

Frederick's syndrome: A forgotten eponym

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Abstract

Frederick's syndrome is a rare eponym that is characterized by a combination of atrial fibrillation or flutter with complete atrioventricular block on electrocardiogram. We describe here a 69-year-old woman with persistent asymptomatic Frederick's syndrome that was successfully treated with the implantation of a cardiac pacemaker. Various aspects of this entity are discussed.

Keywords

Frederick's syndrome; atrial fibrillation; complete heart block

Introduction

Frederick's (Fredericq in French) syndrome was first described in 1904 by a Belgian physiologist Leon Frederick [1]. Frederick demonstrated that in animals with atrial fibrillation, cutting the bundle of His results in regular ventricular contractions but the atria continue to fibrillate [1,2]. Frederick's syndrome is characterized by a combination of atrial fibrillation or flutter with complete atrioventricular block on electrocardiogram [1-4]. This syndrome has been reported to present in 0.6-1.5% of patients with atrial flutter or fibrillation [3]. Surprisingly, we identified only a handful of reports of Frederick's syndrome in the English literature [3,4]. This may be explained by under recognition of this eponym by physicians. We present a 69-year-old woman with asymptomatic Frederick's syndrome. In this report, we impart our knowledge about this rare entity.

Case Presentation

A 69-year-old woman presented to a family physician for a routine follow-up examination without complaints. On physical examination, her pulse was 34/min and regular, and blood pressure 132/64 mm Hg. Electrocardiogram showed atrial flutter or fibrillation and complete atrioventricular block with ventricular

response 34 beats per minute (Figure 1A). These findings are consistent with Frederick's syndrome [2-4]. The patient was sent to the Emergency Department and was admitted to the hospital. She continued to be asymptomatic. Her history showed permanent nonvalvular atrial fibrillation, heart failure with preserved left ventricular ejection fraction, hypertension, diabetes mellitus, chronic renal failure and hyperlipidemia. Her regular medications included: warfarin, bisoprolol, losartan, lercanidipine, furosemide, repaglinide, linagliptin, atorvastatin and pregabalin. On admission, body temperature was 36.7°C, pulse rate 34 beats per minute, blood pressure was 138/71 mm Hg, respiratory rate 16 breaths per minute and oxygen saturation 98% in room air. Cardiovascular examination revealed regular rhythm with a rate of 34 per minute and normal heart sounds. Physical examination of lungs and abdomen was unremarkable. The arms and legs were warm and with no edema. Laboratory findings included normocytic anemia with a hemoglobin concentration of 11.0 g/dl, serum creatinine 2.3 mg/dl and an international normalized ratio of 2.0. Values of leukocytes, platelets, glucose, potassium, sodium, calcium, troponin and thyroid-stimulating hormone were normal. Chest radiography was unrevealing. An echocardiographic examination demonstrated moderate dilatation of atria, mild dilatation of both ventricles with reduced left ventricular ejection fraction (40%), moderate mitral and tricuspid regurgitation, and severe pulmonary hypertension. Discontinuation of treatment with bisoprolol did not improve the bradycardia. Thus, on the fifth day after admission to the hospital, a permanent cardiac pacemaker was implanted (Model 5076-58 cm, Medtronic Inc.) with pacing mode VVIR. Figure 1B presents an electrocardiogram of the patient with successful ventricular pacing at a rate of 60 per minute. Nine days after admission to the hospital, the patient was discharged in a stable hemodynamic condition.

Discussion

We describe a patient with Frederick's syndrome, as demonstrated by permanent atrial flutter or fibrillation and severe bradycardia caused by complete atrioventricular block [2-4]. On electrocardiogram, this disorder is characterized by the disappearance of P waves, the presence of atrial flutter or fibrillation waves and slow regular nodal or idioventricular rhythm with a constant interval RR [3]. Causes of Frederick's syndrome include: ischemic heart disease, myocarditis and cardiomyopathies, as well as medications with negative chronotropic and dromotropic effects such as beta-receptor blockers, anti-arrhythmic agents, verapamil and digoxin [3]. Frederick's syndrome may be asymptomatic as in the described patient. More commonly, patients present with complaints including weakness, dizziness, shortness of breath and syncope [3]. Frederick's syndrome may result in falls, decompensating heart failure and sudden death. The management of Frederick's syndrome is related to the hemodynamic state of the patient. If the patient is stable hemodynamically, the first step is withdrawal of any offending drug and treatment of underlying illness. Persistence of bradycardia and hemodynamic instability in patients with Frederick's syndrome are indications for implantation of a permanent cardiac pacemaker [3]. The optimal mode of the pacing is VVIR, such that the right ventricle is paced, sensed and inhibited for spontaneous activity.

In conclusion, we described a patient with asymptomatic Frederick's syndrome, a disorder that has received insufficient attention in the medical literature. We suspect that the majority of physicians have not heard of this eponym. We hope that the presented report may help to delineate, substantiate and broaden

knowledge regarding this entity.

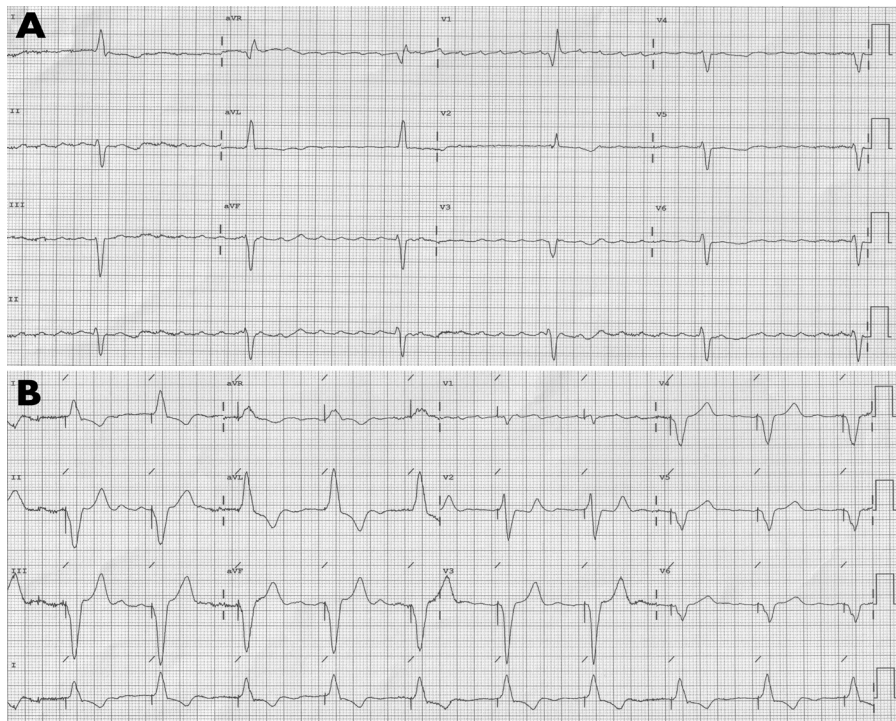


Figure 1: (A) A 12-lead and strip electrocardiogram demonstrating concomitant atrial flutter or fibrillation and complete atrioventricular block with ventricular response of 34 beats per minute (Frederick's syndrome). (B) A 12-lead and strip electrocardiogram demonstrating atrial flutter or fibrillation with successful ventricular pacing at the rate of 60 per minute.

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Manuscript Information: Received: September 01, 2019; Accepted: November 19, 2019; Published: November 29, 2019

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Citation: Tzur I, Izhakian S, Gorelik O. Frederick's syndrome: A forgotten eponym. *Open J Clin Med Case Rep.* 2019; 1603.

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