



Prevalence and incidence of interatrial block in global population and in different clinical situations

Manuel Martínez-Sellés

Hospital General Universitario Gregorio Marañón, Universidad Europea y Universidad Complutense, CIBERCV, Madrid, Spain.

E-mail: mmselles@secardiologia.es

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1 Introduction

The high prevalence of interatrial block (IAB) is widely neglected due to its frequent underdiagnosis. Its prevalence depends mainly on age and also on the presence of associated heart disease. In patients without structural heart disease, it is mainly an elderly condition. This is particularly true for advanced IAB, rarely found in global population before 65 years but with prevalence of 8% in the 70's and 25% in centenarians.^[1] When studying prevalence data of this condition, three factors should be taken into account in order to interpret differences that are frequently related with the methodology used (Table 1, Figure 1).^[2,3]

2 Why is the prevalence of interatrial block increasing

IAB is already pandemic mainly due to two reasons. The first one is population ageing.^[4] Worldwide, the fraction of individuals > 60 years increased from 9% in 1990 to 12% in 2013 and is projected to reach 21% (> 2 billion) by 2050.^[4] Ageing increases not only the rate of elderly population but also the prevalence of cardiovascular disease, as ageing affects extensively the heart and specifically modifies the specialized cardiac conducting system.^[5] The second reason is that the recent advances in the management of cardiac conditions—including ischemic heart disease, valvular heart disease, and heart failure—is increasing the survival of these patients, most of whom already have IAB or will acquire it during the course of their disease.^[6]

3 Association with age: total prevalence and prevalence in those that remain in sinus rhythm

It is well known that the prevalence of atrial fibrillation

Table 1. Factors to be taken into account when studying prevalence data of interatrial block.

- Studies published before the 2012 consensus frequently use the cut-off of 110 ms instead of the correct one (120 ms).^[2]
- Several studies use only one ECG lead (II) or the lead with the longest P wave instead of selecting the first initiation of P wave and the last finish in any lead (Figure 1).^[3]
- The measurement methods of P wave length vary between studies (automatic, semiautomatic, manual).

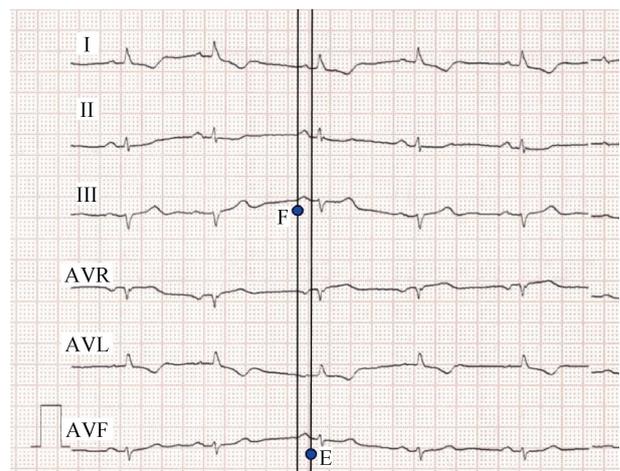


Figure 1. The method to measure the P wave duration is to quantify the difference between the first (F) start of the P wave and the end (E) in the last one.^[3] In this case, lead III is the lead that shows first the start of P wave and VF is the last one that records the end of P wave.

increases with age,^[7,8] and this is also the case with IAB,^[7–13] in both cases in probable association with the degree of atrial fibrosis.^[14] P-wave duration is correlated to age, even during infancy.^[15] This is why IAB is practically inexistent in healthy children,^[15] and rare in young adults,^[16] except in the case of cryptogenic stroke and patent foramen ovale.^[17]

Cotter, *et al.*,^[17] found a prevalence of only 16% in a control group with a mean age of 37 years. However, in the group of patients with mean age 41 years that presented cryptogenic stroke and patent foramen ovale, the prevalence increased to 46%. IAB prevalence in global population is mainly an issue in the elderly.^[13] Also in the elderly, IAB increases with age. In septuagenarians the prevalence is almost 40%,^[1,18] and is over the rate of 50% in octogenarians.^[13] The fact that IAB is an elderly condition is even clearer in the case of advanced IAB. In the Atherosclerosis Risk in Communities (ARIC) study performed in a global population with mean age of 54 years,^[19] only 0.5% had advanced IAB at baseline, but the effect of the age was clear as 1.3% developed advanced IAB during the mean 6-year follow-up. These authors found an incidence for advanced IAB of 2.3 per 1000 person-years. However, the rate of atrial fibrillation shows a similar increase with age, this is why if we focus in all the elderly population, the increase in IAB can be confounded by the increase in atrial fibrillation. In fact, if we study only subjects who persist in sinus rhythm, the association of age with IAB is clearly stronger. When we consider the extreme age of centenarians, about one quarter of them have atrial flutter/fibrillation, and a similar number have normal P wave, partial IAB, and advanced IAB.^[1] Finally, as happens with atrial fibrillation and IAB, atrial premature beats and runs of atrial arrhythmias are also associated with age, and its incidence is higher in subjects with IAB than in those with normal P wave, and in those with advanced vs. partial IAB.^[1]

4 Association with heart disease

The prevalence of advanced IAB is reported to be around 1% in patients with structural heart disease, including valvular heart disease.^[19] In the Cardiac and Clinical Characterisation of Centenarians registry, centenarians with IAB had a rate of significant mitral regurgitation that fell between the ranges observed in individuals with a normal P wave and those with atrial fibrillation/flutter (Figure 2), suggesting that this heart valve disease could play a potential role in triggering IAB, and later, atrial fibrillation.^[1]

Previous studies have reported a much higher prevalence of advanced IAB in subjects with heart failure and also in those with ischemic heart disease. Sadiq, *et al.*,^[20] found advanced IAB in 38% heart failure patients undergoing cardiac resynchronization therapy, and we found this condition in 17% of patients admitted with heart failure that had sinus rhythm.^[21] Interestingly, in our patients, the rate of partial IAB was extremely high (64%), as only 18% presented a normal P-wave (Figure 3). In a population of patients undergoing coronary bypass graft surgery with a

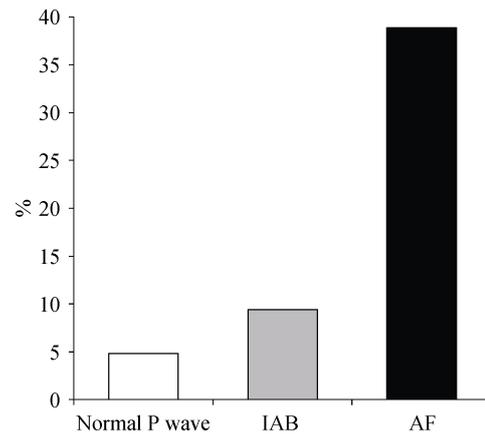


Figure 2. Rate of significant mitral regurgitation in the cardiac and clinical characterization of centenarians (4C) registry. This figure has been performed with data from Martínez-Sellés, *et al.*^[1] AF: atrial fibrillation; IAB: interatrial block.

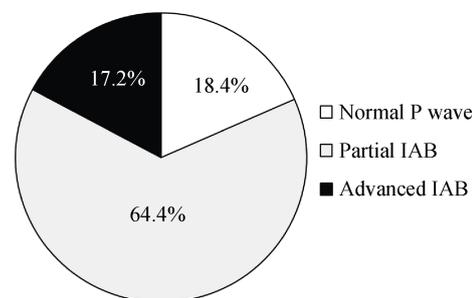


Figure 3. Prevalence of IAB in patients admitted with heart failure that are in sinus rhythm. This figure has been performed with data from Avarez García, *et al.*^[21] IAB: interatrial block.

mean age of 65 years, Conde, *et al.*,^[22] found an IAB prevalence of 36% (partial 22%, advanced 14%).

IAB is also frequently found in unselected populations of hospitalized patients and of outpatients, with rates of 35%–45%.^[23–26] IAB prevalence is even higher in patients with other diseases as hypertension,^[13] Friedreich's ataxia,^[27] obstructive sleep apnea,^[28] and stroke.^[29]

In a group of patients with typical atrial flutter treated with cavotricuspid isthmus ablation (mean age 67 years), the prevalence of advanced IAB was 18%,^[30] and a similar rate was found in patients with recent onset atrial fibrillation without structural heart disease (mean age 58 years) that underwent successful pharmacological cardioversion.^[31] In patients with sinus node dysfunction who were implanted dual chamber pacemaker, the prevalence of IAB is also high (32%).^[32]

In conclusion, the prevalence of atrial fibrillation increases with age and is higher in the presence of heart disease and this is also true for IAB, a pre-atrial fibrillation condition associated with premature atrial beats. This data suggest that screening for IAB and atrial fibrillation should be performed in the elderly.

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