

Bacterial Infective Endocarditis Associated with Gerbode Ventricular Septal Defect: A Case Report

Bakteriyel Enfektif Endokardit ile İlişkili Gerbode Ventriküler Septal Defekt: Olgu Sunumu

ABSTRACT

A 61-year-old male presented to emergency department with symptoms of shortness of breath, palpitations, and night sweats. We performed bedside transthoracic echocardiography which showed shunt from the left ventricle to the right atrium in systole with color Doppler examination. Gerbode-type ventricular septal defect and an image of a fibrillar, mobile mass compatible with vegetation was observed just above the tricuspid valve. We performed trans-esophageal echocardiography which showed vegetations on the aortic valve noncoronary cusp. Two sets of blood cultures were positive for *Streptococcus sanguinis*. The patient was evaluated by the heart team and an operation decision was made for the patient. The patient underwent surgery after 2 weeks of antibiotic therapy. In the surgery, the Gerbode-type ventricular septal defect was closed with a polytetrafluoroethylene patch. Tricuspid annuloplasty was performed with De Vega technique. Mechanical aortic valve was implanted. Postoperative transthoracic echocardiography showed no residual shunt.

Keywords: Echocardiography, infective endocarditis, Gerbode ventricular septal defect

ÖZET

61 yaşında erkek hasta acil servise nefes darlığı, çarpıntı ve gece terlemesi şikâyetleri ile başvurdu. Yatak başı yapılan transtorasik ekokardiyografi renkli Doppler incelemesinde sol ventrikülden sağ atriya sistol sırasında şant izlendi. Gerbode tipi ventriküler septal defekt ve triküspit kapağın hemen üzerinde fibriller, mobil vejetasyon ile uyumlu kitle gözlemlendi. Yapılan transözofageal ekokardiyografide aort kapak nonkoroner kusp üzerinde vejetasyonlar izlendi. İki set kan kültüründe *Streptococcus sanguinis* saptandı. Hasta kalp takımı tarafından değerlendirildi ve hasta için ameliyat kararı alındı. İki haftalık antibiyotik tedavisinin ardından hasta ameliyata alındı. Ameliyatta Gerbode tipi ventriküler septal defekt polytetrafluoroetilen yama ile kapatıldı. De Vega tekniği ile triküspit anüloplasti uygulandı. Mekanik aort kapak implante edildi. Postoperatif transtorasik ekokardiyografide rezidüel şant izlenmedi.

Keywords: Ekokardiyografi, enfektif endokardit, Gerbode tipi ventriküler septal defekt

The Gerbode ventricular septal defect (VSD), that is a direct communication between the left ventricle and right atrium, was first described in 1838 by Thurman.¹ It is usually congenital, but is rarely acquired, as a complication of bacterial endocarditis, blunt chest trauma, myocardial infarction, or previous cardiac surgery.^{2,3} Echocardiography is a mainstay of its diagnosis and helps clinical management. In the current case report, we present the clinical course of a patient with bacterial infective endocarditis associated with Gerbode VSD without previous cardiac surgery who underwent surgical repair.

Case Report

A 61-year-old male was admitted to the emergency department (ED) with complaints of shortness of breath, palpitations, and night sweats for 1 week. His medical history was not significant except smoking and arterial hypertension. At the presentation to ED, his heart rate was 130 per minute, respiratory rate was 16 per minute, oxygen saturation was 98% on ambient air, and the axillary body temperature was 36.6°C. He had pretibial 1+ pitting edema in both legs. His electrocardiogram (ECG) revealed AF

CASE REPORT OLGU SUNUMU

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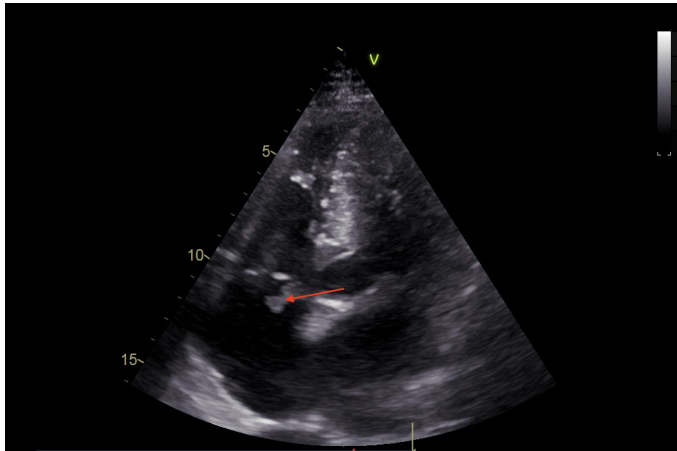


Figure 1. The arrow in the apical 4-chamber image shows the mass compatible with the vegetation which was observed just above the tricuspid valve.

with rapid ventricle response. Blood test results revealed mildly elevated high sensitive cardiac troponin T (hs-TnT) level (0.031 pg/mL) (normal range: <0.014 pg/mL), elevated C reactive protein level (69.54 mg/L) (normal range: <10 mg/L), normal renal and liver function, and neutrophilic leukocytosis (12,760 $10^3/\mu\text{L}$ leukocyte, neutrophil ratio 88%). We performed bedside transthoracic echocardiography (TTE) which showed normal left ventricular contraction with ejection fraction (EF) of 60%, moderate mitral, aortic, and tricuspid valve insufficiencies. Shunt from the left ventricle to the right atrium was observed in systole with color Doppler examination. Gerbode VSD diameter was measured as 6 mm. Just above the tricuspid valve, an image of a fibrillar, mobile mass compatible with vegetation was observed adjacent to the VSD (Figures 1 and 2). The patient was admitted to the coronary intensive care unit with the suspicion of bacterial endocarditis with Gerbode VSD. We performed transesophageal echocardiography which showed masses compatible with vegetation with a dimension of 9×6 mm and 6×8 mm on the aortic valve noncoronary cusp (NCC) (Figures 3 and 4). At this level, the shunt from the left ventricle to the right atrium with the color Doppler was observed. In the right atrium, a mobile mass compatible with a vegetation with a dimension of 11 mm was observed adjacent to the VSD. Two sets of blood cultures were positive for *Streptococcus sanguinis*. Ceftriaxone and gentamicin intravenous treatment was started according to the culture antibiogram result. The patient was evaluated by the heart team which was constituted of a cardiologist, cardiovascular surgeon, infectious diseases specialist, and anesthesiologist, and surgery was decided for the patient.

The patient underwent surgery after 2 weeks of antibiotic therapy. In surgery, aortic leaflets were resected and Gerbode VSD

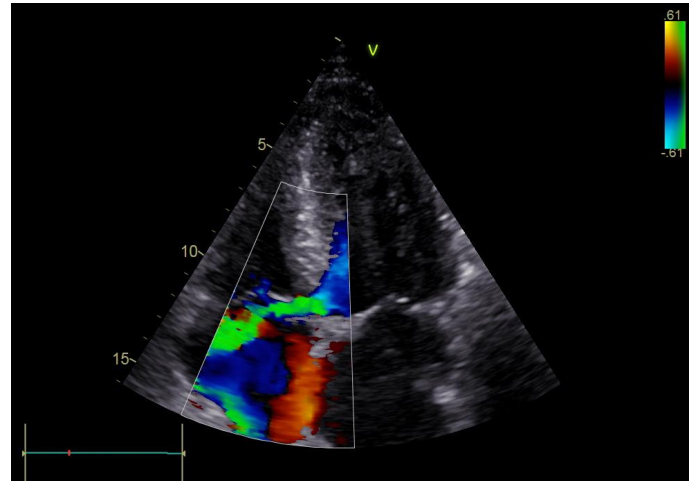


Figure 2. Shunt from the left ventricle to the right atrium was observed in systole with color Doppler examination in the apical 4-chamber image.

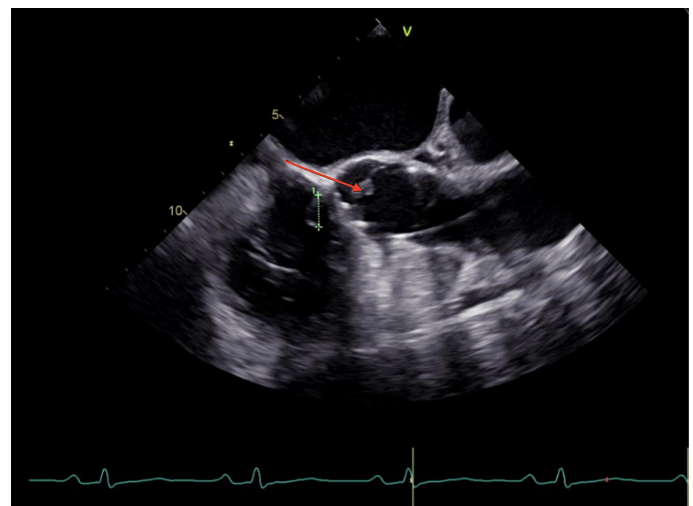


Figure 3. The arrow shows mass vegetations on the aortic valve noncoronary cusp.

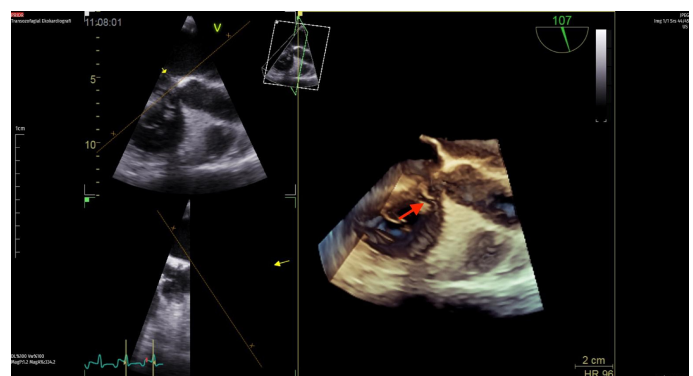


Figure 4. The arrow in the 3D Transesophageal echocardiography image shows the VSD.

ABBREVIATIONS

ECG	Electrocardiogram
ED	Emergency department
EF	Ejection fraction
NCC	Noncoronary cusp
TTE	Transthoracic echocardiography
VSD	Ventricular septal defect

was seen inferior to noncoronary aortic sinus. Healed endocarditis tissue was seen on noncoronary and right aortic cusps. The connection between right atrium and left ventricle was confirmed with a surgical instrument. Endocarditis tissue surrounding the defect was resected for microbiological study. The defect was closed with a polytetrafluoroethylene patch with single-interrupted, pledgeted sutures. Tricuspid annuloplasty was performed with De Vega technique. 21 No. mechanical aortic valve (St. Jude Medical, Minnesota, USA) was implanted with single-pledgeted sutures (Figures 5 and 6). Postoperative TTE showed no residual

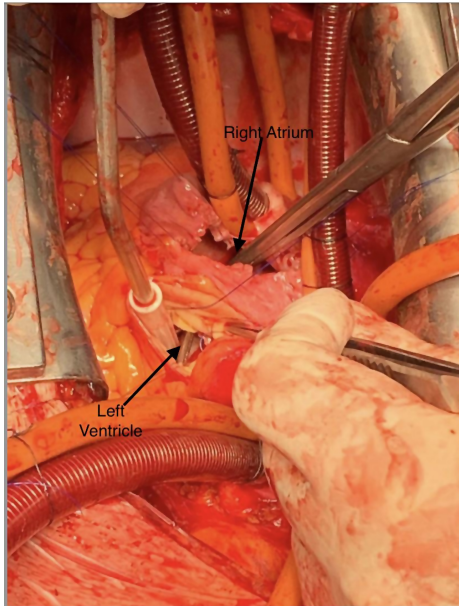


Figure 5. Connection between right atrium and left ventricle was confirmed with a surgical instrument.

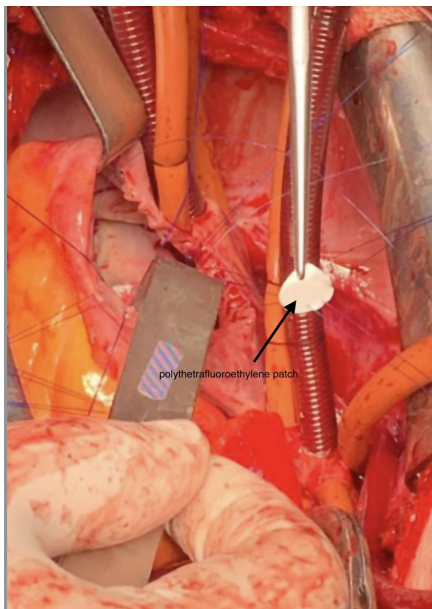


Figure 6. The defect was closed with a polytetrafluoroethylene patch with single-interrupted, pledgeted sutures.

shunt. Endocarditis tissue culture was positive for *Bacillus firmus*. Antibiotic treatment was continued for 2 more weeks after surgery. The patient was discharged.

Discussion

Gerbode's first description of direct communication between the left ventricle and the right atrium included cases of congenital VSDs.⁴ By up to one-third of all patients, associated with congenital defects, are present, the most common one being an atrial septal defect.² In this case, the patient had no previous transthoracic echocardiographic examination. The transthoracic echocardiographic examination showed no other congenital cardiac malformations. During the operation, it was observed that the VSD was 8 mm in diameter and its edges were well circumscribed. The small size and the smooth margins suggested that the defect was more likely to be congenital. Small congenital defects tend to be asymptomatic. This defect may also be congenital, and the damage caused by the shunt flow jet on the endocardium of the right atrium may lead to the development of bacterial endocarditis in the area adjacent to the VSD inside the right atrium and on the aortic valve. However, a clear distinction between a congenital or acquired origin could not be made by the patient who had no previous echocardiographic examination.

Echocardiography is a mainstay of its diagnosis and clinical management. Color flow Doppler is useful to detect the presence of a Gerbode defect, and the use of continuous wave Doppler allows confirmation of left to right shunt.⁵

Transthoracic echocardiography has been recommended for the recognition of vegetations and associated complications such as abscess formation. Every case of Gerbode VSD with bacterial endocarditis should be confirmed through a TEE, by examining all heart valves in multiple views for potential vegetations.⁶

Surgical management of infective endocarditis with Gerbode defect is recommended. This allows a more effective source control, prevention of embolism, and repair of the Gerbode defect. Patient-based decisions should be made by a heart team.⁷

Conclusion

Gerbode VSDs are rare defects. Echocardiographic evaluation for this defect requires a high level of suspicion. Surgical management of infective endocarditis with Gerbode defect is recommended.

Informed Consent: Written informed consent was obtained from the patient for the publication of this case report including images and associated text.

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References

1. Thurman J. Aneurysms of the heart. *Med Clin Trans*;R 1838(21):187.
2. Wasserman SM, Fann JI, Atwood JE, Burdon TA, Fadel BM. Acquired left ventricular-right atrial communication: Gerbode-type defect. *Echocardiography*. 2002;19(1):67-72. [\[CrossRef\]](#)
3. Taskesen T, Prouse AF, Goldberg SL, Gill EA. Gerbode defect: another nail for the 3D transesophageal echo. *Int J Cardiovasc Imaging*. 2015;31(4):753-764. [\[CrossRef\]](#)
4. Gerbode F, Hultgren H, Melrose D, Osborn J. Syndrome of left ventricular-right atrial shunt; successful surgical repair of defect in five cases, with observation of bradycardia on closure. *Ann Surg*. 1958;148(3):433-446. [\[CrossRef\]](#)
5. Davies A, Lai K, Bastian B. Acquired Gerbode defects associated with infective endocarditis. *Heart Lung Circ*. 2016;25(3):e59-e61. [\[CrossRef\]](#)
6. Kretzer A, Amhaz H, Nicoara A, Kendall M, Glower D, Jones MM. A case of Gerbode ventricular septal defect endocarditis. *CASE (Phila)*. 2018;2(5):207-209. [\[CrossRef\]](#)
7. Habib G, Hoen B, Tornos P, et al. Guidelines ESCCfP. Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009): the Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and the International Society of Chemotherapy (ISC) for Infection and Cancer. *Eur Heart J*. 2009;30(19):2369-2413. [\[CrossRef\]](#)