A Rare Problem During Implantation of Biventricular Pacemaker: Stenosis of the Coronary Sinus Branch

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ABSTRACT

Cardiac resynchronisation therapy can provide benefit in heart failure patients. However, lead insertion in the coronary sinus for left ventricular pacing is challenging due to anatomic variations of the coronary sinus. Coronary vein stenosis is a rare but important issue. In this report, we present a case in whom a coronary vein stenosis was demonstrated by venography during biventricular pacemaker implantation. We could be able to advance the coronary sinus lead to the distal part of the vessel after dilatation of the stenosis by an angioplasty balloon catheter. An effective left ventricular pacing was, then, achieved. Balloon angioplasty of a stenotic coronary vein for left ventricular lead insertion seems to be effective and safe. However, this novel approach should be performed carefully when there is no other appropriate coronary sinus branch at all.

KEYWORDS
Biventricular pacemaker, coronary vein stenosis, balloon angioplasty

Biventriküler Kalp Pili İmplantasyonunda Nadir Bir Sorun: Koroner Sinüs Dalındaki Darlık

ÖZET


ANAHTAR KELİMELER
Biventriküler kalp pili, koroner ven stenozu, balon anjiyoplasti

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Introduction

Cardiac resynchronization therapy can provide a more favorable clinical outcome in patients with heart failure who are resistant to drug therapy by either reducing symptoms and mortality or improving exercise tolerance and quality of life. The biggest challenge of this novel approach is lead insertion in the coronary sinus for left ventricular pacing. Coronary vein stenosis is a rare but important reason for failure of left ventricular lead implantation. Here, we report a case in whom successful coronary sinus lead insertion could be possible only after balloon dilation of the stenotic branch of the coronary sinus during biventricular pacemaker implantation.

Case Report

The 69-year-old patient was admitted to our clinic with the complaints of palpitation, shortness of breath and fatigue. His medical history was remarkable with an anterior myocardial infarction and a coronary artery by-pass grafting surgery 7 years ago. He did well except for the last two years when he started to suffer congestive heart failure. His symptoms did not resolve despite appropriate medical therapy with angiotensin converting enzyme inhibitors, beta blocking agents, spironolactone and furosemide. He had been hospitalized twice for heart failure exacerbations during the last six months. His ECG showed a LBBB morphology with a QRS duration of 160 ms and PR interval of 200 ms. On echocardiographic evaluation, a left ventricular ejection fraction of 25%, third degree mitral regurgitation and ventricular dyssynchrony criteria were detected. There was significant intraventricular dyssynchrony with a delay between septal and lateral mitral annular systolic motion of 100 ms.

FIGURE 1

ECG recordings of the patient before and after biventricular pacemaker implantation.
Interventricular delay was found to be 75 ms using the difference between time intervals from the beginning of Q wave to aortico-pulmonary out-flows. We accepted a delay between aortic and pulmonary outflows >40 ms as significant for interventricular dyssynchrony (3). We decided to implant a biventricular pacemaker (Medtronic 8042 INSYNC III). Angiography of the coronary sinus revealed a critical stenosis of the proximal segment of left posterior branch. The stenosis was dilated by an angioplasty balloon catheter sized 3.5x20 mm. The balloon was inflated to 12 atm pressure. After dilation, a residual stenosis causing 50% obstruction of the vessel diameter was demonstrated on repeat venography.

However, the pacemaker lead (Medtronic, 4193-78) was easily advanced to the distal part of the posterolateral branch of the coronary sinus (Figure 2). An effective left ventricular pacing was achieved with acceptable pacing and sensing thresholds. After pacemaker programming, echocardiographic evaluation revealed no interventricular and intraventricular dissynchrony.

**Discussion**

Anatomic variations of the coronary sinus and its tributaries make left ventricular lead insertion challenging. Among these, coronary vein stenoses are rare (1.83%). However, it represents an important problem during coro-

**FIGURE 2**

*Successful coronary sinus lead insertion after venous balloon dilation of the stenotic posterolateral tributary.*

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For this reason, we did not implant a stent for the residual stenosis. We think stenting of the residual stenosis after suboptimal balloon dilation is not necessary in patients who have successful lead insertion despite residual stenosis. Similarly, Sandler et al. have reported successful implantation of the left ventricular lead in a patient who had balloon suboptimal angioplasty without consequent stent implantation (8).

Coronary vein stenosis may be either congenital or acquired. Coronary bypass grafting surgery, scarring after myocardial infarction, previous implantation of a coronary sinus lead5, and radiofrequency catheter ablation (9) may cause coronary vein stenosis. Our patient had a history of coronary bypass surgery. As a result, we report successful left ventricular lead insertion after balloon dilatation in a patient with coronary vein stenosis. Balloon angioplasty of a stenotic coronary vein for left ventricular lead insertion is effective and safe. However, this novel approach should be performed carefully in patients without any other appropriate coronary sinus branch for lead implantation.

REFERENCES