The Role of Oral Amiodarone in Treating Pre-Excited Atrial Fibrillation in Low-Resource Rural Areas: A Case Report

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Amiodarone, Atrial Fibrillation, Digoxin, WPW syndrome

ABSTRACT
Background: Wolff-Parkinson-White (WPW) syndrome is a pre-excitation syndrome defined by the presence of an accessory pathway responsible for ventricular pre-excitation that can lead to severe arrhythmias. Coexistence with Atrial Fibrillation (AF) exposes potential degenerescence into ventricular arrhythmias when atrial impulses are transmitted along the accessory pathway. The choice of drug in this special presentation must be noteworthy to avoid potentially dangerous treatments, such as digoxin. In rural areas, where treatment options may be limited, oral amiodarone offers a viable alternative for rate control due to its availability.
Case Illustration: We report a case of a 54-year-old female with newly diagnosed pre-excited AF who routinely consumed digoxin and presented with palpitations, general weakness, and near syncope. The symptoms worsened from three years ago when the patient was initially diagnosed solely with AF and began her medication regimen at a different hospital as part of her routine care. After switching therapy by using oral amiodarone based on the clinical, electrocardiography, and echocardiography findings, better symptoms and clinical outcomes were observed.
Conclusion: This case highlights the potential role of oral amiodarone as an alternative treatment for pre-excited AF in rural areas. Underdiagnosed pre-excited AF can lead to sudden cardiac death, especially when treatment errors occur. A comprehensive diagnosis and appropriate therapy are crucial for improving clinical outcomes for patients in such settings.

INTRODUCTION

Wolff-Parkinson-White (WPW) syndrome is a pre-excitation syndrome defined by the presence of an accessory pathway (AP) that allows abnormal electrical conduction between the atria and ventricles. WPW syndrome is frequently linked to supraventricular tachyarrhythmias such as atrioventricular reentrant tachycardia (AVRT) and Atrial Fibrillation (AF).[1] During AF, several impulses reach the atrioventricular (AV) node, which normally blocks some of them through its decremental activity and thus controls the heart rate. In patients with with WPW and AF, what we called Pre-excited AF, this protection is lost due to the AP, rapid conduction to the ventricle may result potentially escalating to the life-threatening complication of ventricular fibrillation. [1,2]

Hemodynamically stable patients with AF and WPW syndrome may be treated with class IA, IC, or III antiarrhythmic drugs to slow ventricular responses. Beta blockers are ineffective in controlling the ventricular rate in pre-excited AF, whereas non-dihydropyridine calcium channel blockers and digoxin may shorten the effective refractory period and increase the ventricular rate. AV nodal blockers should be avoided in these cases, including intravenous amiodarone. [3,4]

However, we report a case of pre-excited AF in a patient with a history of digoxin treatment, which led to the clinical worsening of her symptoms, and describe how we managed the condition in a rural setting.

CASE PRESENTATION

We report the case of a 54-year-old female admitted to the emergency department with the primary complaint of palpitations, general weakness, and nearly syncope that worsened 3 days ago. Although she had a history of frequent palpitations from three years ago, the patient experienced a near syncope for the first time. The patient did not report any shortness of breath, abdominal pain, and other remarkable symptoms. Her medical history was AF and routinely consumed digoxin, clopidogrel, and spironolactone. The other history was unremarkable for hypertension, stroke, diabetes, or coronary heart disease. The family history of any cardiac diseases and sudden death without unknown cause were denied.

Physical Examination on presentation revealed that the patient was conscious and oriented. Her blood pressure and heart rate showed 115/81 mmHg and 126 beats per minute with positive pulsus deficit respectively. Her Breathing rate was 20 breaths per minutes, temperature was 36.7, and her Visual Analogue Scale (VAS) 0 out of 10. The remarkable head-to-toe examinations were only minimal ronchi at bilateral lungs. Meanwhile, the laboratory results were within normal limits.

12-lead electrocardiography (ECG) on admission revealed an irregularly-irregular supraventricular rhythm, incomplete right bundle branch block, and a delta wave, consistent with Pre-excited AF with Rapid Ventricular Response (Fig.1). We conducted a transthoracic echocardiography that showed Ejection Fraction of 35.2%, Regional Wall Motion Abnormalities, and dilatation of Left Atrium, Right Ventricle, and Right Atrium (Fig.2).

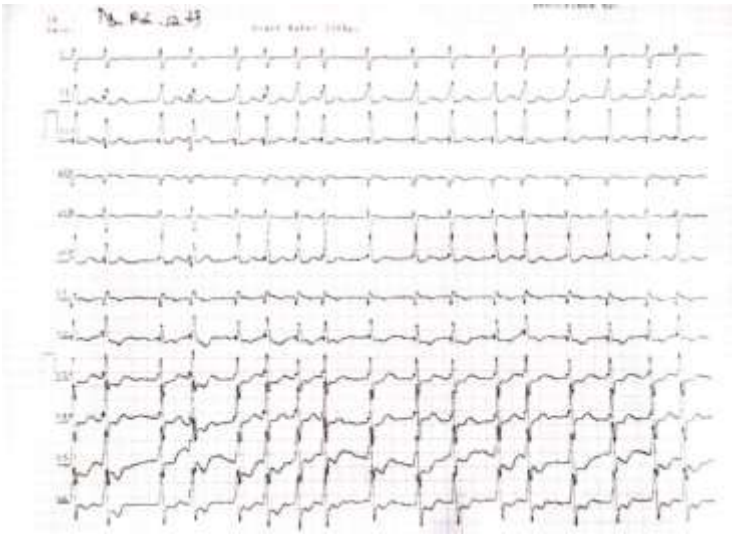

Fig. 1 The 12 leads electrocardiogram on admission showed a supraventricular rhythm, irregularly-irregular, RBBB, and delta waves in leads V3-V6 leads to Pre-excited AF with Rapid Ventricular Response

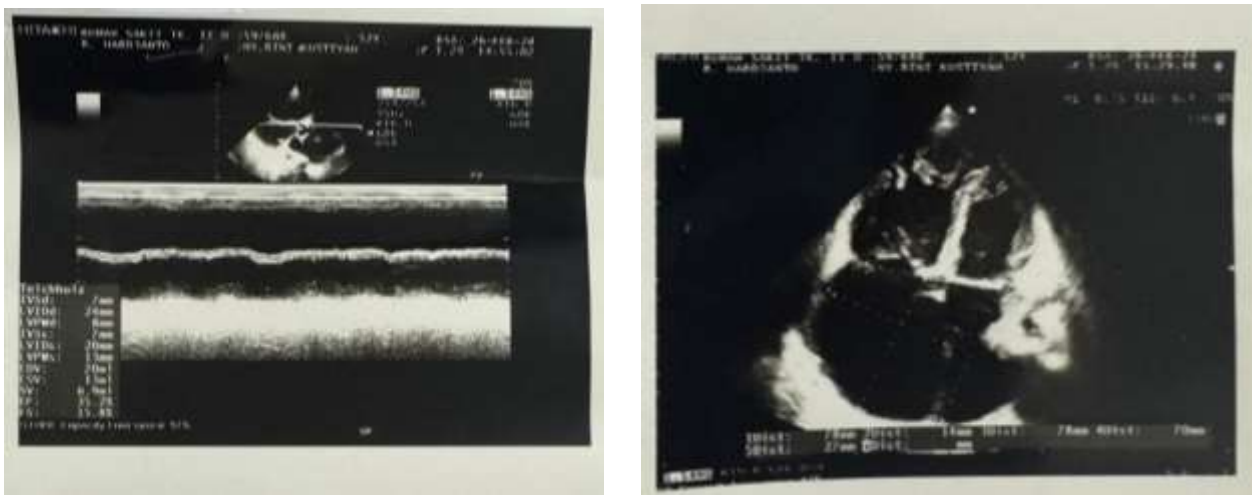

Fig. 2 Transthoracic echocardiography showed Ejection Fraction of 35.2%, and dilatation of Left Atrium, Right Ventricle, and Right Atrium

We were considering the initial treatment for the patient, as the drug of choice for rate control in pre-excited atrial fibrillation (AF) was unavailable in rural areas. However, literature suggests that oral amiodarone prolongs the refractory period in most cardiac tissues due to its "use-dependent" properties. This makes it more effective in managing increased heart rate, leading to an rate control effect, compared to AV nodal blockers. In contrast, intravenous amiodarone has little to no effect on refractory period prolongation, except in AV nodal fibers, which makes it contraindicated according to clinical practice guidelines. [4,5] Based on this evidence, we chose oral amiodarone and proceeded with follow-up care for the patient.

The patient's complaints of palpitations and general weakness gradually improved day by day, and near-syncopal episodes were denied. A follow-up 12-lead ECG still revealed pre-excited AF, but the heart rate was reduced, resulting in a normal ventricular response (Fig. 3). After 5 days of treatment, the patient was discharged from the hospital and scheduled for follow-up at the outpatient clinic, with a recommendation for an ablation procedure.

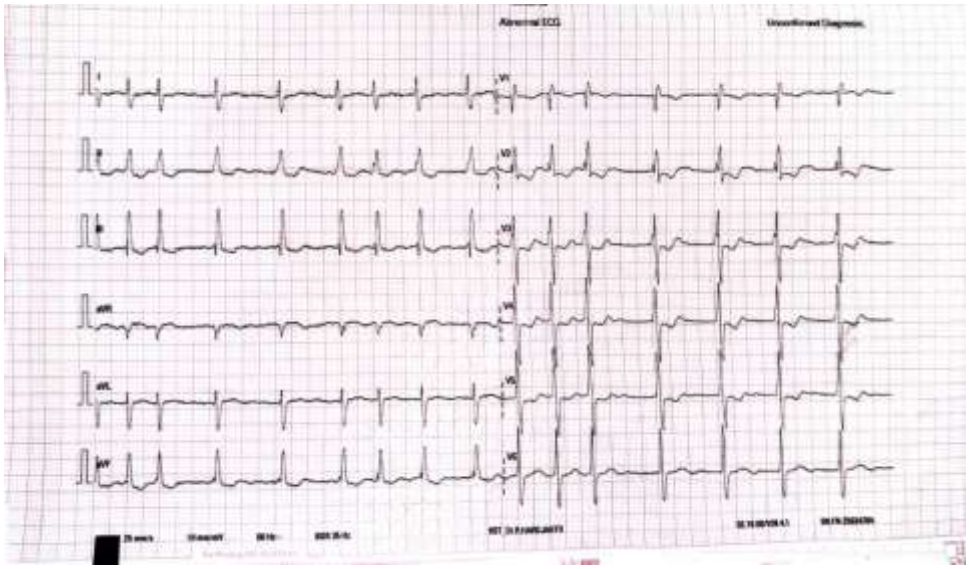

Fig. 3 The Follow Up 12-leads ECG showed Pre- Excited AF with Normal Ventricular Response

CONCLUSION

This case highlights the potential role of oral amiodarone as an alternative treatment for pre-excited AF in rural areas. Underdiagnosed pre-excited AF can lead to sudden cardiac death, especially when treatment errors occur. A comprehensive diagnosis and appropriate therapy are crucial for improving clinical outcomes for patients in such settings.

AVAILABILITY OF DATA AND MATERIAL

All Data described in this manuscript will be freely available to any scientists or researchers.

ABBREVIATIONS

AF : Atrial Fibrillation
AP : Accessory Pathway
AV Node : Atrioventricular Node
AVRT : Atrioventricular Reentrant Tachycardia
ECG : Electrocardiogram
VAS : Visual Analogue Scale
WPW : Wolff-Parkinson-White

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Contributions

Rivaldo Brahmantio Hardani is responsible for manuscript writing, editing, and submitting. Callista Rizvidella, Aleyda Zahratunany, and Martin Perdhana Muchlis are also responsible for manuscript writing and editing.

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ETHICS DECLARATIONS

Ethical approval and consent to participate

All procedures performed in this study follow the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from participants included in this study.

Consent for publication

Written consent was obtained from the patient to publish this case report.

Competing interest

All authors have no competing interest