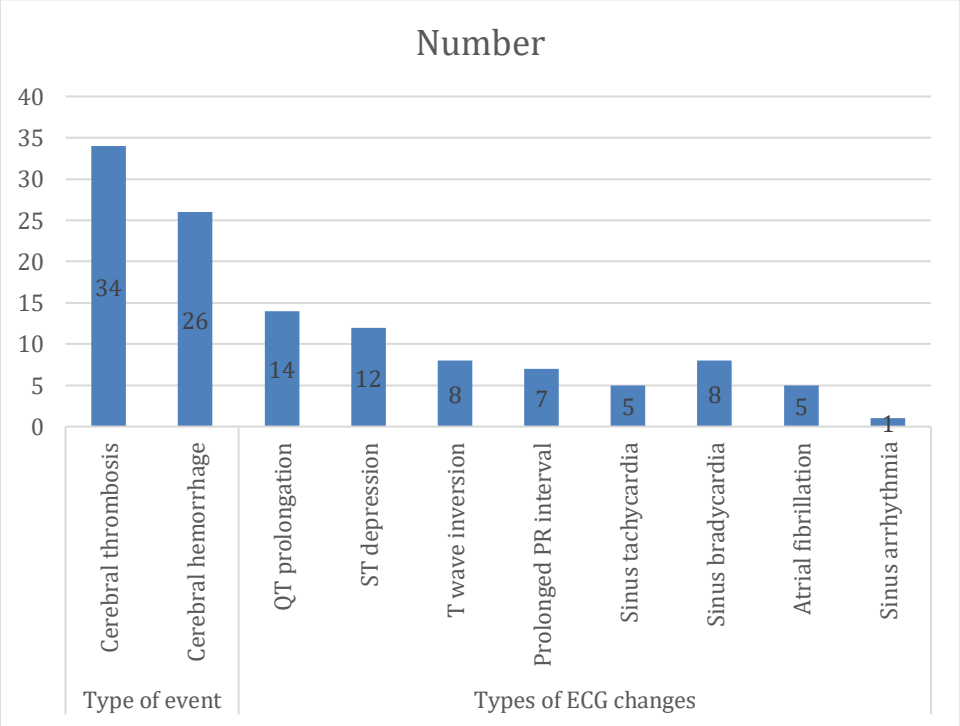
Table I shows that out of 60 patients, males were 32 and females were 28.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Type of event	Cerebral thrombosis	34	0.52
	Cerebral hemorrhage	26	
Types of ECG changes	QT prolongation	14	0.05
	ST depression	12	
	T wave inversion	8	
	Prolonged PR interval	7	
	Sinus tachycardia	5	
	Sinus bradycardia	8	
	Atrial fibrillation	5	
	Sinus arrhythmia	1	

Table II, graph I shows that the type of events was cerebral thrombosis in 34 and cerebral hemorrhage in 26 patients. Types of ECG changes were QT prolongation in 14, ST depression in 12, T wave inversion in 8, prolonged PR interval in 7, Sinus tachycardia in 5, sinus bradycardia in 8, atrial fibrillation in 5 and sinus arrhythmia1patients. The difference was significant (P< 0.05).

Graph IAssessment of parameters



DISCUSSION

High blood pressure is a significant risk factor for both ischemic and hemorrhagic strokes. Tobacco smoke contains chemicals that can damage blood vessels and increase the risk of blood clots.[8,9] Uncontrolled diabetes can contribute to the development of atherosclerosis, a condition where arteries become narrowed and predispose to blood clots.[10] Elevated levels of cholesterol can lead to the formation of plaques in the arteries, increasing the risk of stroke. An irregular heart rhythm that can lead to the formation of blood clots in the heart, which can then travel to the brain and cause a stroke.[11,12] The present study was conducted to assess

electrocardiographic changes in acute cerebrovascular accidents.

We found that out of 60 patients, males were 32 and females were 28. Saxena et al[13] studied 132 patients (82 males and 50 females) with acute stroke, presented to the hospital within 48 hours of onset of stroke during one year. Patients suffering from preexisting heart disease, previous stroke or electrolyte imbalance were excluded. The ECG were observed for ST-T changes and read according to the Minnesota Code. Of the 132 patients with acute stroke included in this study, 61 (46.21%) patients had ischemic stroke and 71 (53.79%) patients had haemorrhagic stroke and; ST-T changes were seen in ECG of 72 (54.55%) patients while 60(45.45%) patients had normal ECG. In patients with ST-T changes, major ST-T changes i.e. ST-segment elevation were seen in 11.11% (n=8) whereas minor ST-segment changes i.e. ST-segment depression and T inversion were seen in 88.89% (n=64). Out of 72 patients with ST-T changes, 62.28% (n=47) expired during the hospital stay, among them 12.77% had major ST-T changes while 87.23% had minor ST-T changes, and 37.72% (n=25) survived. Out of 60 patients with normal ECG, 46.67% (n=28) expired and 53.33% (n=32) survived.

We found that the type of events was cerebral thrombosis in 34 and cerebral hemorrhage in 26 patients. Types of ECG changes were QT prolongation in 14, ST depression in 12, T wave inversion in 8, prolonged PR interval in 7, sinus tachycardia in 5, sinus bradycardia in 8, atrial fibrillation in 5 and sinus arrhythmia1patients. Sachdeva et al[14] in their study 80 consecutive patients who fulfilled the clinical definition of stroke were included. The majority of cases were having ischemic stroke. The mean age of presentation was 63 years. No ECG abnormalities were found in 11.25 % of cases. The most common ECG change observed was T wave inversion seen in 32.5 % of cases. QTc prolongation was the most common ECG change in intracerebral hemorrhage cases. Other ECG changes were ST depression in 25 %, bradycardia in 12.5%, tachycardia in 5%, atrial fibrillation in 3.75%, and U waves in 7.5% of cases.

Dogan et al[15] compared the electrocardiographic (ECG) abnormalities in patients with acute ischemic and hemorrhagic stroke who had no history of heart disease. During 12 months, 222 consecutive stroke patients were enrolled in this study. Of them 162 had ischemic stroke and 60 had hemorrhagic stroke. Frequency of arrhythmias and ECG changes were compared between two stroke groups. Electrocardiographic abnormalities included ischemia-like changes (ST-segment depression or elevation, abnormal T and U waves), QTc prolongation and arrhythmias. Ischemic stroke patients were elder than hemorrhagic ones (64+/-14 years vs. 57+/-13 years, p=0.003). Other clinical characteristics were comparable in both groups. Ischemia-like ECG changes were found in 65% of ischemic stroke patients while they were observed in 57% of hemorrhagic stroke patients (p=0.33). Atrial fibrillation was more frequent in ischemic stroke than in hemorrhagic stroke (34% vs. 13%, p=0.01) patients. Individually, other ECG abnormalities were not different in both groups. With relation of ECG abnormalities to location of the brain lesion, there was a trend in favor of involvement of the temporal, frontal and parietal lobes.

The limitation of the study is the small sample size.

CONCLUSION

Authors found that ECG abnormalities are frequently observed in acute cerebrovascular accident patients.

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