Original Article

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FREQUENCY OF INTER-ATRIAL BLOCKS IN PATIENTS WITH ISCHEMIC STROKE

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ABSTRACT

Objective: To determine the frequency and association of Interatrial block in hospitalized patients with Ischemic Stroke.

Study Design: A case control study.

Place and Duration of Study: Department of medicine, Military Hospital, Rawalpindi from 1st Jan 2009 to 30 December 2009.

Methodology: It included 64 patients, 32 cases of diagnosed ischemic stroke and 32 patients were taken as controls not suffering from ischemic stroke or ischemic heart disease. ECG findings of both selected groups were evaluated for presence or absence of interatrial block.

Results: Out of 32 ischemic stroke patients, 14 (43.85%) were found to have interatrial block on electrocardiogram (ECG). Whereas only 6 (18.80%) controls were found to have interatrial block on ECG. Odds ratio was 1.66.

Conclusion: Interatrial block is more frequent in ischemic stroke patients and may represent a risk factor for such stroke.

Key words: Interatrial-block, Risk-factor, Ischemic-stroke.

INTRODUCTION

Stroke is the second most common cause of death worldwide. It leads to 5.5 million worldwide deaths; among which two third occur in developing countries. Stroke secondary to ischemic brain injury comprises 85% of all these stroke cases. There is no cost effective cure for stroke cases and thus bulk of public health efforts are to be directed to its prevention[1]. ECG is an excellent diagnostic tool for detecting various cardiac arrhythmias as well as Interatrial blocks (IAB)[2].

IAB is a conduction delay between the atria (P wave ≥ 110 ms), is well described but poorly recognized since its discovery in 1925. It is highly prevalent in general population (40%) as well as in hospitalized patients as demonstrated by Asad et al[3,6]. Patients with IAB have large, baggy left atrium (LA) with reduced and delayed LV filling[7]. IAB leads to electro-mechanical dissociation of LA and abnormal atrial excitability leading to atrial fibrillation (AF) and other arrhythmias. All these abnormalities cause LA thrombosis and systemic embolism[3-5]. The major opportunities regarding IAB are that physicians can anticipate AF and design randomized controlled trails of therapies aimed at preventing AF and thrombo embolism and if possible IAB.

Thus, IAB could be a risk for embolic stroke due to its known sequel of LA dilation and electromechanical dysfunction that leads to thrombosis and latter embolization[8]. Although these are documented in international literature but such a phenomenon has not been investigated in Pakistan. The purpose of our study was to investigate whether there is an increased frequency of IAB in cases of ischemic strokes as compared to general population.

PATIENTS AND MATHODS

This case control study was conducted at Military Hospital, Rawalpindi over a 12 months period from 1st Jan 2009 to 30 December 2009. Total 64 patients were selected by non-probability purposive sampling, 32 patients with ischemic stroke (cases) and 32 controls.

Two groups were included in the study. Study group and control group. Study group comprised patients proven to be suffering from ischemic stroke. In control group, hospital patient population (by matched selection) or

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outdoor patients not suffering from stroke and cardiac disease were included.

Exclusion criteria were patients not willing, cerebro-vascular events attributed to subarachnoid or intraparenchymal bleeding and patients presenting with dementia, seizures, hypertensive encephalopathy, subdural hematoma, dizziness, vertigo and psychosis.

For control group exclusion criteria included patients suffering from any form of cardiac disease, dementia, seizures, hypertensive encephalopathy, subdural hematoma, dizziness, vertigo , psychosis and a history of stroke.

All cases and controls were selected from medical wards, OPDs and emergency of Medical department. After informed consent describing the advantages and disadvantages of the study, demographic data like name, age, gender were recorded. All patients presenting with stroke (diagnosed on clinical presentation and CT scan findings) were evaluated by documenting detailed history, specifically history of risk factors like smoking, diabetes mellitus, cardiac disease and hypertension. Thorough physical examination was performed. Every patient with acute stroke was investigated including all indicated laboratory investigations, ECG, Chest X-ray and Neuroimaging studies.

First 32 patients diagnosed as ischemic stroke based on CT scan findings were included as cases (cases). ECG findings of ischemic stroke patients were evaluated for presence or absence of interatrial block. Interatrial block was defined as prolonged p wave (≥ 110 ms) on electrocardiogram. Ischemic stroke was defined as focal neurological deficit with rapid onset due to occlusion of blood supply to the brain which persisted at least 24 hours or until death. It was confirmed by non contrast CT scan brain. P wave duration of 3 consecutive complexes in ECG lead II was measured by electronic caliper and their mean recorded. Control patients were selected after careful matching with cases on the basis of age and sex during time period of the study. Their ECG findings were evaluated for presence or absence of interatrial block (mean P wave duration of 3 consecutive complexes in lead II). Chest X Ray and Echocardiography were done when indicated. Data were collected and recorded on data forms.

All the data was entered and analyzed SPSS-16. Descriptive statistics were used to describe the data. Chi square test was applied to compare the frequency of interatrial block in cases and controls and odds ratio was calculated, p value less than 0.05 ($p<0.05$) was considered significant.

RESULTS

Study population comprised 32 cases and 32 controls. Control group had a mean age of 62.5±4.1years, ($p=0.048$) and male to female ratio was 3:1. Both the groups were comparable with respect to age ($p>0.05$) and gender ($p>0.05$).

In cases, 14 (43.8%) patients were found to have interatrial block on Electrocardiogram (Table-1). This group had p value 0.035 and odds ratio 1.66. Out of these 14 patients, 06 patients having interatrial block (42%) were found to have evidence of atrial fibrillation on electrocardiogram but 12 patients had left atrial dilatation on Echocardiography. Among matched controls, only 06 (18.75%) patients were found to have Interatrial block on electrocardiogram ($p=0.045$), only 1 patient had dilated left atrium on echocardiography (Fig 1) IAB was more frequent in cases in comparison with control ($p < 0.05$) and Odds ratio was 3.37 (Table-1).

DISCUSSION

IAB is mainly considered to be an electrical abnormality of Bachman bundle and it causes delayed activation of LA. IAB is manifested on surface electrocardiogram as prolonged duration of P waves (≥ 110 ms), measured in leads II, aVF and V1. IAB was first discovered in 1925 but its real clinical significance came to

Table: Frequency of IAB in study population

IAB	Cases	Control
Present	14 (43.8%)	18 (56.2%)
Absent	6 (18.8%)	26 (81.2%)

$p<0.05$

horizon in 1965[8]. It is highly prevalent in general population (15-40%) as well as in hospitalized patients as demonstrated by Asad et al[3,6].

IAB is an important marker of LA enlargement (85% of patients with LA enlargement have concurrent IAB) leading to thrombosis and subsequent embolism. IAB is an excellent predictor of various arrhythmias especially supraventricular arrhythmias like AF and atrial flutter[9]. Besides the risk of stroke, patients with IAB have high risk of developing congestive heart failure due to ineffective atrial functioning. Enlarged, baggy, poorly contractile LA leads to diminished arial natriuretic peptide release and poor contribution to left ventricular preload and diastolic performance and thus as a result reduced left ventricular ejection fraction and impaired exercise performance[10]. Therefore it is of vital importance to be aware of, and timely detect IAB in order to prevent its serious consequences[11].

This study demonstrates how IAB remains mostly undiagnosed in general hospital population. There is a need to be more aware of IAB and significance of IAB must be highlighted because otherwise this scenario of under diagnosing IAB and poor understanding of its clinical importance will continue. This lack of awareness and understanding along with misconception of IAB as an incidental finding does not help in the efforts being carried out to prevent and perhaps revert this pathologic process. These short falls also don't help much in decreasing the incidence of serious consequences of IAB.

Various efforts are being made to prevent IAB and its sequel. Recently multiple trials are held involving atrial pacing to normalize prolonged P wave duration and thus possibly averting incidence of various tachyarrhythmia's and specially AF[16]. Also use of ACE inhibitors as an adjutant therapy to prevent IAB has been highlighted.

However, unless due importance is not given to better understanding, recognition and early detection of IAB, relying on prevention alone at this stage could be futile. Current diagnostic means often fail to detect AF, especially if it is paroxysmal, as a potential cause of thrombo-embolic events. Using ECG software's to include P wave durations in computer-generated ECG recordings could be very useful in generating awareness and aiding in clinical diagnosis of IAB. Despite the fact that clinical consequences of IAB could be grave, at present, lack of controlled trials means that no guidelines can be made for managing patients with IAB.

Do these patients require immediate therapy in form of ACE inhibitors, anticoagulants or anti arrhythmic drugs, and if so, should it be prophylactic, anticipating various atrial tachyarrhythmia's (i.e. anticoagulation)? Would there be a role for pacing in coming years, given the potential serious consequences already associated with IAB such as AF and heart failure[17]. It is a well accepted fact that electrophysiological studies can evaluate the propensity of the atria in initiating and perpetuating various atrial arrhythmias.

While such investigatory modes are important and needed, electrophysiological studies are costly, time taking, inconvenient and unsuitable as a screening tool among the general population. Clinically ECG is an important diagnostic tool for detecting abnormal inters atrial conduction[18]. Therefore, ECGs should be carefully scrutinized by clinicians for early detection of IAB. Better understanding of IAB and its serious consequences by clinicians is vital in providing better health care.

CONCLUSION

Following conclusions may be drawn from this study:

- Interatrial block in ischemic stroke patients is approximately 4 times more than general hospital population.
- Physicians should be conscious of text that interatrial block is quite frequent in general population and is a potential risk factor for ischemic stroke.

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