

## Aneurysm of membranous septum as a long-term complication of mechanical aortic valve replacement

Mekanik aort kapak replasmanının uzun dönem bir komplikasyonu olarak membranöz septum anevrizması

Talay S Kaygın M A Dağ Ö Erkut B

Erzurum Eğitim ve Araştırma Hastanesi, Kalp Damar Cerrahisi Kliniği, Erzurum, Türkiye

### Summary

We report a case of an unusual morphological complication of a mechanical aortic valve replacement which was observed as an aneurysm formation from the interventricular membranous septum during the first postoperative year. The aneurysm resulted in a functional impairment of the mechanical prosthesis with elevated pressure gradients and valve leak. However, due to the severe neurological status of the patient's emergent administration, an aneurysmectomy and/or renewal of aortic valve prosthesis was not possible. We hereby present the clinical and echocardiographical evaluation of the case.

**Key Words:** Mechanical aortic valve replacement, late postoperative complication, aneurysm of inter-ventricular membranous septum, cardiac surgery, valve disease.

### Özet

*Biz bu yazıda mekanik aort kapak replasmanı yapılan bir hastada postoperatif birinci yılında gelişen interventriküler membranöz septumun anevrizması olgusunu sunduk. Mevcut anevrizma mekanik kapakta fonksiyonel bir bozulmaya neden olarak aort kapağına ait yüksek bir gradiente ve kapakta kaçığa sebep olmuştur. Hastadaki nörolojik durum bozukluğu nedeniyle cerrahi olarak anevrizmektomi ya da yeni kapak protez uygulamasına gidilmemiştir. Bu olguda hastaya ait klinik ve ekokardiyografik değerlendirme bulgularından bahsetmekteyiz.*

**Anahtar Sözcükler:** Mekanik aort kapak replasmanı, geç postoperatif komplikasyon, interventriküler membranöz septum anevrizması, kardiyak cerrahi, kapak hastalığı.

### Introduction

Mechanical AVR operations can cause very undesirable results such as anticoagulant related hemorrhage, thromboembolism, valve thrombosis, valvular and paravalvular leaks, prosthetic valve endocarditis, structural dysfunctions of prosthesis, patient and prosthesis mismatch and conventional heart surgery complications. Postoperative thromboembolism risk enhance with atrial fibrillation, left ventricular enlargements, ventricular wall motion abnormalities, lower ejection fraction, increased age with hypercoagulability, systemic diseases such as cancer or infections and diabetes. Postoperative thromboembolism may lead to neurological complications from mild clinical features to coma, as in our patient (1, 2).

### Case Report

In April 2010, a 22 year old male patient presented to emergency department with a sudden loss of consciousness. He had a medical history of aortic valve replacement in another cardiac medical center the previous year.

On physical examination, a decreased level of consciousness was observed with an irregular respiration type. The Glasgow coma scale was 9/15. The patient's pupil examination revealed an abnormal morphology in shape and size with a mild dilatation on the left side and almost a pin point pupil on the right side. Pupils were slightly constrictive to light on both direct and indirect response. His arterial blood pressure was 90/40 mmHg with a sinus rhythm and heart rate was between 90-110/min. Respiration volumes were shallow and the respiratory rate was 35 breaths per minute. His oral temperature was 38,5<sup>0</sup>C with an oxygenation saturation of 88%. The lung sounds were normal. A

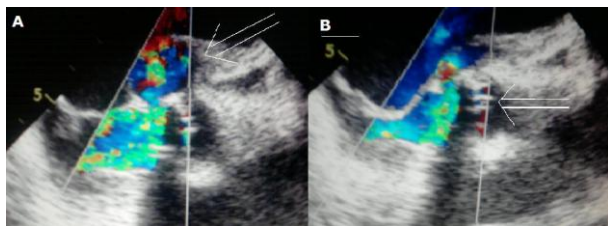
Yazışma Adresi: Bilgehan ERKUT

Erzurum Eğitim ve Araştırma Hastanesi, Kalp Damar Cerrahisi Kliniği, Erzurum, Türkiye

Makalenin Geliş Tarihi: 04.06.2011 Kabul Tarihi: 10.10.2011

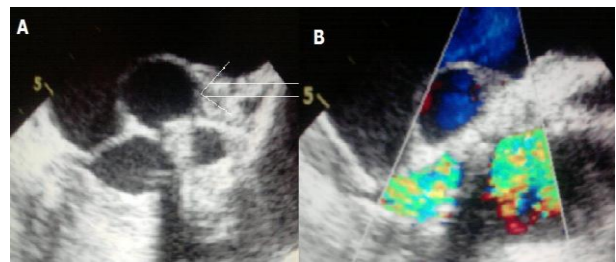
previous sternotomy incision was observed. Cardiac auscultation revealed irregularly snaps of the mechanical valve with a moderate systolic soufflé. The remainder of the physical examination was normal.

Laboratory examination of complete blood count, metabolic panel, liver and kidney functions were essentially unremarkable. The international normalized ratio level was 2,6. Electrocardiography examination presented a sinus rhythm with frequent ventricular premature beats. The patient was intubated upon these findings at the emergency department. Emergent cranial computed tomography was normal without any evidence of cerebral embolus, hemispheric shift and/or hemorrhage. By the trans-thoracic echocardiogram, a mild mitral insufficiency and prosthetic valve leak were observed. The left ventricular ejection fraction was 35% with anterior wall and septal motion abnormalities. On the other hand, an unusual aneurysm of the interventricular membranous septum was detected with a flow pattern between systolic and diastolic periods (Figure-1a,b). The aneurysm was located right beneath the bi-leaflet mechanical aortic valve prosthesis with an enlargement to left ventricular chamber (Figure-2a). The aneurysm was interacting with the performance of valve function of the aortic prosthesis by creating a pressure gradient between 75mmHg maximally and 40 mmHg minimally (Figure-2b). The need to re-operation was illustrated to the patient and their relatives. Since they did not accept a new operation, the patient was transferred to intensive care unit for medical treatment.



**Figure-1a.** Systolic period intra-aneurysm flow (arrow: aneurysmal sack).

**Figure-1b.** Diastolic period of aneurysm (arrow: aortic prosthesis).



**Figure-2a.** Localization of aneurysm at membranous septum (arrow).

**Figure-2b.** Pressure gradients of prosthesis.

## Discussion

Zellner et al. (3) reported their series of mechanical valve prosthesis replacements with their clinical experience in 418 AVR and 292 mitral valve replacements (MVR) cases. They observed 120 late deaths among AVR patients. There were 55 thromboembolic events with a rate of 2.7%/patient year. These patients presented their postoperative complications as valve related complications for structural deteriorations, thromboembolic events, hemolysis, leaflet malfunction, noninfectious paravalvular leaks, anti-coagulant complications, prosthetic valve endocarditis and permanent neurological impairments. In a large series as Zellner has reported, complications did not mention an aneurysm of the interventricular septum. Like Zellner et al., Hellgren et al. (4) presented their clinical experience of mortality, morbidity and clinical characteristics of their patients undergoing valve surgery over the last decade. Their series of AVR consisted of 1746 cases. In this large series of patients observation of postoperative heart failure rate was 16% with early deaths in 4.8%. A complication of valvular dysfunction according to an aneurysm of the interventricular septum was also not mentioned in this larger series of Hellgren. Akhtar et al. (5) also reported 3 stroke related deaths among their series of 88 adolescent valve operation patients. None of which presented a morphological postoperative complication related to the interventricular septum.

Over our medical data scan, as far as we know, an aneurysm of membranous septum after AVR was not previously observed as a complication of AVR.

## References

1. Da Col U, Ramoni E, Di Bella I, Ragni T. An unusual left ventricular outflow pseudoaneurysm: Usefulness of echocardiography and multidetector computed tomography for surgical repair. *Cardiovasc Intervent Radiol* 2009;32(1):188-91.
2. Yavuz S, Eris C, Goncu T, Sezen M, Ata Y, Turk T. An incidental aneurysm of the interventricular membranous septum. *Arch Iran Med* 2010;13(4):363-4.
3. Zellner JL, Kratz JM, Crumbley AJ, et al. Long-term experience with the St. Jude medical valve prosthesis. *Ann Thorac Surg* 1999;68(4):1210-8.
4. Hellgren L, Kvidal P, Ståhle E. Improved early results after heart valve surgery over the last decade. *Eur J Cardiothorac Surg* 2002;22(6):904-11.
5. Akhtar RP, Abid AR, Zafar H, et al. Prosthetic valve replacement in adolescents with rheumatic heart disease. *Asian Cardiovasc Thorac Ann* 2007;15(6):476-81.