Minimally invasive procedure of retensioning of artificial chords implanted using the NeoChord DS1000 under echocardiographic guidance: the first case in Poland

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A 79-year-old man with a history of severe mitral regurgitation (MR), who underwent a transapical mitral valve (MV) repair using the NeoChord DS1000 system 3 years earlier, was admitted to the department of cardiac surgery due to significantly reduced exercise tolerance and atrial fibrillation for at least 4 months. During the first MV repair, 3 Gore-Tex chords were successfully implanted to the prolapsing P2 segment (flail leaflet) under 2-dimensional/3-dimensional (2D/3D) transesophageal echocardiography (TEE) guidance. A significant reduction of MR to a small jet was achieved, followed by clinical improvement. The left ventricular (LV) reverse remodeling (end-diastolic diameter decreased from 59 to 50 mm), reduced left atrial dimensions, and normalized mitral inflow were observed on a follow-up transthoracic echocardiography performed every 6 months.

Due to recurring clinical symptoms, we repeated transthoracic echocardiography and 2D/3D TEE at 34 months after the first procedure. A recurrent significant eccentric MR (Figure 1A) caused by the P2 prolapse without ruptured implanted chords was revealed (Figure 1B and 1C). Additionally, we noticed enlargement of the left atrium and reduced LVEF of 45% assessed during arrhythmia. The patient was qualified for the first procedure of transapical artificial chords retensioning in Poland, performed through a left-sided mini-thoracotomy, under general anesthesia, and without extracorporeal circulation. The scar from the previous thoracotomy was excised, and then pericardiotomy was performed. After the apex of the heart was exposed, 3 pairs of fixed Gore-Tex sutures (knots of artificial chordae) were prepared. The artificial chords were retensioned and fixed with additional felt pledgets (Figure 1D), restoring the MV leaflet tightness by reaching 10 mm of leaflets coaptation (Figure 1E) under 2D/3D TEE guidance. No bleeding or any other intraoperative complications were observed. Eventually, after the surgery, a significant reduction of the posterior leaflet prolapse was obtained and only mild central MR was found (Figure 1F). The patient was discharged home in good condition 6 days after the surgery.

Transapical implantation of artificial chords using the NeoChord DS1000 system is an effective alternative to other surgical methods of MV repair and reconstruction of the valvular apparatus requiring extracorporeal circulation and cardioplegia.1,2 The procedure is used in the treatment of MR caused by progression of degenerative changes in the case of rupturing or extending of the native tendinous chords. It can also be used successfully in selected patients after a failed conventional surgical MV repair.1 The effectiveness of the method depends on many factors. Early results are promising as the valve function improves and the LV size diminishes quite rapidly.1

However, in some cases, a recurrence of MR is observed. Causes of recurrent MR may include...
A minimally invasive procedure of artificial chords retensioning caused by recurrent P2 prolapse: B – 2D TEE, long-axis view, showing implanted neochords visible in the left ventricle (white arrow) and recurrent P2 prolapse (red arrow); C – 3-dimensional (3D) TEE, mitral valve “en face” view, showing prolapse of a wide P2 segment (arrow); D – an intraoperative image showing the length of chords needed to be pulled out of the left ventricle to resume coaptation (arrow); E – 2D TEE, long-axis view, showing optimal coaptation of mitral valve leaflets achieved after the procedure (arrow); F – 2D TEE, color Doppler, long-axis view, showing a very small central jet of mitral regurgitation achieved after the procedure (arrow).

D – two-dimensional (2D) transesophageal echocardiography (TEE), color Doppler, showing significant eccentric mitral valve regurgitation (arrow) caused by recurrent P2 prolapse; B – 2D TEE, long-axis view, showing implanted neochords visible in the left ventricle (white arrow) and recurrent P2 prolapse (red arrow); C – 3-dimensional (3D) TEE, mitral valve “en face” view, showing prolapse of a wide P2 segment (arrow); D – an intraoperative image showing the length of chords needed to be pulled out of the left ventricle to resume coaptation (arrow); E – 2D TEE, long-axis view, showing optimal coaptation of mitral valve leaflets achieved after the procedure (arrow); F – 2D TEE, color Doppler, long-axis view, showing a very small central jet of mitral regurgitation achieved after the procedure (arrow).

Abbreviations: AML, anterior mitral leaflet; Ao, aorta; LA, left atrium; LV, left ventricle; PML, posterior mitral leaflet.

REFERENCES

ARTICLE INFORMATION
CONFLICT OF INTEREST None declared.
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