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Original Article

Detection of paroxysmal atrial fibrillation or flutter in patients with acute ischemic stroke or transient ischemic attack by Holter monitoring

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ABSTRACT

Background and purpose: Paroxysmal atrial fibrillation and flutter are strong risk factors for stroke. Due to high recurrence rate of ischemic events and given the benefit of oral anticoagulation over antiplatelet drugs, it is important to identify this arrhythmia. Unfortunately, paroxysmal AF or flutter is asymptomatic in majority and therefore, difficult to detect.

Methods: Consecutive patients presenting with symptoms of acute ischemic stroke or transient ischemic attack were included. All patients free of AF or flutter on presentation underwent 24 h Holter monitoring within 7 days of admission.

Results: Overall, fifty two (52) patients (mean age 59.51 ± 13.45 years) with acute stroke (80.8%) and TIA (19.8%) underwent 24 h Holter monitoring. Paroxysmal AF was detected in 3 cases (5.8%), all 3 patients had acute stroke and were older than age 60 years. Type of stroke was the only factor which was associated with greater risk of having paroxysmal AF or flutter, AF accounted for 50% cases (2 out of 4) of clinically suspected cardio embolic stroke.

Conclusion: Screening consecutive patients with ischemic stroke with routine Holter monitoring will identify new atrial fibrillation/flutter in approximately one in 17 patients. Older age and type of stroke are strongly associated with increased risk. By carefully selecting the patients, the detection rates could be further increased.

1. Introduction

Atrial fibrillation (AF) and flutter are strong risk factors for stroke and identifying them is an important part of the etiological work up of patients with acute ischemic stroke or transient ischemic attack (TIA). Atrial fibrillation and flutter account for 10% of all strokes and 50% of cardio embolic strokes.[1] Stroke associated with AF carries a poor prognosis as more than 50% of the survivors remain with a severe deficit, and recurrence may be as high as 12% per year.[2] Treatment with warfarin and other oral anticoagulants provides a greater

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relative risk reduction in recurrent stroke compared with antiplatelet therapy[3]; therefore it is important to identify this arrhythmia. Unfortunately, AF remains under diagnosed as it is often asymptomatic with up to 30% of patients unaware of their diagnosis,[4] moreover paroxysmal atrial fibrillation is intermittent and has been reported to be asymptomatic in up to 90% of the patients, therefore it is difficult to detect.[5,6] However, the risk of thromboembolism purported by atrial fibrillation is same whether paroxysmal or permanent.[7]

Because of poor sensitivity of single standard ECG for detection of paroxysmal AF, 24 h Holter study is a better option, allowing the detection of previously unrecognized AF. Also the probability of detecting atrial fibrillation may be higher in the acute phase due to clustering of episodes of the arrhythmia,[8,9] making early initiation of monitoring advantageous.

In this study we examined feasibility and detection rates of atrial fibrillation with 24 h Holter monitoring applied early (within 7 days of admission) in patients presenting with acute stroke or transient ischemic attack (TIA).

2. Material and methods

We enrolled 52 patients admitted with a diagnosis of acute stroke or TIA to the Neurology and Medicine Department of S.M.S Hospital, Jaipur, India. Patients with previously diagnosed persistent or paroxysmal AF, primary hemorrhagic stroke, acute large vessel dissection or inability or refusal of consent were excluded from the study.

Baseline characteristics were recorded including a detailed medical history and major risk factors. All patients underwent detailed neurological examination, standard laboratory tests, extra cranial carotid duplex ultrasonography, transthoracic echocardiography and a neuroimaging study (cerebral CT scan or cerebral MRI or both).

3. Electrographic studies

All patients had a standard 12-lead ECG at admission. Additional ECG was performed if any arrhythmia was suspected on clinical grounds. In absence of any evidence of AF, the patients were recruited into the study group and after written informed consent, a 24 h 12 channel Holter (H-SCRIBE, Mortara instruments, Inc. Milwaukee USA.) monitor was applied within 7 days of symptom onset by specifically trained medical staff and monitors were collected for analysis after 24 h. Electrographic recordings were later on analyzed offline with a focus on detecting atrial fibrillation or flutter. Heart rate and RR variability plots were checked for patterns suggestive of atrial fibrillation. Supraventricular premature complexes, supraventricular tachycardia, ventricular premature complexes and ventricular tachycardia as detected by the automated software algorithm were scanned. Electrographic strips representing fastest and slowest heart rates were also inspected and intensive manual review was also undertaken for most of the cases.[10]

Results of the Holter study were communicated to respective treating physicians and any change of therapy was solely left to the discretion of treating physician.

4. Definitions and statistical analysis

Etiology of the stroke was classified according to Trial of org in Acute Stroke Treatment (TOAST) classification scheme.[11] Transient ischemic attack was defined as sudden, focal neurological deficit of presumed vascular origin lasting less than 24 h. Presence of atrial fibrillation was defined as at least 1 period of >30 s duration. Episodes of frequent supraventricular ectopy (>10 supraventricular complexes in a row) were also recorded.

Discrete categorical data were presented as n (%); Normality of quantitative data was checked by measures of Kolmogorov Smirnov tests of normality. Continuous data were given as mean ± SD, range or as median and interquartile range as appropriate. Mann–Whitney U-test was used for statistical analysis of continuous variables. For categorical data comparisons were made by Pearson Chi-square test or Fisher's exact test as appropriate. All statistical tests were two-sided and performed at a significance level of $\alpha = 0.05$. Analysis was conducted using SPSS for Windows (version 15.0; SPSS Inc., Chicago, IL, USA).

5. Results

Total 52 patients of acute stroke or transient ischemic attack (TIA) were finally enrolled in our study after ruling out those with exclusion criteria. 42 (80.8%) had acute ischemic stroke and 10 (19.2%) had TIA. Baseline clinical characteristics are summarized in Table 1. All patients had their Holter monitoring initiated within 7 days of admission. In 31 cases (59.6%) it was started on day 2 of admission, in 17 cases (32.7%) on day 3 and in remaining 4 cases (4.7%) on day 4.

Routine transthoracic echocardiogram was done in all cases, 8 patients (15.4%) had evidence of left ventricular hypertrophy (LVH) and one patient had severe left ventricular dysfunction secondary to old myocardial infarction.

In our study we found 3 cases (5.8%) of paroxysmal AF among 52 patients. All patients had acute ischemic stroke, and were older in age (Table 2). One patient had single episode of AF of 4 min duration while other 2 cases had multiple episodes lasting several seconds to few minutes (Fig. 1). None of the patients reported any symptoms during the recording period.

Neither prior history of stroke or TIA, nor prior history of palpitations was associated with greater risk of having paroxysmal AF or flutter. Only factor which was found to be significantly associated with risk of AF or flutter was the type of stroke, AF was present among 2 out of 4 cases of suspected cardio embolic stroke on the basis of clinical presentation and neuroimaging data.

6. Discussion

In the present study, paroxysmal AF was detected in 3 (5.8%) cases, beyond that was detected by physical examination and initial electrocardiogram on presentation, thus identifying AF in approximately one in 17 patients. Detection rates are similar to those reported by earlier studies (3.9%–5.5%).[12,13] Importantly paroxysmal AF accounted for 50% (2 out of 4) of