

Physical Performance after Dual Chamber Pacemaker Implantation: A Case Report

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Abstract: Rhythm disturbances are serious problems in medical centers around the world. In this article, we report an interestingly case of implantation of a dual chamber pacemaker in a young patient, which previously presented a history of several episodes of syncope diagnosed as Sick Sinus Syndrome (SSS). Two years after surgery, this patient showed an excellent physical performance as analyzed by treadmill exercise test. Although this was only one case, it illustrated the efficiency of this type of pacemaker in young patients with SSS.

Key words: Aerobic capacity, sick sinus syndrome, pacemaker, physical exercise

INTRODUCTION

Dual chamber pacemakers (DDDR) are thought to be more physiological than single ventricular pacemakers, once DDDR maintain the atrioventricular synchrony (Gregoratos *et al.*, 2002; Montanez *et al.*, 2003). However, the advantages of these pacemakers in comparison with single ventricular pacemakers are limited (Connolly *et al.*, 1996; Ovsyshcher *et al.*, 1998). In this current case report, we describe a well succeeded dual chamber pacemaker implantation which permitted a young patient to achieve excellent cardiovascular parameters when submitted to treadmill exercise test.

Case report: A 22 years old male weighing 74 kg was admitted to hospital with history of seven episodes of syncope during a nine-month period. There was no family history of heart disease or sudden death. Clinical and laboratorial parameters including red and white blood cells count, serum glucose, creatinine, urea, nitrogen and Electrolytes, Electrocardiogram (ECG), Electroencephalogram (EEG), color echo Doppler cardiogram presented normal range values. Tilt test displayed asymptomatic sinus arrhythmias and small periods of sinus pause. Dynamic electrocardiogram (Holter) also showed asymptomatic sinus pauses up to 3.5 sec (Fig. 1). Based on these findings, it was diagnosed

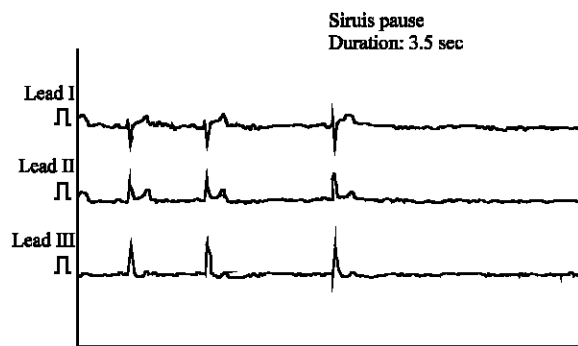
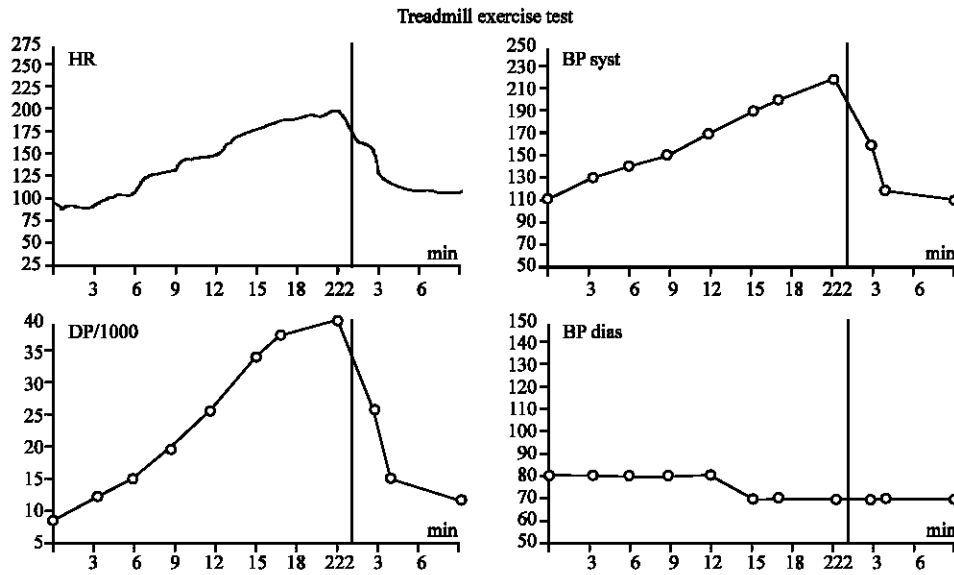


Fig. 1: Representative dynamic electrocardiogram showing sinus pause in leads I, II and III.

as Sick Sinus Syndrome (SSS) and the patient underwent a dual chamber pacemaker implantation for cardiac rhythm correction. Afterwards, no signs of arrhythmias were observed. Two years later, the patient was further examined and no evident rhythm disturbances were observed. Interestingly, treadmill exercise test using Bruce protocol with workload showed an excellent cardiovascular profile, i.e., a marked increase in heart rate (70 bpm at resting vs. 198 bpm at the stage 7) systolic pressure (120 mmHg at resting vs. 220 mmHg at the stage 7) double product (systolic pressure \times heart rate) (12,220 at resting vs. 43,560 at the stage 7) and a



Time (min)	Stage	HR (bpm)	BP (mmHg)	DP	METs
03:17	01	094	130/080	12220	5.1
05:54	02	106	140/080	14840	7.3
08:44	03	131	150/080	19650	9.6
11:43	04	149	170/080	25330	12.1
15:00	05	177	190/070	33630	14.8
16:43	06	186	200/070	37200	16.2
21:01	07	198	220/070	43560	19.8

Fig. 2: Cardiovascular and metabolic parameters two years after surgery for a dual chamber pacemaker implantation in a 22 years old patient. BPdias, diastolic blood pressure; BPsyst, systolic blood pressure; DP, double product; HR, heart rate; METs, metabolic rates

decrease in diastolic pressure (80 mmHg at resting stage vs. 70 mmHg at the stage 7) (Fig. 2). In addition, metabolic rates achieved at the end of the test were significantly augmented (5.1 Mets at resting vs. 19.8 Mets at the stage 7, Fig. 2). In keeping with these data, outstanding maximum oxygen consumption (VO_2) of 69.3 mL/Kg/min was observed reaching excellent functional values (Pina *et al.*, 2003).

DISCUSSION

The current report showed that dual chamber pacemaker allows patients to keep life quality. Specifically, after the pacemaker implantation procedure, the mentioned patient obtained an excellent cardiovascular profile which allowed him to perform high intensity physical activity.

Recent studies have shown the superiority of dual chamber pacemakers compared to ventricular pacemakers in reducing the rates of atrial fibrillation and hospitalization due to heart failure and somewhat the

rates of stroke in SSS (Lamas *et al.*, 2002). In addition, DDDR increases quality-adjusted life expectancy at a cost that is generally considered acceptable (Rinfert *et al.*, 2005). In these studies were included patients with the mean age of 74 years old.

Although we have reported only one case, our results showed that dual chamber pacemaker was extremely efficient in young patient with SSS. Thus, DDDR could be an appropriate pacemaker for young people who want to perform in somewhat moderate to intense physical activity. However, further analyses, including larger number of patients, should be done in the future to establish the efficacy and safety of DDDR pacemaker in a long term run in young patients with SSS and also to assure the intensity of physical activity that could be performed safely by these patients.

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