Original Article

Electrocardiographic changes during the acute phase of stroke seen in Unit of Neurology in Teaching Hospital Befelatanana Madagascar

Aspect électrocardiographique au cours de la phase aigüe des accidents vasculaires cérébraux vus dans le Service de Neurologie du Centre Hospitalier Universitaire Befelatanana Madagascar

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Abstract

Aims: To determine the prevalence of electrical changes and to describe the electrocardiographic aspects of patients during the acute phase of stroke. Materials and methods: It was a retrospective, descriptive and analytical study in a Neurology Department in Madagascar. Have been included all stroke with cerebral tomodensitometry and having performed an electrocardiogram (ECG) during acute phase of stroke, defined by the first 5 days which symptoms appears.

Results: In fact, 226 files were collected with a mean age of 58.66 and a sex ratio of 1. Hypertension was the main risk factor for cardiovascular disease. One hundred and twenty-two patients (53.98%) had ischemic stroke. ECG was abnormal in 153 patients (67.70%). ST segment changes were the most common electrical anomalies (19.47%). There was no significant association between stroke type and electrical abnormalities (p = 0.35).

Conclusion: Electrical abnormalities during the acute phase of stroke are frequent. The interpretation of the ECG is difficult because these abnormalities could mimic the electrical symptomatology of an acute coronary syndrome.

Keywords: stroke, arterial hypertension, ECG, Madagascar

Résumé

Buts : Déterminer la prévalence des modifications électriques et de décrire les aspects électrocardiographiques des patients au cours de la phase aiguë des accidents vasculaires cérébraux.

Matériels et méthodes : Il s'agissait d'une étude rétrospective, descriptive et analytique dans un Service de Neurologie à Madagascar. Ont été inclus tous AVC avec preuve scanographique et ayant effectué un ECG durant la phase aigue des AVC, définie étant les 5 premiers jours suivant l'apparition des symptômes.

Résultats : Au total, 226 dossiers ont été colligés avec un âge moyen de 58,66 et un sex-ratio de 1. L'hypertension artérielle constituait le principal facteur de risque cardiovasculaire. Cent vingt-deux patients (53,98%) présentaient un AVC

ischémique. Les ECG étaient anormaux chez patients 153 (67,70%).

Les modifications du segment ST étaient les anomalies électriques les plus fréquentes (19,47%). Il n'y avait aucune association significative entre le type d'AVC et les anomalies électriques (p=0,35).

Conclusion : Les anomalies électriques au cours de la phase aiguë des AVC sont fréquentes. L'interprétation de l'ECG s'avère difficile car ces anomalies pourraient mimer la symptomatologie électrique d'un syndrome coronarien aigu.

Mots clés : accident vasculaire cérébral, hypertension artérielle, ECG, Madagascar

Introduction

Cardiological disorders in the acute phase of stroke are observed in 60% to 70% of cases. A part from cardiac arrhythmias, myocardial dysfunction and electrocardiographic changes are among the most frequent abnormalities [1]. The interpretation of these results is still difficult in practice because this has an impact on the treatment of patients who often remains discordant. The purpose of this study was to determine the prevalence of electrical changes and to describe the electrocardiographic aspects of patients during the acute phase of stroke.

Methods

Its was a retrospective, descriptive, analytical, transverse, single-center patient study over a 24-month period from July 1, 2016 to July 31, 2018. Only records of patients with cerebrovascular accident with evidence CT scan who performed electrocardiogram (ECG) were included in the study. CT abnormalities were classified as ischemic stroke and hemorrhagic stroke. Epidemiological data and cardiovascular risk factors were mentioned. The interpretation of 12-lead ECGs focused on heart rate, rhythm, and abnormalities of repolarization. The data was collected and saved on Excel then analyzed by Epi Info® version 7.

Results

In total, we selected 226 patients. The mean age was 58.66 years with a sex ratio of 1. One hundred and eighty-nine patients (83.63%) had high blood pressure (hypertension). The other cardiovascular risk factors were dominated by smoking in 24.78% of cases (56), dyslipidemia in 11.95% (n = 27) and diabetes mellitus 9.29% (n = 21). The majority of patients (79.20%) were older than 50 years old (Table 1). One hundred and twenty-two patients (53.98%) had ischemic stroke. Only one hundred and four patients had hemorrhagic stroke. Of the 113 male patients, 58 (51.33%) had ischemic stroke, and of the 113 female patients 64 (56.64%) had ischemic stroke (Table 2). ECG was abnormal in 153 patients (67.70%). The main ECG abnormalities that we found were dominated by ST segment changes in 19.47% of cases (n = 44), incomplete left bundle branch block in 14.16% cases (n = 32), and hypertrophy left ventricular electric in cases 9.73% (n = 22). ST segment changes associated with the incomplete left branch block were the most common association in 4.87% of cases (n = 11). The Table 4 describes electrical abnormalities. We were unable to find a significant relationship between stroke type and electrocardiographic abnormalities (p = 0.35). However, ST segment and left incomplete block changes are much more common in patients with ischemic stroke while left ventricular hypertrophy was more likely to occur in hemorrhagic stroke. Among the changes in the ST segment, the T waves negative in the anterior and lateral territories were the most frequent at 3.54% of cases (n = 8) and 3.54% of cases (n = 8) respectively, followed by T waves negative in apico-lateral and lateral low in 3.10% of cases (n = 7) and 3.10% of cases (n = 7).

Table 1: Age and sex distribution in stroke patients

Age group (years)	Female	Male	Percentage
21-39	9	9	7,96
40-49	16	13	12,84
50-59	23	39	27,43
60-69	41	34	33,19
70-79	19	13	14,16
80-96	5	5	4,42

Table 3: Test for association between electrographic abnormalities and types of stroke

ECG changes	Cerebral hemorrhage	Cerebral infarction	Total
Normal	33 (45,21%)	40 (54,79%)	73 (100,00%)
Abnormal	71 (46,41%)	82 (53,59%)	153 (100,00%)
Total	104 (46,02%)	122 (53,98%)	226 (100,00%)

p-value = 0.48

Table 4: Incidence of the electrical abnormalities in the study group

ECG changes	Total no. of cases	Percentage
ST Segment changes	44	19,47
Incomplet left branch block	32	14,16
Left ventricular hypertrophy	22	9,73
Atrial fibrillation	6	2,65
Incomplet right branch block	3	1,33
Complet right branch block	3	1,33
Monomorphic ventricular extrasystole	3	1,33
T wave negative apicolateral	2	0,88
Atrial tachycardy	2	0,88
T wave negative lateral low	1	0,44
T wave negative anteroseptal	1	0,44
Sinusal tachycardy	1	0,44
Complet left branch block	1	0,44
Auriculoventriculaire block I	1	0,44
Left ventricular hypertrophy and incomplet left branch block	8	3,54
Monomorphic ventricular extrasystole and left branch block	2	0,88
Sinusal tachycardy and complet left branch	1	0,44
ST segment changes and incomplet left branch block	11	4,87
ST segment changes and auriculoventriculaire blokc I	1	0,44
ST segment changes and T wave negative in lateral	1	0,44
ST segment changes and left ventricular hypertrophy	3	1,33
Monomorphic ventricular extrasystole and left ventricular hypertrophy	1	0,44
Atrial fibrillation and left ventricular hypertrophy	1	0,44
Auriculoventriculaire block end left ventricular hypertrophy	1	0,44
Atrial Tachycardy, left ventricular hypertrophy and ST segment changes	1	0,44

Table 2: Incidence of infarct and hemorrhage with reference to sex

Types of stroke	Female		Male		Total	Percentage
	Cases	%	Cases	%		
Cerebral hemorrhage	55	48,67	49	43,36	104	46,02
Cerebral infarction	58	51,33	64	56,64	122	53,98
Total	113		113		226	100,00

Discussion

In our study, the majority (79.20%) of patients are older than 50 years old. The average age was 58.66 years with a sex ratio of 1. In India, Tandur et al [2] found that the incidence of stroke was more common in fifty to sixty years old. This result can be explained by the age is a risk factor of stroke and mean age because of the life expectancy that is lower in these countries. Our study showed predominance (53.98%) of ischemic attacks. Daniele et al [3] mentioned the same results. High blood pressure was the main risk factor for cardiovascular disease in our study (83.63%). Tandur et al, and Shaper et al also found the same result. These results were explained by the fact that high blood pressure is a major cardiovascular risk factor with a prevalence of 28.05% in the city where the study was conducted [4]. We identified 67.70% of electrical anomalies in our study. Tandur et al [2] found a frequency of 74% and Daniele et al have found a frequency of 75% as well. This difference could be explained by the fact that in our study, it is the ischemic stroke that predominated. Indeed, electrical abnormalities occur in 60% to 90% of hemorrhagic stroke cases and 5% to 20% in ischemic stroke [5]. The most common electrical abnormalities observed in our study were ST segment changes, left incomplete block and left ventricular hypertrophy with a frequency of 19.47%; 14.16% and 9.73%. And atrial fibrillation was found in 2.65% of cases. ST segment changes were dominated by negative T waves in anterior, lateral, apicolateral, and lateral lateral territory. Dutt (Saha) et al [6] reported an incidence of 19.23% negative T waves, which was also the case in our study. Tandur et al reported 24.3% inversion of the T wave, 20.27% ST segment shift, 13.51% tachycardia, 6% U wave, and 1.35% others arrhythmias. The results of Goldstein et al [7] are similar to those of Tandur. In our study, the prevalence of ECG abnormalities was low compared to that found in the literature. This could be explained by the fact that we have recorded details about the QRS complex on the ECG. We separately recorded the electrical abnormalities into isolated electrical abnormalities and then associated electrical abnormalities. And the electrical manifestations relating to arterial hypertension, were not negligible thus changing the distribution of electrical abnormalities.

Conclusion

Electrical abnormalities during the acute phase of stroke are not negligible. Apart from abnormalities related to arterial hypertension, changes in the ST segment and the T wave were most prevalent. These changes may mimic underlying myocardial ischemia that will require further investigation to confirm.

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Conflict of interest: No

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