Journal of Heart Health
ISSN 2379-769X | Open Access

CASE REPORT

Volume 9 - Issue 1

Considerations for Cardiac Pacemaker Implant in Selected Patients with Marked First Degree AV Block

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Received: 08 Aug, 2024 | **Accepted:** 11 Sep, 2024 | **Published:** 17 Sep, 2024

Citation: Patel V, Pekas N, Frommeyer T, Mukerji B, Aung T, et al. (2024) Considerations for Cardiac Pacemaker Implant in Selected Patients with Marked First Degree AV Block. J Heart Health 9(1): dx.doi.org/10.16966/2379-769X.168

Abstract

Marked first degree AV block can cause atrial contraction to occur close to the preceding ventricular systole, resulting in incomplete atrial filling and thus compromised ventricular filling and reduction in cardiac output. This can lead to patients experiencing dizziness, unsteadiness, fatigue, exercise intolerance or other symptoms typically associated with pacemaker syndrome. Small, uncontrolled trials have shown that pacing can improve symptoms and function in patients with PR intervals exceeding 0.30 by reducing AV conduction times. We present a case of a patient with marked first degree AV block in whom permanent pacemaker implant could be considered in the absence of overt symptoms.

Keywords: Pacemaker; First-degree AV block

Introduction

While first-degree AV block (AVB) is generally considered to be of no prognostic significance, a markedly prolonged AV conduction can result in hemodynamic impairment. In such instances, atrial systole may excessively precede ventricular systole resulting in compromise of ventricular end-diastolic volume and thus cardiac output. These hemodynamic consequences can be accentuated in the context of lowered ventricular compliance, such as normal aging or structural heart disease. The presence of symptoms such as fatigue and exertional intolerance in these patients has been termed pseudo-pacemaker syndrome. Some small uncontrolled trials suggest that pacing can alleviate these symptoms in patients with PR interval exceeding 0.30 seconds. Permanent pacemaker implantation may be considered in some of these patients.

Clinical Case

This is a male patient employed as a research engineer with advanced qualifications engaged in a sedentary job. This patient was seen on two separate occasions. On the first occasion the patient was 32 years old and presented for a pre-employment physical. He denied any symptoms at that time. His electrocardiogram (ECG) showed marked first-degree AV block with a PR interval of 414 msec (Figure 1). On the second occasion, the patient was 64 years old. He did not report any symptoms. However, upon questioning, he indicated that he experienced dyspnea with mild activity and was easily tired. Further questioning revealed that he had been dealing with these symptoms for his entire life, leading him to avoid athletic activity or other forms of exertion. As a research engineer he had no problem functioning at work. Notably, his ECG showed the same markedly prolonged PR interval, and was otherwise unchanged.

Discussion

The ACC/AHA/HRS guidelines for cardiac pacing in first degree AV block are as follows.

Class IIa: Permanent pacemaker implantation is reasonable for first degree AV block with symptoms similar to those of pacemaker syndrome or with hemodynamic compromise.

(Level of Evidence: B)

Class IIb: Permanent pacemaker implantation may be considered for neuromuscular diseases such as myotonic muscular dystrophy, Erb dystrophy (limb-girdle muscular dystrophy), and peroneal muscular atrophy, with or without symptoms, because there may be unpredictable progression of AV conduction disease. (Level of Evidence: B) [1].

The ESC guidelines on cardiac pacing and resynchronization therapy reinforce the idea that there must a clear correlation between marked first-degree AV block and the clinical syndrome similar to pacemaker syndrome prior to pacemaker implantation. The ESC guidelines also note that when the age of onset of AVB is advanced, symptoms such as fatigue, exertional intolerance and heart failure tend to be underestimated [2].

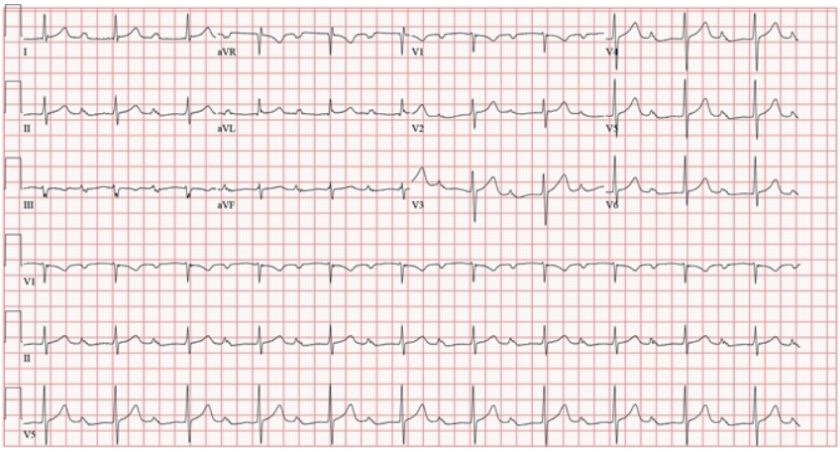

Figure 1: Electrocardiogram (ECG) showed the same markedly prolonged PR interval.

Our observation in this case suggests that marked first-degree AV block can impact an individual's quality of life by limiting the ability to participate in physical activities. However, if someone has lived with this conduction defect since childhood, the individual may not recognize these symptoms as being restrictive. To identify the limitation, a careful and thorough interview with precise questioning is necessary. Echocardiographic or invasive methods can be used to evaluate for hemodynamic improvement with pacing before considering pacemaker implantation. While current guidelines do not explicitly recommend permanent pacemaker implantation for these cases, the option may be presented to the patient.

Conclusion

This case underscores the potential impact of marked first-degree AV block on an individual's quality of life, even in the absence of overt symptoms. Patients may not perceive or report restrictive symptoms with regard to physical activity since they have modified their lifestyle. Precise questioning is necessary to identify any physical limitation that the patient may be experiencing. Comprehensive testing is necessary to identify any hemodynamic compromise. The possible benefit of cardiac pacing can then be presented to the patient and should guide decision-making regarding pacemaker implantation.

References

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