Prevalence of Interatrial Block in a General Population of Elderly People

Ilias Ninios, M.D.,* Christodoulos Pliakos, M.D.,* Vlasios Ninios, M.D.,†
Haralampos Karvounis, M.D.,* and George Louridas, M.D.*

From the *1st Department of Cardiology, AHEPA Hospital, Aristotle University, Thessaloniki, Greece; and †Heart Institute, St. Luke's Hospital, Thessaloniki, Greece

Background: Interatrial block (IAB: P wave ≥ 110 ms) is highly prevalent in people ≥ 65 years old living in a community.

Methods: We investigated 720 consecutive people age ≥ 65 years old, from the general population, with the intention of evaluating the prevalence of IAB in their electrocardiogram. After excluding 42 people with atrial fibrillation and atrial flutter (5%) or having a permanent pacemaker (0.83%), we evaluated the electrocardiograms of the remaining 678 people with sinus rhythm.

Results: We identified 400 (59%) persons with IAB with a similar distribution between men (58.5%) and women (59.4%). IAB was also identified in 347 from a total of 570 hypertensive people (60.9%) and only in 53 out of 108 (49.1%) nonhypertensive people ($P = 0.015$).

Conclusions: The surprisingly large prevalence of the IAB in the general older population emphasizes the importance of the early recognition of this abnormality from the surface 12-lead electrocardiogram.

A.N.E. 2007;12(4):298–300

interatrial block; prevalence

The P wave represents the atrial depolarization and its form and contour are influenced by the site of origin of atrial depolarization, the thickness of interatrial septum, the volume of the atria, and the spread of activation through both atria. The interatrial block (IAB) is characterized by the prolongation of P wave duration (>110 ms) in any electrocardiographic (ECG) lead.^{1,2} The IAB signifies the conduction delay of atrial depolarization from the right to the left atrium. The interatrial conduction disturbances may be due to left atrial enlargement, to ischemic, degenerative and infiltrative disorders, such as lipomatous hypertrophy of the interatrial septum, all findings associated with advancing age.³ Patients with advanced IAB are prone to develop atrial tachyarrhythmias and atrial flutter.⁴ However, the IAB as an entity is frequently overlooked many physicians and textbooks even in cardiology fail to notice or mention IAB, despite its association with significant atrial tachyarrhythmias.⁵ The present article determines the prevalence of IAB in an elderly general population outside the hospital.

METHODS

In order to evaluate the prevalence of the IAB in a general out of hospital population of elderly people and to investigate the correlation of the IAB with gender and hypertension we screened 720 people age ≥ 65 years, living in the town of Pidna in Northern Greece. The people were subjected to clinical examination and an ECG was performed. We prospectively examined the resident population aged ≥ 65 years old. The remaining 10% of the population age ≥ 65 years refused to participate in the investigation. A 12-lead ECG was recorded using 25 mm/sec and 10mm/mV standardization. The onset of the P wave was recorded at the junction of the TP baseline with the beginning of the P deflection, while the end of the P wave was measured at the junction between the end of the P deflection and the PR segment. Forty-two people were excluded due to atrial fibrillation and atrial flutter (5%) or permanent pacemaker (0.83%). The remainder (678 people) were in sinus rhythm and consisted of 306 men and 372 women. The

ECGs were analyzed and the P wave duration was measured in all ECG leads. Interatrial block was considered to be present when the P wave duration was >110 ms (≥ 120 ms to ensure specificity) in any of the ECG leads. Blood pressure was measured in the left arm and hypertension was considered when the recording was $\geq 140/90$ mm Hg or/and when the patient was taking antihypertensive drugs. Their current medication was recorded in order to identify patients with antihypertensive treatment.

Statistics

Comparison between categorical variables was performed by χ^2 test or the Fisher's exact test, when appropriate. In order to assess the mean differences between the two groups a *t*-test (independent samples *t*-test) was performed. All tests were two sided and the level of significance was $\alpha = 0.05$. All the data were analyzed using the statistical software SPSS for social sciences.

RESULTS

Of the 678 people in sinus rhythm 400 (59%) were identified with IAB. Interatrial block was identified in 179 men (58.5% of the males) and in 221 women (59.4% of the females) (Table 1). The mean age $\pm$ SD was 72.4 ± 5.8 years for the people who demonstrated IAB and 72.3 ± 5.4 for the people without IAB.

The maximum P wave duration in any single ECG lead ranged from 40–160 ms (Table 2).

Interatrial block was identified in 347 from a total of 570 hypertensive people (60.9%) but only in 53 out of 108 (49.1%) nonhypertensive people (Table 3).

DISCUSSION

The IAB is considered as an important clinical predictor of atrial fibrillation. The importance of

Table 2. Maximal P Wave Duration in Any Single ECG Lead and Number of Cases in Sinus Rhythm

P Wave (ms)	Number of Cases	%
40	3	0.4
60	10	1.4
80	168	24.7
100	97	14.3
120	362	53.4
140	29	4.2
160	9	1.3

IAB has been recently reevaluated mainly because of the impact of atrial fibrillation on morbidity, mortality and socioeconomic status.⁶ Abnormalities of the P wave seen during sinus rhythm are associated with atrial fibrillation and other supraventricular arrhythmias.⁷ The maximum P wave duration is an independent predictor of chronic atrial fibrillation in patients in sinus rhythm and structural heart disease, while P wave duration seems to be the only independent variable significantly associated with the occurrence of paroxysmal atrial fibrillation.^{6,8} Despite the recent appreciation of IAB as a predictor of atrial fibrillation IAB is still underused in everyday clinical practice. It seems that the bedside ECG is the simplest and most appropriate method that could aid clinicians to appreciate and recognize IAB.

It has recently been reported a 41% and 47% prevalence of IAB in hospitalized patients.^{9,10} The same prevalence (38.8%, 48.6%, and 40%) of IAB has been shown recently in three more studies among outpatients.^{11–13} The prevalence was higher in the elderly population (≥ 65 years old) reaching 60% in the hospitalized patients with sinus rhythm.¹⁰ The present investigation showed a very high (59%) prevalence of IAB in a general non-hospitalized population, above the age of 65 years, who were in sinus rhythm. It seems, therefore, that

Table 1. Maximal P Wave Duration in Any Single ECG Lead and Sex

P wave (ms)	Sex		Total
	Male	Female	
P < 120	127 (41.5%)	151 (40.6%)	278 (41.1%)
P $\geq$ 120	179 (58.5%)	221 (59.4%)	400 (58.9%)
Total	306 (100%)	372 (100%)	678 (100%)

Table 3. Maximal P Wave Duration in Any Single ECG Lead and Hypertension (P = 0.015)

P Wave (ms)	Hypertension		Total
	Yes	No	
P < 120	223 (80.2%)	55 (19.8%)	278 (100%)
P $\geq$ 120	347 (86.8%)	53 (13.3%)	400 (100%)
Total	570	108	678

the majority of the people in sinus rhythm above the age of 65 years had IAB. The early recognition of IAB is important because of the association of IAB with atrial fibrillation and embolic stroke.¹⁴

An important new finding of this study was the association of IAB and hypertension. This correlation with hypertension was statistically significant in our study population. ($P = 0.015$) Probably this association could be explained by the presence of left ventricular hypertrophy, diastolic dysfunction and left atrial enlargement in patients with hypertension. Unfortunately we were not able to perform an echocardiogram on all of our patients to clarify this clinical finding.

Our study showed the large prevalence of IAB among the general population age ≥ 65 years with sinus rhythm and can be regarded as a confirmation of similar findings in hospital populations previously reported. It is the first prospective study about the prevalence of IAB in such a great number of elderly outpatients. The results of our study also suggest that there is a correlation between the ECG appearance of IAB and hypertension.

REFERENCES

1. New York Heart Association Criteria Committee: Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels, 8th edition. Boston, Little Brown, 1979.
2. Willems JL, Demedina EO, Bernard R, et al. World Health Organization International Society and Federation of Cardiology Task Force criteria for intraventricular conduction disturbances and preexcitation. *J AM Coll Cardiol* 1985;5:1261-1275.
3. Isner IM, Swan CS, Mikus JP, et al. Lipomatous hypertrophy of the interatrial septum: *In vivo* diagnostic. *Circulation* 1982;66(2):470-473.
4. Bayes De Luna A, Cladellas M, Oter R, et al. Interatrial conduction block and retrograde activation of the left atrium and paroxysmal supraventricular tachyarrhythmia. *Eur Heart J* 1998;9(10):1112-1118.
5. Ariyaratna V, Puri P, Spodick DH. Clinician underappreciation of interatrial block in a general hospital population. *Cardiology* 2005;104(4):193-195.
6. Darbar D, Jahangir A, Hammil SC, et al. P wave signal-averaged electrocardiography to identify risk for atrial fibrillation. *Pacing Clin Electrophysiol*. 2002;25(10):1447-53.
7. Jordaens L, Tavernier R, Gorgov N, et al. signal averaged P wave: Predictor of atrial fibrillation. *J Cardiovasc Electro-physiol* 1998;9(8 Suppl):S30-S34.
8. Atunkeser BB, Ozdemir K, Gok H, et al. Can P wave parameters obtained from 12-lead surface electrocardiogram be a predictor for atrial fibrillation in patients who have structural heart disease? *Angiology* 2003;475-9.
9. Jairath UC, Spodick DH. Exceptional prevalence of interatrial block in a general hospital population. *Clin Cardiol* 2001;24:548-550.
10. Asad N, Spodick DH. Prevalence of interatrial block in a general hospital population. *Clin Cardiol* 2003;91:609-610.
11. Frisella ME, Robinette MM, Spodick DH. Interatrial block: Pandemic prevalence concealed by anachronistic electrocardiographic standards. *Clin Cardiol* 2005;28(8):381-383.
12. Ariyaratna V, Puri P, Kranis M, et al. Prevalence of interatrial block in the Program of All-Inclusive Care for the Elderly (PACE). *Am J Geriatr Cardiol* 2006;15(3):174-177.
13. Frisella ME, Spodick DH. Confirmation of the prevalence and importance of a 12-lead investigation for diagnosis of interatrial block. *Am J Cardiol* 2005;96(5):696-697.
14. Lorbar M, Lerrault R, Phadke J, et al. Interatrial block as a predictor of embolic stroke. *Am J Cardiol* 2005;95:667-668.