An unexpected complication of the MitraClip device: one of the arms gets stuck inside the guide catheter in the left atrium

MitraClip cihazının beklenmeyen komplikasyonu: Cihaz kanatlarından birinin sol atriyumda yönlendirici kateter içerisinde sıkışması

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Summary– Percutaneous edge-to-edge mitral valve repair using the MitraClip (Abbot Vascular, USA) system is a promising technique for mitral regurgitation treatment in select high-risk surgical patients. Although the safety and efficacy of the technique have been demonstrated, a few complications of the MitraClip device have been reported. In this report, we present a rare complication that recently occurred during the performance of a MitraClip procedure in a patient with severe functional mitral regurgitation. One MitraClip arm got stuck inside the guide catheter in the left atrium and a decision was made to discontinue percutaneous intervention because the problem could not be resolved.

Özet– Perkütan uç uca mitral kapak tamiri yöntemi olarak MitraClip (Abbot Vascular, USA) sistemi, yüksek riskli seçilmiş hastalarda mitral yetersizliği tedavisi için umut vaad etmektedir. Bu tekniğin etkinliği ve güvenilirliği gösterilmiş olmakla birlikte, az sayıda da olsa MitraClip cihaz komplikasyonu bildirilmiştir. Biz bu yazıda ileri derece fonksiyonel mitral yetersizliği nedeniyle MitraClip işlemi yapılırken ortaya çıkan nadir bir komplikasyonu sunuyoruz. MitraClip cihazının kanatlarından biri yönlendirici kateter içerisinde sıkıştı ve problemin sol atriyumda çözülememesi nedeniyle işleme son verme kararı aldık.

While traditional open-heart mitral valve repair or replacement represents the gold standard for severe mitral regurgitation (MR) of any etiology, percutaneous edge-to-edge mitral valve repair using the MitraClip System (Abbott Vascular, Abbott Park, IL) offers treatment options in high risk or very elderly patients. The last decade has seen interventional treatment of mitral valve regurgitation using the MitraClip procedure growing rapidly in Europe and America, following completion of a safety and feasibility registry (EVEREST I) with the MitraClip system, and a subsequent randomized controlled EVEREST II trial comparing the MitraClip system with surgery. Although the safety of the technique has been demonstrated, some complications have been reported during the procedure or postoperative period.

Abbreviations:

CDS	*Clip delivery system*
LA	*Left atrium*
LAA	*Left atrial appendage*
MR	*Mitral regurgitation*

In this report, we describe an unexpected complication that recently occurred during performance of a MitraClip procedure in a patient with severe functional MR.

CASE REPORT

A 80-year-old male patient was admitted to our hospital with a diagnosis of dilated cardiomyopathy with severe functional mitral regurgitation (MR). In the previous six months, he had been hospitalized twice for worsening heart failure, and once with acute pulmonary edema. Transoesophageal echocardiography revealed severe functional MR between A2-P2 scallops due to malcoaptation of the mitral valve leaflets because of left ventricular annulus dilatation, and tenting of the mitral valve leaflets and an ejection fraction around 25%. The patient was assessed by

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cardiothoracic surgery for a mitral valve operation. Taking into account his calculated logistic EuroScore of 43% and his STS score of 24%, the patient was deemed a high surgical risk. He was denied for operation and accepted for percutaneous mitral valve repair with the MitraClip device.

The procedure was performed using the standard approach. Using right femoral venous access, a transseptal puncture was performed to allow placement of the 24-Fr guide catheter in the left atrium. The clip delivery system (CDS) was introduced through the guide into the left atrium (LA). During progress of the CDS in the LA, the tip of the clip made contact with the lateral wall of the left atrial appendage (LAA), and needed to be pulled back to avoid any further touching of the LAA wall. After a controlled maneuver in the left atrium, one arm of the MitraClip device got stuck inside the guide catheter. Fluoroscopy showed that one arm of the device was inside the guide catheter, and the other outside (Fig. 1a, b). On 3-dimensional TEE, the end portion of the catheter was similar to a half arrow (Fig. 1c). We decided to retract the entire system. The guide catheter was carefully pulled back into inferior vena cava, close to the groin site. In

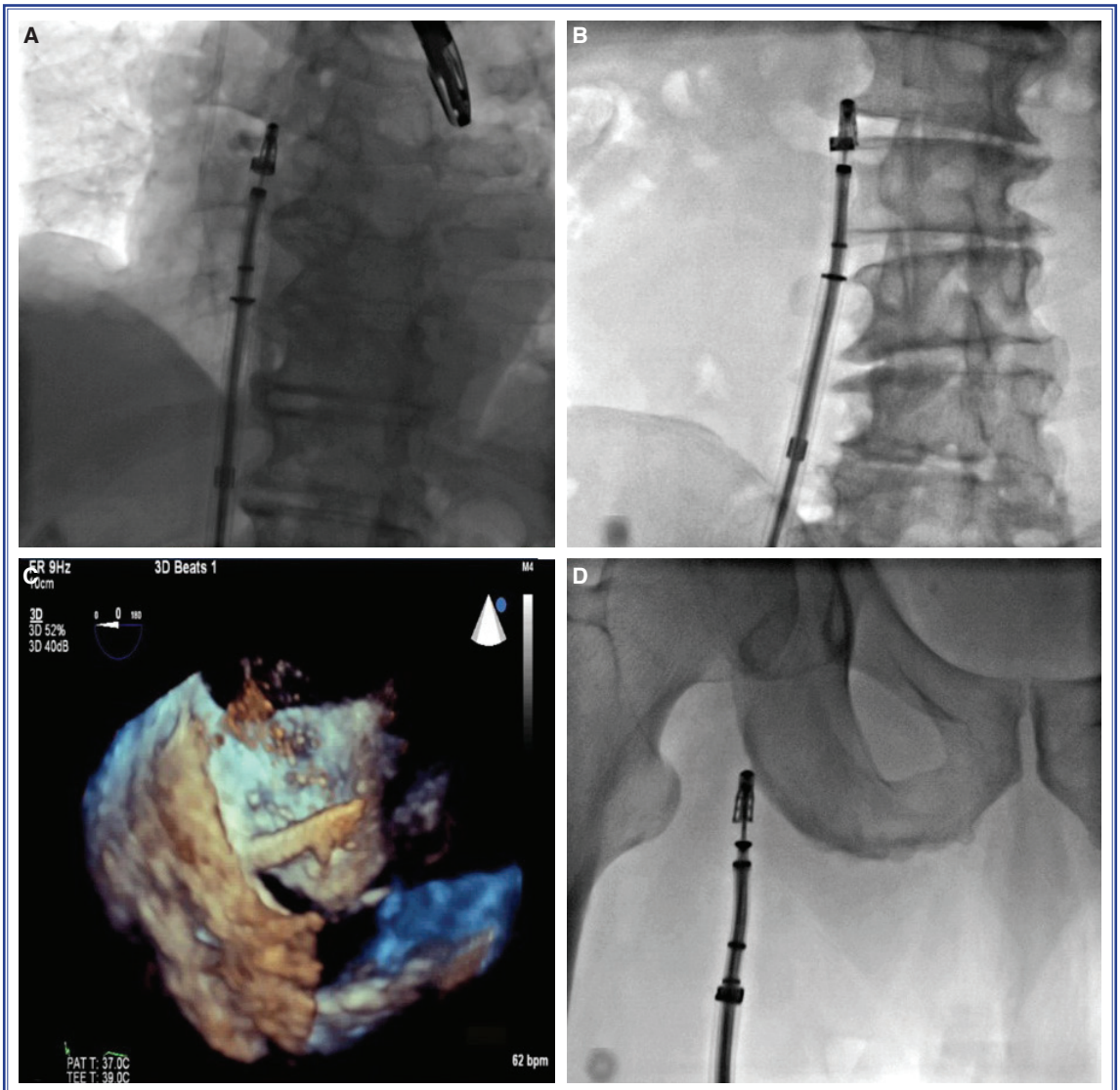

Figure 1. Fluoroscopic image showing one arm of the MitraClip device inside the guide catheter, and the other outside the guide catheter, in the left atrium **(A)**, and in the inferior vena cava **(B)**. Three-dimensional echocardiographic view of the MitraClip device appearing as a half arrow **(C)**. Fluoroscopic image showing the arms of the MitraClip device outside the guide catheter in the right inguinal region **(D)**.

the right iliac region, a forced opening and closing of the arms and grippers movements was repeated, and separation of the CDS from the catheter was achieved (Fig. 1d). During these maneuvers, the guide catheter came out of the groin site, and it was impossible to remove the CDS inside the guide catheter.

Therefore, the retracted MitraClip device was extracted by femoral vein dissection using the cut-down technique, and with the assistance of cardiovascular surgeons. We decided to discontinue the percutaneous intervention because of our lack of experience regarding procedure from left femoral venous access, and because the patient had already spent excessive time under general anesthesia.

DISCUSSION

Reconstructive mitral valve surgery represents the gold standard for treatment of severe MR of any given etiology according to current international guidelines.[1] However, as many as 49% of patients with MR and in need of repair or replacement are considered high-risk for surgical intervention, and are therefore not amenable to surgery.[2] The MitraClip system (Abbott Vascular, Abbott Park, IL) was developed to achieve percutaneous repair of MR. It has been suggested that successful MitraClip therapy effectively improves functional and clinical outcomes in inoperable or high-risk patients.[3] This case report presents a rare complication that recently occurred during the performance of a MitraClip procedure in a patient with severe functional MR. The arms of the device were trapped by the guide catheter after a maneuver in the LA. We think that during the attempt to remove the CDS through the guide catheter in order to improve left ventricular axial alignment after contact with the lateral wall of the LAA, a stretching in the device might have caused it to jump back. This problem was resolved with some manipulation in the right inguinal region because the device could not be retrieved. Although it got rid from guide catheter, we cannot retrieving without cutdown because MitraClip device into the subcutaneous tissue.

In the course of our procedure, a number of significant lessons were learned that might prove helpful to operators who may be faced with this complication in the future: (1) there is a need for great care while maneuvering the device in the LA, (2) forced opening and closing of the MitraClip device may resolve this complication and allow the procedure to continue.

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REFERENCES

1. Vahanian A, Alfieri O, Andreotti F, Antunes MJ, Barón-Esquivias G, Baumgartner H, et al. Guidelines on the management of valvular heart disease (version 2012): the Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). Eur J Cardiothorac Surg 2012;42:1-44. CrossRef
2. Wan B, Rahnavardi M, Tian DH, Phan K, Munkholm-Larsen S, Bannon PG, et al. A meta-analysis of MitraClip system versus surgery for treatment of severe mitral regurgitation. Ann Cardiothorac Surg 2013;2:683-92.
3. Paranskaya L, D'Ancona G, Bozdag-Turan I, Akin I, Kische S, Turan GR, et al. Percutaneous vs surgical repair of mitral valve regurgitation: single institution early and midterm outcomes. Can J Cardiol 2013;29:452-9. CrossRef

Key words: Mitral valve regurgitation; MitraClip device.

Anahtar sözcükler: Mitral kapak yetersizliği; MitraClip cihazı.