Spontaneous left atrial dissection due to mitral regurgitation

Kenji Iino, MD, PhD, Yoshitaka Yamamoto, MD, PhD, Hideyasu Ueda, MD, and Hirofumi Takemura, MD, PhD, Kanazawa, Japan

From the Department of Cardiovascular Surgery, Kanazawa University, Kanazawa, Japan.

Disclosures: The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

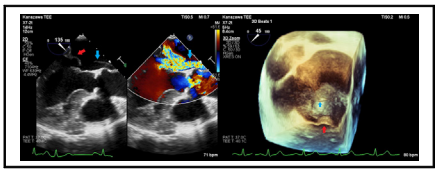
Received for publication Sept 24, 2022; revisions received Nov 11, 2022; accepted for publication Nov 21, 2022; available ahead of print Dec 12, 2022.

Address for reprints: Kenji Iino, MD, PhD, Department of Cardiovascular Surgery, Kanazawa University, 13-1 Takaramachi, Kanazawa 920-8641, Japan (E-mail: knj.iino@gmail.com).

JTCVS Techniques 2023;17:76-8

2666-2507

https://doi.org/10.1016/j.xjtc.2022.11.012



TEE indicates LA dissection due to mitral regurgitation.

CENTRAL MESSAGE

Left atrial dissection, which is defined as the forced separation of layers of the LA wall by blood, is rare. We report a spontaneous case of LA dissection caused by mitral regurgitation.

Video clip is available online.

Left atrial (LA) dissection is rare and is usually observed as a complication of mitral valve (MV) surgery or other cardiac procedures.[1] Incidence is 0.16% associated with MV surgeries (0.84% associated with valve replacements) and 0.02% associated with isolated coronary artery bypass grafting.[1,2] Noncardiac surgical etiologies have included myocardial infarction, percutaneous coronary intervention, radiofrequency ablation, and blunt cardiac trauma.[3]

CLINICAL SUMMARY

An 81-year-old woman presented to another hospital with a 2-day history of progressive exertional dyspnea. She was initially diagnosed with heart failure due to severe mitral regurgitation (MR). Initial echocardiography indicated a LA diameter of 46 mm and an estimated right ventricular systolic pressure (RVSP) of 70 mm Hg. She underwent diuretic treatment for heart failure. She was admitted to our hospital for surgery 3 months later. Her medical history included autoimmune hepatitis diagnosis at age 58 years and Sjögren syndrome diagnosis at age 64 years. She had received inpatient steroid treatment for autoimmune hepatitis for 1 month at age 58 years but had not required subsequent steroid therapy due to inactive autoimmune hepatitis. She had previous treatment for severe dental cavities due to Sjögren syndrome-related dry mouth. She had no history of cardiac surgery or chest trauma. On physical examination, a grade 4/6 systolic murmur was audible over the cardiac apex. Abdominal and neurological examinations were unremarkable. Laboratory tests showed the following: rheumatoid factor, 18 IU/mL (normal, <15 IU/mL); immunoglobulin G, 2200 mg/dL (normal, <1700 mg/dL); antinuclear antibody, 1:1280 (normal, <1:40); and brain natriuretic peptide, 41.6 pg/mL (normal, < 18.4 pg/mL). Transthoracic echocardiography showed severe MR due to posterior mitral leaflet prolapse of a central scallop secondary to chordae rupture (Figure 1, *A*). The LA diameter was 43 mm, the estimated RVSP was 36 mm Hg, and the maximum velocity of MR was 5.22 m/sec. Transesophageal echocardiography revealed prolapse in the P2 segment with flail and a LA dissection cavity extending from the mitral anterior annulus along the LA wall and color flow Doppler imaging showed the MR jet leaking into the cavity (Figure 1, *B*), which was confirmed on 3-dimensional transesophageal echocardiography (Figure 1, *C*) and cardiac computed tomography (Figure 1, *D* and *E*). Written informed consent was obtained from the patient (institutional review board No. 2022-149 (114097), September 2022). The patient underwent MV

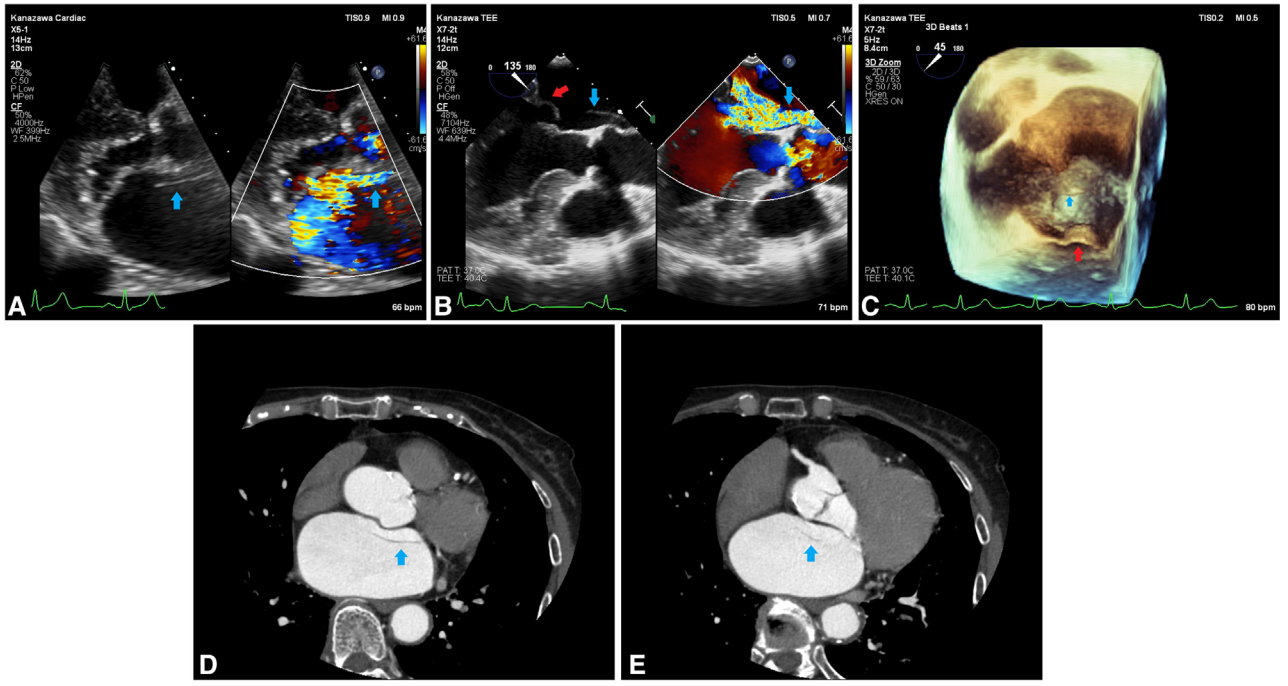


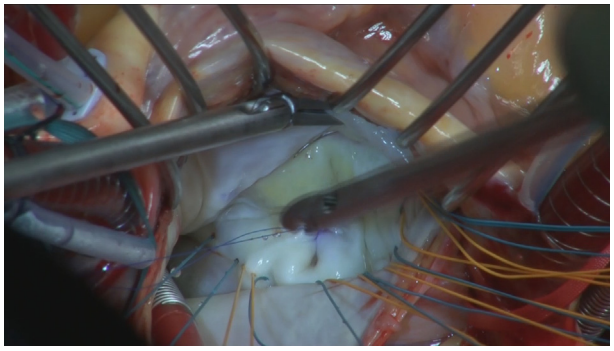
FIGURE 1. Preoperative echocardiographic image and computed tomography angiogram of left atrial (LA) dissection. A and B, Transthoracic (A) and transesophageal (B) echocardiograms demonstrate the LA dissection flap (*blue arrow*) and mitral regurgitation (*red arrow*) and show the blood flow into the LA false lumen. C, Three-dimensional transesophageal echocardiogram shows the posterior mitral leaflet prolapse (*red arrow*), the entry site of the LA dissection (*blue arrow*), and severe mitral regurgitation jet. D and E, Single-axial image from a preoperative computed tomography angiogram shows the LA dissection flap (*blue arrow*).

repair with 2 CV4 and 2 CV5 Gore-Tex polytetrafluoroethylene neochords (W. L. Gore & Associates Inc) and 32 mm ring annuloplasty, and tricuspid valve repair with 32 mm ring annuloplasty. During surgery, it was observed that the dissection of the LA wall without hematoma extended from the anterior annulus of the MV to the LA roof. The torn atrial tissue was not friable. The mitral annulus was normal and standard repair techniques resulted in a competent valve. The ring was placed on the LA dissection flap at the anterior part of the annulus and the LA dissection was closed with 2–0 Nespolen sutures through the edge of the LA dissection flap (Video 1).

Postoperative transthoracic echocardiography and cardiac computed tomography revealed repair of the LA dissection cavity and flap as well as a competent MV with negligible regurgitation (Figure 2, *A*-*C*). The postoperative period was without incident. Follow-up computed tomography angiogram performed 6 months after surgery showed no findings of recurrence of LA dissection (Figure 2, *D* and *E*).

DISCUSSION

Spontaneous LA dissection without any preceding intracardiac manipulation is exceedingly rare and is generally attributed to underlying pathology involving severe mitral annular calcification and infectious endocarditis.[4,5] Infection and necrosis of a heavily calcified posterior mitral annulus are possible contributors to the formation of a dissection.[4] Nevertheless, our patient did not have such underlying causes and no history of cardiac procedures. In the present case, initial echocardiography indicated a nondilated LA and a markedly high estimated RVSP. The symptom onset and the initial echocardiographic findings indicated the development of MR as an acute event secondary to chordal rupture. LA dissection was not observed in



VIDEO 1. The left atrial dissection cavity was closed, and mitral valve repair was performed. Video available at: https://www.jtcvs.org/article/S2666-2507(22)00592-2/fulltext.

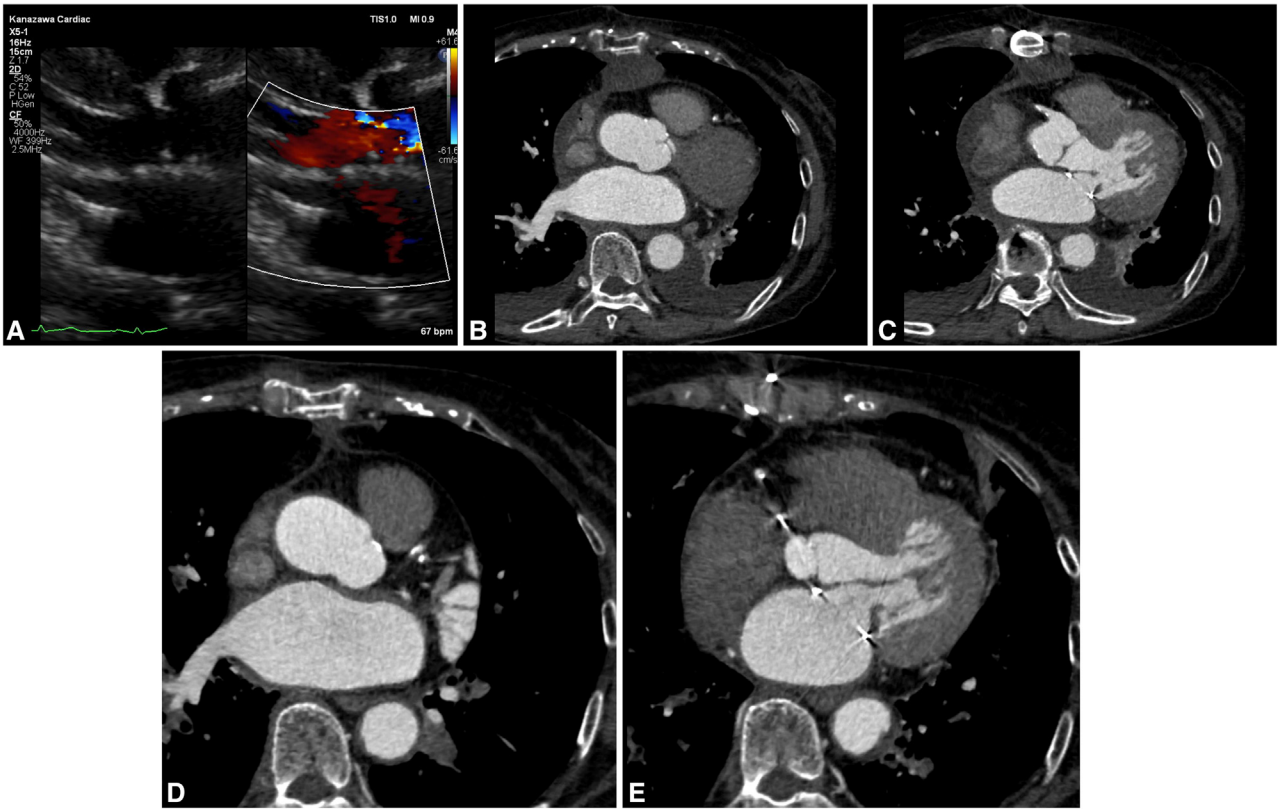


FIGURE 2. Postoperative echocardiographic image and computed tomography angiogram of left atrial (LA) dissection. A, Postoperative transthoracic echocardiogram shows the LA dissection cavity repair and resolution of mitral regurgitation. B and C, Single-axial image from a postoperative computed tomography angiogram shows the repair of the LA dissection flap. D and E, Follow-up computed tomography angiogram performed 6 months after surgery showed no findings of recurrence of LA dissection.

the initial echocardiography scan; therefore, the time of its onset was unclear, and the development of acute MR was considered to contribute to the development of LA dissection.

The treatment of patients with LA dissection is determined by their clinical presentation.[3] Although patients with hemodynamic instability require immediate surgical intervention, stable patients can be treated conservatively. Different surgical techniques were reported, including entry closure with obliterating the false lumen and unroofing of the false lumen after removing the hematoma.[1,2,5] When the atrial wall tissue and mitral annulus are friable, concomitant use of strong surgical adhesive and a bovine pericardial or synthetic patch may be useful for entry closure by obliterating the false lumen.[1] In patients with LA dissection secondary to infective endocarditis, unroofing of LA dissection is also useful to prevent a closed cavity from becoming infected.[5] Alongside MV repair in our patient, we simultaneously closed the LA dissection cavity to secure the entrance point of the flap with simple sutures between the mitral annulus and ring because the dissection flap and mitral annulus were not friable.

In our case, due to the force of the MR jet caused by the extensive posterior MV leaflet prolapse and subsequent substantial systolic flow into the false lumen, the LA wall was likely susceptible to dissection. We report a rare case of LA dissection due to MR that was treatable with simple suturing for simultaneous MV repair.

References

1. Fukuhara S, Dimitrova KR, Geller CM, Hoffman DM, Ko W, Tranbaugh RF. Left atrial dissection: etiology and treatment. *Ann Thorac Surg*. 2013;95:1557-62.
2. Martinez-Sellés M, García-Fernandez MA, Moreno M, Bermejo J, Delcán JL. Echocardiographic features of left atrial dissection. *Eur J Echocardiogr*. 2000;1:147-50.
3. Fukuhara S, Dimitrova KR, Geller CM, Hoffman DM, Tranbaugh RF. Left atrial dissection: an almost unknown entity. *Interact Cardiovasc Thorac Surg*. 2015;20:96-100.
4. Isonaga Y, Yamaguchi T, Ohta M, Kodama T. Left atrial dissection associated with disruption of mitral annular calcification: a case report. *Eur Heart J Case Rep*. 2022;6:1-5.
5. Eldridge TB, Shah JN, Poltak J, Powers JB, Quinn RD, Diaz MN, et al. Repair of spontaneous left atrial dissection resulting in severe paravalvular native mitral valve regurgitation. *JACC Case Rep*. 2020;2:1099-102.