



# Cardiac Resynchronization Therapy After Percutaneous Valve Repair in Functional Mitral Regurgitation Management

Tolga Çimen, Tolga Han Efe, Hamza Sunman, Lale Dinç Asarcıklı, Ekrem Yeter

Ankara Dışkapı Yıldırım Beyazıt Training and Research Hospital, Clinic of Cardiology, Ankara, Turkey

## ABSTRACT

We present a case of a 72-year-old female with symptomatic heart failure and ischaemic functional mitral regurgitation (FMR), who underwent a successful percutaneous trans-coronary venous mitral annuloplasty with the Carillon™ system. The procedure resulted in some clinical improvement but patient was still very symptomatic. Six months later, the patient underwent cardiac resynchronisation (CRT) device implantation, resulting in a further improvement in clinical and echocardiographic measures of FMR. This case suggests a possible synergistic effect between CRT and percutaneous trans-coronary-venous mitral annuloplasty.

**Key Words:** Mitral regurgitation; percutaneous mitral annuloplasty; cardiac resynchronization therapy

## Fonksiyonel Mitral Yetersizliği Tedavisinde Perkütan Kapak Tamiri Sonrası Kardiyak Resenkronizasyon Tedavisi

### ÖZET

Bu olgu sunumunda kalp yetersizliği semptomları ve iskemik fonksiyonel mitral yetersizliği (FMR) sebebiyle Carillon™ sistemiyle başarılı olarak koroner venöz mitral annüloplasti yapılan 72 yaşındaki kadın hasta anlatılmaktadır. İşlem sonrası bir miktar klinik iyileşme olan hastanın semptomları devam etmekteydi. Altı ay sonra hastaya kardiyak resenkronizasyon tedavisi (CRT) uygulandı ve hastanın klinik bulgularında ve ekokardiyografik olarak FMR'sinde olumlu ek iyileşme sağlandı. Bu olgu CRT ile perkütan trans-koroner-venöz mitral annüloplastinin olası sinerjistik etkisinden söz etmektedir.

**Anahtar Kelimeler:** Mitral yetersizliği; perkütan mitral annüloplasti; kardiyak senkronizasyon tedavisi

## INTRODUCTION

Functional mitral regurgitation (FMR) and left ventricular dyssynchrony (LVD) may coexist in most patients with heart failure with reduced ejection fraction (EF). In this case, percutaneous treatment of mitral regurgitation (MR) is a promising alternative for patients with FMR who are unsuitable for surgery and are unresponsive to optimal medical 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 security concerns. There are insufficient data regarding the implementation efficacy of the Carillon system as a first-step treatment method in patients with FMR, who are suitable for percutaneous mitral annuloplasty and have CRT indications. This paper presents the application of CRT to a patient that 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. An 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 a high surgical risk (Society of Thoracic Surgeons score= 10.5%) and annular dilatation as the possible mechanism of MR, percutaneous annuloplasty was performed in the patient. The patient underwent percutaneous mitral annuloplasty with the Carillon™ system, which resulted in a slight decrease in the degree

## Correspondence

Tolga Çimen

E-mail: drtolgacim@hotmail.com

Submitted: 16.03.2016

Accepted: 08.04.2016

© Copyright 2018 by Koşuyolu Heart Journal.  
Available on-line at  
www.kosuyoluheartjournal.com

of MR and no change in EF as observed on echocardiography. Six months after Carillon™ device implantation, patient was still symptomatic [New York Heart Association (NYHA) Class II-III]. We decided on the implantation of an implantable cardioverter-defibrillator device with CRT function. CS catheterization was easily accomplished owing to the visibility of proximal anchor of Carillon™ device (Figure 1). After the CS angiography, the lateral branch was detected, and the left ventricular lead was implanted in this branch. A second CS catheterization was performed because of 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.

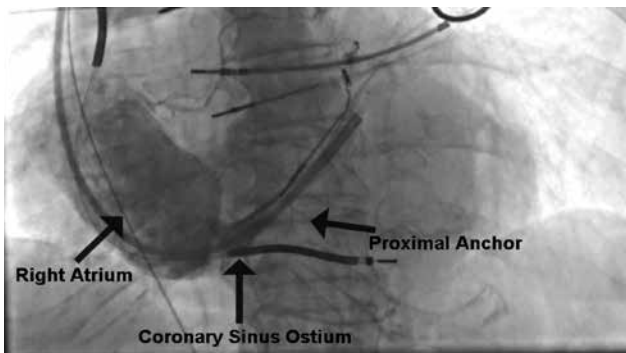


Figure 1. Coronary sinus angiography.

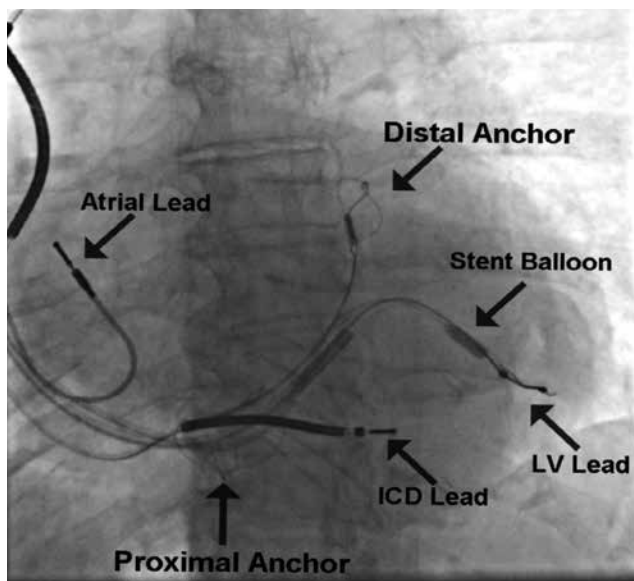


Figure 2. Coronary stent was introduced beside the lead into the side branch.

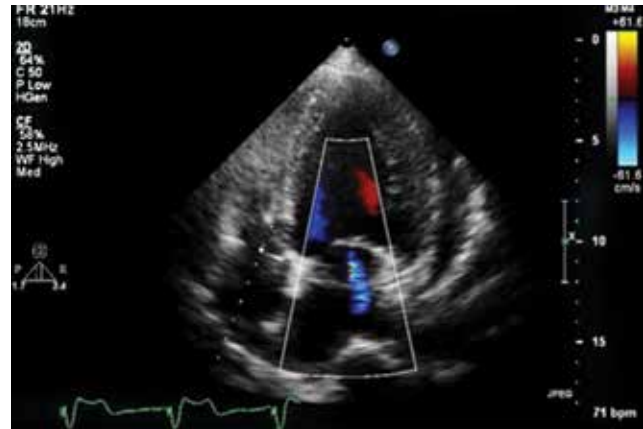


Figure 3. Follow-up monitoring using 4-chamber transthoracic echocardiography in which color Doppler ultrasound shows mild-to-moderate mitral regurgitation.

## 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<sup>(1)</sup>. Besides its positive effects on the ventricular geometry in the long run, CRT corrects dyssynchrony in the sub-valvular structure as well<sup>(2)</sup>. Current guidelines recommend an operative intervention for FMR only after optimal medical therapy (including CRT, if indicated)<sup>(3)</sup>. Because of the presence of a CS lead remains as an exclusion criterion for Carillon™ device implantation, patients have to undergo mitral annuloplasty before CRT. Even though there are cases in which this strategy has synergistic benefits, there are no data solely comparable to device implantation in CRT. Although there was a decreased MR after Carillon™ procedure in our case, the response to CRT was much more remarkable both clinically and echocardiographically<sup>(4)</sup>.

The efficacy of percutaneous mitral contour device as the first-step treatment approach is unknown in cases with CRT indication and apparent LVD. Future clinical trials are warranted.

## REFERENCES

1. Lamas GA, Mitchell GF, Flaker GC, Sidney CS, Bernard JG, Lofty B, et al. Clinical significance of mitral regurgitation after acute myocardial infarction. *Circulation* 1997;96:827-33.
2. Siminiak T, Jerzykowska O, Kalmucki P, Link R, Baszko A. Cardiac resynchronisation therapy after percutaneous trans-coronary-venous mitral annuloplasty. *Kardiol Pol* 2013;71:1293-4.
3. Nishimura RA, Otto CM, Bonow RO, Carabello BA, Erwin JP 3<sup>rd</sup>, Guyton RA, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease. *J Thorac Cardiovasc Surg* 2014;148:e1-e132.
4. Cleland J, Freemantle N, Ghio S, Fruhwald F, Shankar A, Marijanowski M, et al. Predicting the long-term effects of cardiac resynchronization therapy on mortality from baseline variables and the early response a report from the CARE-HF (Cardiac Resynchronization in Heart Failure) Trial. *J Am Coll Cardiol* 2008;52:438-45.