

Exceptional Prevalence of Interatrial Block in a General Hospital Population

UMESH C. JAIRATH, M.D., AND DAVID H. SPODICK, M.D., D.SC., FACC

Division of Cardiovascular Disease, Saint Vincent Hospital at Worcester Medical Center, and the Cardiology Division, University of Massachusetts Medical School, Worcester, Massachusetts, USA

Summary

Background: Interatrial block (IAB: P wave ≥ 110 ms) is a strong correlate of left atrial (LA) enlargement and an important predictor of supraventricular tachyarrhythmias, notably atrial fibrillation and flutter. It is surprising that, despite its association with arrhythmias and its effects on the electromechanical properties of the left atrium, there is widespread neglect of this common abnormality.

Hypothesis: The study was undertaken to investigate the prevalence of IAB in a general hospital population.

Methods: We prospectively evaluated the electrocardiograms of 1,000 consecutive adult patients, analyzed for P-wave duration.

Results: Our results showed a very high prevalence of IAB (41.1% of patients in sinus rhythm and 32.8% of all patients). As expected, it was more common in patients aged > 60 years.

Conclusions: Given this unusually high prevalence of IAB in hospital patients and its ominous portents (LA enlargement, thrombosis and embolism, arrhythmias), physicians should be aware of its frequency and computer software should be programmed to recognize it.

Key words: electrocardiography, interatrial block, P wave

Introduction

Interatrial block (IAB) exists when atrial depolarization is delayed in conduction from the right to the left atrium¹ mainly

via the Bachmann bundle.² It is manifest on the surface electrocardiogram (ECG) as prolonged P-wave duration (≥ 110 ms)^{3,4} in any ECG lead (Fig. 1). Interatrial block is an important predictor of supraventricular tachyarrhythmias,⁵ notably atrial fibrillation and flutter.^{6–8} It is also a strong correlate of left atrial (LA) enlargement leading to thrombosis and embolism.^{9,10} Recently, electromechanical delay due to IAB has been shown to delay significantly the active filling of the left ventricle.¹¹ It is surprising that, despite its association with various arrhythmias and its effects on the electromechanical properties of the left atrium, ECG computer software does not and physicians frequently do not recognize IAB. Our hitherto unconfirmed impression from daily ECG conferences had been that IAB was very frequent in our patients. We therefore investigated its prevalence in this general hospital.

Methods

We prospectively evaluated P-wave duration in the ECGs of 1,000 consecutively recorded adult patients. Interatrial block was considered present with P-wave duration > 110 ms (i.e., ≥ 120 ms, our cutoff to ensure specificity). A magnifying lens was used by two mutually blinded observers, with any differences resolved by consensus. To place IAB in context, the 1,000 consecutive tracings were not limited to sinus rhythm, although tracings with sinus rhythm (essential to IAB interpretation) were segregated. Mean age of men and women with IAB was compared with that of the patients without IAB.

Results

Table I summarizes the results. Out of 1,000 patients, a total of 328 (32.8%) ECGs showed IAB. When we excluded patients with arrhythmias and abnormal atrial pacemakers, IAB was present in 41.1% of those in sinus rhythm. Interatrial block was more common in male patients (58.5% of the series) whose mean age was 68.2 years (range 34–92 years); that of the female patients was slightly higher: 71.7 years (range 24–94 years). The mean age of men without IAB was 62.6 years and that of women without IAB was 69.5 years; moreover, only 14.9% of the patients with IAB were < 60 years old.

Address for reprints:

David H. Spodick, M.D., D.Sc., FACC
Saint Vincent Hospital @ Worcester Medical Center
20 Worcester Center Blvd.
Worcester, MA 01608, USA

Received: October 23, 2000

Accepted: December 5, 2000

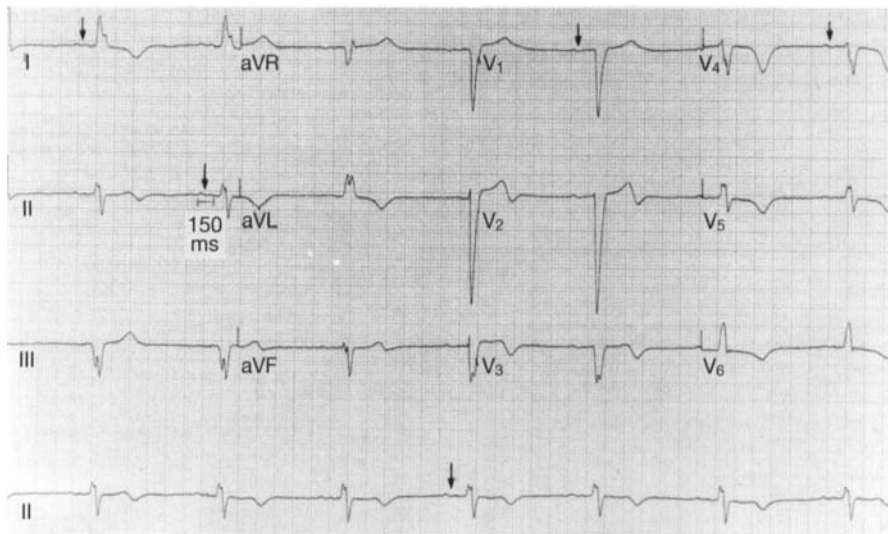


FIG. 1 Interatrial block (IAB: arrows). P waves are wide, the widest (lead II) being 150 ms. As is common in IAB, they are notched, representing the spread between the right atrial (first peak) and left atrial (second peak) components. In addition to those indicated (arrows), there is IAB in leads aVF, V₅, and V₆.

TABLE I Interatrial block in consecutive hospital patients (n = 1,000)

	Present	Absent
All patients (%)	328 (32.8)	672 (67.2)
Men	192	
Ages	68.2 ± 11.34	62.6
Women	136	
Ages	71.8 ± 11.29	69.5
Patients with sinus rhythm (%)	328 (41.1)	469 (58.9)

In an analysis of interobserver (DHS & UCJ) variability on an aliquot of 60 ECGs, a concordance of 97.2% was found with respect to presence or absence of IAB and a concordance of 92% with regard to the ECG lead(s) showing maximal P-wave duration. Differences (presence or absence of IAB) were resolved by mutual agreement. Observer performance with respect to maximum P-wave duration by lead is shown in Table II.

Discussion

Atrial fibrillation is the most common significant arrhythmia in clinical practice.¹² Incidence rises in the elderly population, which is getting larger as the number of survivors of myocardial infarction and other diseases rises.¹³

Although supraventricular arrhythmias, especially atrial fibrillation and atrial flutter, are so common in hospitalized populations, little attention has been paid to IAB, an ECG correlate that predicts these arrhythmias.⁶⁻⁸ Electrophysiologically, patients with IAB have a higher incidence of abnormalities in atrial excitability,¹⁴ which might explain their increased

TABLE II Maximum P-wave duration by electrocardiogram lead. (observer performance)

Lead	Reader 1 (UCJ)	Reader 2 (DHS)
I (%)	6 (10)	7 (11)
II (%)	37 (61)	35 (58)
III (%)	4 (6)	2 (3)
aVR	0	0
aVL	0	0
aVF (%)	3 (5)	3 (5)
V ₁ (%)	3 (5)	2 (3)
V ₂ (%)	2 (3)	2 (3)
V ₃ (%)	6 (10)	5 (8)
V ₄ (%)	9 (15)	11 (18)
V ₅ (%)	18 (30)	19 (31)
V ₆ (%)	10 (16)	12 (20)

propensity to develop arrhythmias. We, therefore, prospectively analyzed consecutive, unselected ECGs to judge IAB prevalence among patients requiring an ECG in a population representative of large general hospitals. The results demonstrated an extraordinarily high prevalence, confirming and quantifying our initial impression from routine ECG analysis.

Conclusion

Although in this study the ECGs were evaluated in a prospective fashion, a follow-up study was omitted because the clinical importance of IAB (arrhythmic propensity and coronary artery enlargement) is well established. Our objective

was to report its surprising frequency, particularly in older (> 60 years) hospitalized patients. The major clinical implication is clear: patients with IAB must be followed for atrial enlargement, potential thrombosis, and the onset of atrial fibrillation or flutter.

References

1. Bayes de Luna A: *Clinical Electrocardiography: A Textbook*, Chapter 5, p. 172. New York: Futura Company, Inc., 1998
2. Wagner ML, Lazzara R, Weiss A, Hoffman BF: Specialized conducting fibers in the interatrial band. *Circ Res* 1966;18:502-518
3. New York Heart Association Criteria Committee: *Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels*, 8th ed. Boston: Little Brown, 1979
4. Willems JL, Demedina EO, Bernard R, Coumel P, Fisch C, Krikler D, Mazur NA, Meijler FL, Morgensen L, Moret P: 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
5. Bayes de Luna A, Cladellas M, Oter R, Torner P, Guindo J, Marti V, Rivera I, Iturralde P: Interatrial conduction block and retrograde activation of the left atrium and paroxysmal supraventricular tachyarrhythmia. *Eur Heart J* 1988;9(10):1112-1118
6. Bayes de Luna A, Cladellas M, Cafferis F, Oter R, Pons J, Fernandez M, Perez J, Riba J, Sadurni J: Interatrial blocks: Their relationship with atrial tachyarrhythmias. In *Cardiac Arrhythmias*, p. 217-229 (Ed. Levy S). New York: Futura Company, Inc., 1984
7. Leier CV, Meacham JA, Shaal SF: Prolonged atrial conduction: A major predisposing factor for the development of atrial flutter. *Circulation* 1978;57:213-216
8. Davies MJ, Pomerance A: Pathology of atrial fibrillation in man. *Br Heart J* 1972;34:520-525
9. Josephson ME, Kastor JA, Morganroth J: Electrocardiographic left atrial enlargement: Electrophysiologic, echocardiographic and hemodynamic correlates. *Am J Cardiol* 1977;39:967-971
10. Velury V, Spodick DH: Axial correlates of P-VI in left atrial enlargement and relation to interatrial block. *Am J Cardiol* 1994;73:998-999
11. Ramsaran EK, Spodick DH: Electromechanical delay in the left atrium as a consequence of interatrial block. *Am J Cardiol* 1996;50:1132-1134
12. Singh B: Maintenance of sinus rhythm in patients with heart failure and atrial fibrillation. *Cardiology* 2000;6:11-19
13. Foot DS, Lewis RP, Pearson TA, Beller GA: Demographics and cardiology 1950-2000. *J Am Coll Cardiol* 2000;35:1067-1081
14. Simpson RJ, Foster JR, Gettes LS: Atrial excitability and conduction in patients with interatrial conduction defects. *Am J Cardiol* 1982;49:1331-1337