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Kalıntı mitral paravalvüler kaçağı nedeniyle ikinci kez yapılan perkütan kapatma işlemi ve oluşan cihaz embolisinin başarılı tedavisi

A second percutaneous closure due to residual mitral paravalvular leak and successful treatment of device embolization

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Özet– Paravalvüler kaçak (PVK) cerrahi kapak replasmanı sonrası yaygın görülen bir komplikasyondur. Çoğu PVK küçük olup klinik olarak sessiz kalmakta, ancak semptomlu PVK nedeniyle hastaların çok az bir kısmı yeniden ameliyata gitmektedir. Paravalvüler kaçak tedavisi için cerrahi yolla tamir veya kapak replasmanı standart tedavi yöntemi olmasına rağmen tekrarlama oranının ve morbidite ve mortalitesinin yüksekliği nedeniyle perkütan yoldan kaçağın kapatılması son zamanlarda alternatif bir tedavi yaklaşımı haline gelmiştir. Kırk iki yaşında erkek hastaya kalıntı mitral PVK nedeniyle ikinci kez perkütan kapatma işlemi uygulandı. İşlem sırasında inen aortaya embolize olan kapatma cihazı kıskaç yardımıyla başarılı bir şekilde dışarı alındı. Ardından başka bir kapatma cihazı ile PVK başarılı bir şeklide kapatıldı.

Summary– Paravalvular leak (PVL) is a common complication after surgical valve replacement. Most PVLs remain clinically silent; however, some may require reoperation due to symptomatic PVL. Surgical closure of PVL remains the most common therapy for these defects; however, redo surgery has some disadvantages, including a high recurrence rate as well as high morbidity and mortality rates. Percutaneous closure of PVLs has emerged as an alternative to surgical closure. A 42-year-old male patient underwent a second percutaneous closure due to residual mitral paravalvular leak. During the procedure, the closure device embolized in the descending aorta. The device was captured with a snare and successfully retrieved, and then PVL was successfully occluded with another device.

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Abbreviations:

TEE Transesophageal echocardiogram
PVL Paravalvular leak

Paravalvular leak (PVL) is a prevalently seen as a complication of surgical valve replacement. Clinically it manifests with symptoms of heart failure, and anemia. Most cases with PVL are minor, and clinically asymptomatic. However very few patients with symptomatic PVL have undergone reoperations. . Because of its lower morbidity, and mortality, percutaneous closure of the leak has recently become an alternative treatment approach..

Herein we present a patient who underwent successful closure procedure following successful treatment of a complication developed during the second percutaneous closure procedure because of residual mitral PVL.

CASE PRESENTATION

A 42 –year-old male patient presented with progressive exertional dyspnea (NYHA class III) had laboratory values (Hb, 8.9 g/dl, reticulocyte 4.8%) suggesting hemolytic anemia. He had undergone mitral valve replacement with mechanical bi-leaflet prosthesis with the indication of rheumatismal mitral valve disease in 2005. Also his paravalvular mitral valve insufficiency was treated 3 months ago by percutaneous closure procedure performed in another center. Transesophageal echocardiographic (TEE) examination revealed a serious paravalvular mitral leak around the edge of the implanted device in the vicinity of the left atrial appendage. (Figure 1a, Video 1*). Since the patient declined the operation, for the second time , percutaneous closure was planned.

Under sedation anesthesia, and guidance of TEE, right atrial cavity was approached through the femoral vein. Then by way of a created septostomy tract, left atrium was entered. A flat tipped 0.035 in. hydrophilic guidewire was passed through the paravalvular leak with the aid of a 6 Fr right guiding catheter to access into the left ventricle, and aorta. A 6 Fr delivery catheter was implanted in the left ventricle. A 6/4 mm Amplatzer Duct Occluder II device was advanced through the femoral vein, and engaged on the PVL. However when it is left in situ, the device embolized in the descending aorta (Figure 1b). A grasper was advanced through the femoral artery, and one corner of the embolized device was grasped with a snare, and retrieved without any complication. (Video 2*). Then, an 8 mm-Amplatzer Muscular VSD Occluder device was advanced throuıgh the femoral vein to close the PVL defect. (Figure 1c-d, Video 3*). Postprocedural control ventriculograhy, and TEE did not reveal any residual defect (Video 4*).

DISCUSSION

Paravalvular leak is a common complication seen after surgical valve replacement. During clinical follow-up its incidence has ranged between 2-10 %, and 7-17 % in prosthetic aortic, and mitral valve replacements, respectively.[1,2] In TEE screening studies incidence of PVL approaches to 32 % in implantations of mitral prostheses .[3] Clinically PVL manifests itself with symptoms of heart failure, and anemia. Most of PVL s are of minor degree, and clinically asymptomatic. However, 1-3 % of the patients with symptomatic PVL have been re-operated.[4,5]

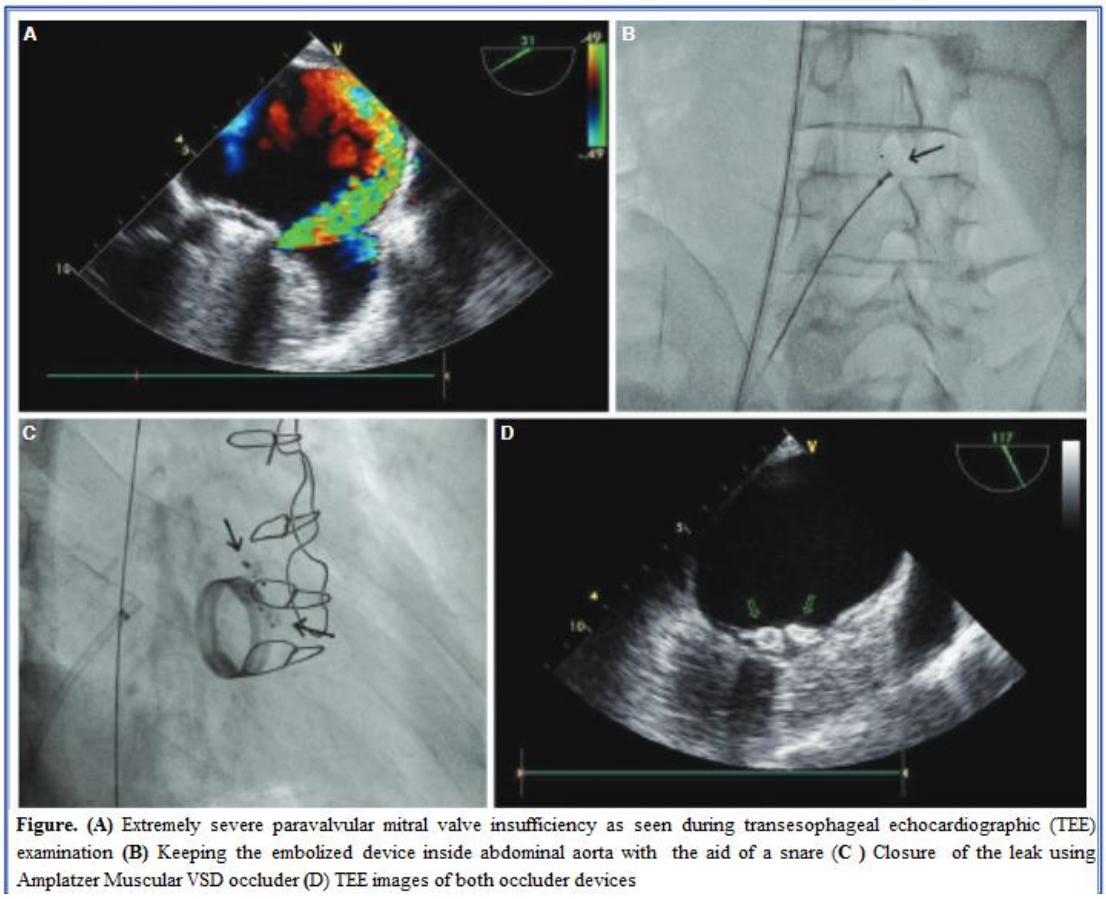

Figure. (A) Extremely severe paravalvular mitral valve insufficiency as seen during transesophageal echocardiographic (TEE) examination **(B)** Keeping the embolized device inside abdominal aorta with the aid of a snare **(C)** Closure of the leak using Amplatzer Muscular VSD occluder **(D)** TEE images of both occluder devices

Although standard treatment modalities of paravalvular leak are surgical repair or valve replacement, because of their higher recurrence, morbidity, and mortality rates, percutaneous closure of the leak has recently emerged as an alternative treatment modality.[6] As complications of percutaneous paravalvular closure, though rarely compression of the leaflets of the prosthetic valve, device embolization, stroke, pericardial effusion, and vascular injury can be encountered. [6,7] Unavailability of specially designed devices for paravalvular closure procedure mandates selection of different devices based on the individual needs. Due to complex structure, and location of the paravalvular defect, use of a single device might not lead to complete success all the time. In this case closure procedure can be achieved using a second device .[8]

Our patient had previously undergone PVL procedure with a partial success rate. The patient declined surgical intervention, and PVL repair was performed for the second time. For the first time, commonly used Amplatzer Duct Occluder II was selected. During implantation of the occluder device embolization occurred. Embolized device was taken out with the aid of a snare. Incomplete closure of the defect was presumed, because of device embolization. Then a bigger size device (Muscular VSD Occluder) was chosen and the procedure was accomplished successfully with an anterior approach.

Rihal et al who have had investigated the highest number of cases cited in the literature used Amplatzer Vascular Plug II in 63 % of their patients, while Ruiz et al. employed Amplatzer Duct Occluder, Amplatzer Muscular VSD

Occluder,and Amplatzer Vascular Plug III in 63, 19, and 8 % of their patients, respectively. Each of these two studies reported 2 device embolizations with only Amplatzer Duct Occluder[6,7]

The procedure was performed under the guidance of 2-D TEE, because of unavailability of 3-D TEE. We think that inability to obtain 3- dimensional images of the defect had an unfavourable impact on the selection of the device.

In conclusion, percutaneous closure of PVL has recently become an alternative treatment approach because of its lower morbidity, and mortality rates.In percutaneous interventions directed at repair of the paravalvular leak, device embolization is a potential complication, operator, and the catheterization laboratory should be prepared to intervene in case of need.

*Video filers are available in the website of the journal

Conflict of interest: None declared

REFERENCES

1. Hammermeister K, Sethi GK, Henderson WG, Grover FL, Oprian C, Rahimtoola SH. Outcomes 15 years after valve replacement with a mechanical versus a bioprosthetic valve: final report of the Veterans Affairs randomized trial. J Am Coll Cardiol 2000;36:1152-8.
2. Genoni M, Franzen D, Vogt P, Seifert B, Jenni R, Künzli A, et al. Paravalvular leakage after mitral valve replacement: improved long-term survival with aggressive surgery? Eur J Cardiothorac Surg 2000;17:14-9.
3. Ionescu A, Fraser AG, Butchart EG. Prevalence and clinical significance of incidental paraprosthetic valvar regurgitation: a prospective study using transoesophageal echocardiography. Heart 2003;89:1316-21.
4. Jindani A, Neville EM, Venn G, Williams BT. Paraprosthetic leak: a complication of cardiac valve replacement. J Cardiovasc Surg (Torino) 1991;32:503-8.
5. Miller DL, Morris JJ, Schaff HV, Mullany CJ, Nishimura RA, Orszulak TA. Reoperation for aortic valve periprosthetic leakage: identification of patients at risk and results of operation. J Heart Valve Dis 1995;4:160-5.
6. Ruiz CE, Jelnin V, Kronzon I, Dudiy Y, Del Valle-Fernandez R, Einhorn BN, et al. Clinical outcomes in patients undergoing percutaneous closure of periprosthetic paravalvular leaks. J Am Coll Cardiol 2011;58:2210-7.
7. Rihal CS, Sorajja P, Booker JD, Hagler DJ, Cabalka AK. Principles of percutaneous paravalvular leak closure. JACC Cardiovasc Interv 2012;5:121-30.
8. Pate GE, Al Zubaidi A, Chandavimol M, Thompson CR, Munt BI, Webb JG. Percutaneous closure of prosthetic paravalvular leaks: case series and review. Catheter Cardiovasc Interv 2006;68:528-33.

Anahtar sözcükler: Ekokardiyografi, transözofajiyal; kalp kapak protezi; mitral kapak; protez başarısızlığı.

Key words: Echocardiography, transesophageal; heart valve prosthesis; mitral valve; prosthesis failure.

Video 1. An extreme case of paravalvular mitral insufficiency as seen on transesophageal echocardiogram

Video 2. Retrieval of the embolized device using a snare from inside the abdominal aorta

Video 3. Closure of the paravalvular leak with Muscular VSD Occluder

Video 4. Colour Doppler US could not reveal any residual defect following the procedure