 DOI: 10.5578/khj.25291

Cardiac Resynchronisation Therapy After Percutaneous Valve Repair in Functional Mitral Regurgitation Management

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ABSTRACT

Functional mitral regurgitation (FMR) and left ventricular dyssynchrony may coexist in most heart failure patients with reduced ejection fraction. In this case, percutaneous treatment of mitral regurgitation is a promising alternative for patients with FMR who are not appropriate for surgery and are not responding to optimal medical therapy and cardiac resynchronization therapy (CRT). Carillon™ is a percutaneous mitral annuloplasty system and its effect on the pre-implanted pacemaker lead in coronary sinus causes worries to arise. There are no sufficient data relating to the efficacy of implementing the Carillon system as a first-step treatment method in FMR patients who are suitable for percutaneous mitral annuloplasty and have CRT indications. This paper presents the administration of CRT to a case who previously underwent annuloplasty with Carillon system.

Keywords: Mitral regurgitation, Percutaneous mitral annuloplasty, Cardiac resynchronisation therapy.

Fonksiyonel Mitral Yetersizliği Tedavisinde Perkütan Kapak Tamiri Sonrası Kardiyak Resenkronizasyon Tedavisi

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ÖZET

Foksiyonel mitral regürjitasyon (FMR) ve sol ventriküler dissenkroni birçok düşük ejeksiyon fraksiyonlu kalp yetersizliği hastasında birlikte bulunabilir. Bu durumda, mitral yetersizliğinin perkütan tedavisi optimal medikal ve kardiyak resenkronizasyon (CRT) tedavisine cevap vermeyen ve cerrahiye uygun olmayan hastalarda umut vaad eden bir alternatif oluşturmaktadır. Carillon bir perkütan mitral annüloplasti sistemidir ve koroner sinüsteki önceden implante edilmiş sol ventrikül elektrodları üzerine etkisi endişe oluşturmaktadır. Perkütan mitral annüloplastiye uygun ve CRT endikasyonu olan FMR'li hastalarda hastalarda Carillon sisteminin birinci basamak tedavi olarak uygulanmasının etkinliği ile ilgili yeterli veri bulunmamaktadır. Bu yazıda daha önce Carillon ile annüloplasti yapılan bir vakaya CRT tedavisi uygulanışı sunulmaktadır.

Anahtar Kelimeler: Mitral yetersizliği, Perkütan mitral annüloplasti, kardiyak senkronizasyon tedavisi.

Geliş Tarihi: 16.03.2016 - **Kabul Tarihi:** 08.04.2016

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 DOI: 10.5578/khj.25291

Introduction:

Functional mitral regurgitation (FMR) and left ventricular dyssynchrony (LVD) may coexist in most heart failure patients with reduced ejection fraction (EF). In this case, percutaneous treatment of mitral regurgitation (MR) is a promising alternative for patients with FMR who are not appropriate for surgery and are not responding to optimal medical therapy and cardiac resynchronization therapy (CRT). Carillon™ is a percutaneous mitral annuloplasty system and its effect on the pre-implanted pacemaker lead in coronary sinus (CS) causes worries to arise. There are no sufficient data relating to the efficacy of implementing the Carillon system as a first-step treatment method in FMR patients who are suitable for percutaneous mitral annuloplasty and have CRT indications. This paper presents the administration of CRT treatment to a case who previously underwent annuloplasty with Carillon system.

Case Report:

A 72-year-old female with hypertension, chronic obstructive pulmonary disease, ischemic heart failure and severe FMR was referred to our clinic. The electrocardiogram revealed left bundle branch block. Left ventricular dilatation, systolic dysfunction (EF = 35%), and severe FMR were confirmed by echocardiography. LVD was highly visible in electrocardiography. Coronary angiography revealed no significant stenosis. Because of high surgical risk (STS score = 10.5 %) and considering the annular dilatation to be the possible mechanism of mitral regurgitation, percutaneous annuloplasty was decided to be performed firstly in the patient. The patient underwent percutaneous mitral annuloplasty with the Carillon™ system which resulted in a slight decrease in the degree of MR and no change in EF on echocardiography. Six months after Carillon™ device implantation, patient was still symptomatic (NYHA class II-III). We decided implantation of an implantable cardioverter-defibrillator device with CRT function. Coronary sinus(CS) catheterization was accomplished easily due to the visibility of

proximal anchor of Carillon™ device (Figure 1). After the CS angiography, lateral branch was detected and left ventricular lead implanted in this branch. A second CS catheterization was performed due to instability and it was fixed with a coronary stent (Figure 2). After this procedure, the echocardiography revealed an increased left ventricle EF. Degree of MR was considered to be mild (Figure 3). During the 6-month follow-up period, the patient's functional capacity recessed to NYHA Class I-II.

Discussion:

The prognosis of patients with FMR is poor. Even the slightest degree of FMR can impact the survival of patients with LV dysfunction with or without coronary artery disease (1). Besides its positive effects on the ventricular geometry in the long run, CRT treatment corrects dyssynchrony in the sub-valvular structure as well (2). Current guidelines recommend operative intervention for FMR only after optimal medical therapy (including CRT if indicated) (3). Because of the presence of a coronary sinus lead remains an exclusion criterion for Carillon™ device implantation, patients will have to undergo mitral annuloplasty before CRT. Even though there are cases for which this strategy has synergistic benefits (4), there are no data comparable solely to CRT device implantation. Although there was a decreased MR after Carillon™ procedure in our case, the response to CRT treatment was much more remarkable both clinically and echocardiographically.

Conclusion: The efficacy of using percutaneous mitral contour device as the first step treatment approach is not known in the cases with CRT indication and apparent LVD. Further studies are needed to investigate this.

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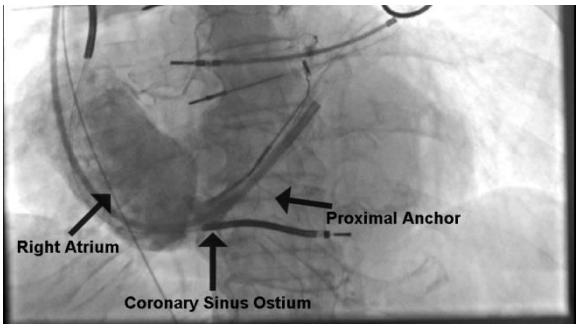

Figure 1. Coronary sinus angiography

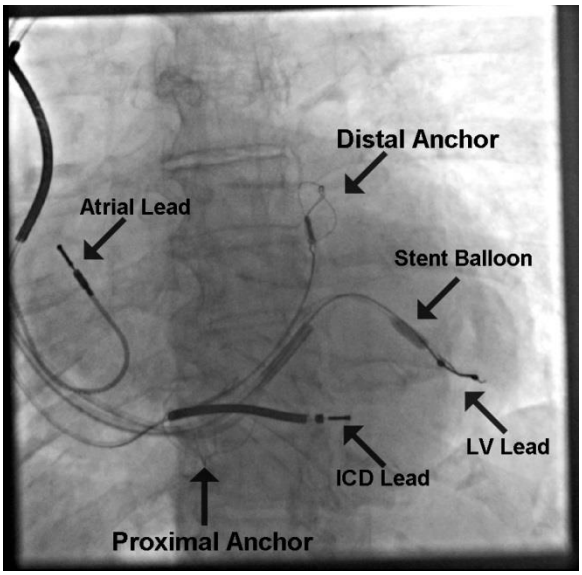

Figure 2. Coronary stent was introduced beside the lead into the side branch

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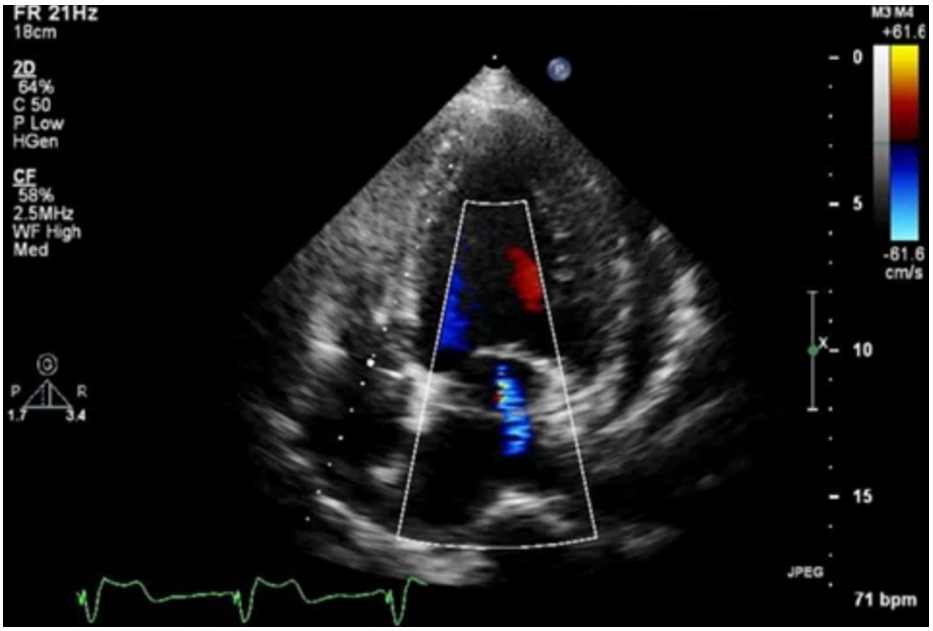

Figure 3. Follow-up monitoring using 4-chamber transthoracic echocardiography in which color Doppler ultrasound shows mild-to-moderate mitral regurgitation