CASE REPORT

UDC: 616.126.3-089
https://doi.org/10.2298/VSP170312117S

Reconstructive surgery of an extremely calcified mitral valve in a Barlow disease patient – a case report

Rekonstruktivna hirurgija ekstremno kalcifikovane mitralne valvule kod bolesnika sa Barlovljevom bolesti

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Abstract

Introduction. Mitral valve calcifications are frequent finding in Barlow disease. This is making mitral repair surgery even more demanding in already complex valve pathology. **Case report.** A fifty–five-year-old Barlow disease patient underwent a mitral repair surgery due to posterior leaflet prolapse at P2 level and extensive posterior leaflet and annular calcifications as well. The prolapsed scallop was resected, while P1 and P3 scallops were detached from the annulus. After complete posterior annulus decalcification, so formed the large atrio-ventricular defect was reconstructed with the autologous pericardial patch and double suture line technique. The P1 and P3 segments were reattached there by the sliding technique and sutured with no strain. Annuloplasty was performed with a saddle rigid ring No 36. The patient was discharged nine days after the surgery with just a trace of mitral regurgitation. **Conclusion.** Annular decalcification and reconstruction in the patients with calcified Barlow mitral disease is neccessary for safe and durable mitral valve surgical repair.

Key words:
barlow syndrome; mitral valve stenosis; mitral valve annuloplasty; reconstructive surgical procedures.

Apstrakt

Uvod. Kalcifikacije mitralne valvule su čest nalaz kod bolesnika sa Barlovljevom bolesti što čini rekonstruktivnu hirurgiju zalistka kod ovih bolesnika znatno složenijom. **Prikaz bolesnika.** Bolesniku starom 55 godina je urađena rekonstrukcija mitralnog zalistka zbog prolapsa posteriornog listića i značajnih kalcifikacija na P2 segmentu i posteriornom anulusu. Nakon resekcije P2 segmenta i odvajanja P1 i P3 segmenta od anulusa, urađena je kompletna resekcija velikog kalcifikata sa skoro polovine obima posteriornog anulusa. Nastali atrioventrikularnog defekt rekonstruisan je autolognim perikardom elipsoidnog oblika sašivenim u dva sloja. P1 i P3 segment su potom reinplantirani na rekonstruisani anulus i međusobno spojeni. Rekonstruktivna procedura je kompletirana anuloplastikom pomoću sedlastog rigidnog prstena veličine 36. Bolesnik je otpušten devetog postoperativnog dana sa neznatnom mitralnom regurgitacijom. **Zaključak.** Dekalcifikacija posteriornog anulusa uz preciznu rekonstrukciju nastalog atrioventikularnog defekta je neophodna procedura za bezbednu i funkcionalno trajnu rekonstrukciju mitralnog zalistka.

Ključne reči:
sindrom barlow; zalistak, mitralni, stenoza; zalistak, mitralni, anuloplastika; hirurgija, rekonstruktivne procedure.

Introduction

Extremely enlarged and thick mixomatous leaflets along with significant annular dilatation are the main features of the Barlow mitral valve disease. Excessive leaflet mobility in these patients results in micro traumas at the leaflet base. The healing process stimulates fibrous scar formation thereafter and annular calcifications in some patients. The adjecent leaflet and myocardial tissue could be affected by the calcification process as well [1, 2]. Therefore, the calcified posterior annulus is not a rare finding in the Barlow patients [3] and makes already complex reconstructive surgery more demanding. This is a case report of a patient who underwent a succesful mitral repair surgery in spite of excessive posterior leaflet and annular calcifications.

Case report

Fifty-five-year-old patient was admitted to hospital for the chronic severe mitral insufficiency. He was in the New

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York Heart Association (NYHA) functional class III. The echocardiography exam revealed grade 4 mitral regurgitation due to the posterior leaflet prolapse at the P2 level. The prolapsed segment was at the same time immobile due to severe calcifications that were extending down into the posterior annulus. The heart chambers were moderately enlarged. Left atrium was 44 mm, while left ventricle end-systolic and end-dyastolic diameters were 43 mm and 59 mm, respectively. Left ventricle ejection fraction was 60%. The patient had no history of rheumatsim or bacterial endocarditis.

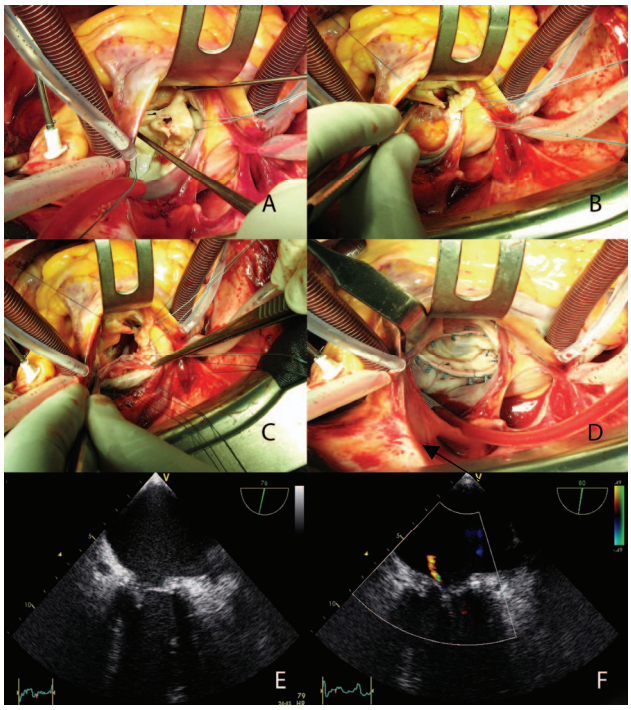

Fig. 1 – Intraoperative images.

a) Massive leaflet calcification that extends down into the posterior annulus; b) Annulus decalcification resulted in a huge atrioventricular defect (arrow); c) Atrioventricular defect was reconstructed with autologous pericardial patch (arrow); d) Preserved anatomy and fully competent mitral valve as well after the reconstruction; e) Postoperative echocardiography exam confirms long coaptation line with f) just a trace of residual mitral regurgitation.

The surgery was performed through the median sternotomy. The valve anatomy and leaflet thickness confirmed the diagnosis of Barlow disease. The posterior leaflet P2 scallop was prolapsing due to elongated and ruptured chordae and was at same time rigid and immobile due to severe calcifications. Posterior annulus was severely calcified as well (Figure 1a). The prolapsed segment was excised while the P1 and P3 scallops were detached from the annulus. Posterior annulus calcification was completely removed, leaving a large gap between the left ventricle and atrium (Figure 1b). The most demanding part of the procedure was a reconstruction of such an important atrioventricular discontinuity. The posterior annulus therefore, was repaired with 4 × 2 cm oval shape autologous pericardium (Figure 1c). Six separate pledgeted 4/0 „U“ stitches, were placed trough the lower rim of the pericardal patch, left ventricle myocardium, and thereafter pulled through the left atrial wall and tied on the left atrial side (Figure 2a). The upper rim of the pericardial patch was then sutured to the left atrial wall with 4/0 runnung polypropylene suture, making quite a strong posterior annulus reconstruction (Figure 2b). After that, the P1 and P3 scallops were reattached to the reconstructed posterior annulus by the leaflet sliding technique and sutured with no strain. Annuloplasty was performed with the N^{o} 36 SJM Saddle ring, Saint Jude Medical, SAD (Figure 1d). The postoperative course was uneventful, and the patient was dicharged nine days after the surgery with almost fully competent mitral valve just a trace of mitral regurgitation was noticed (Figures 1e and 1f).

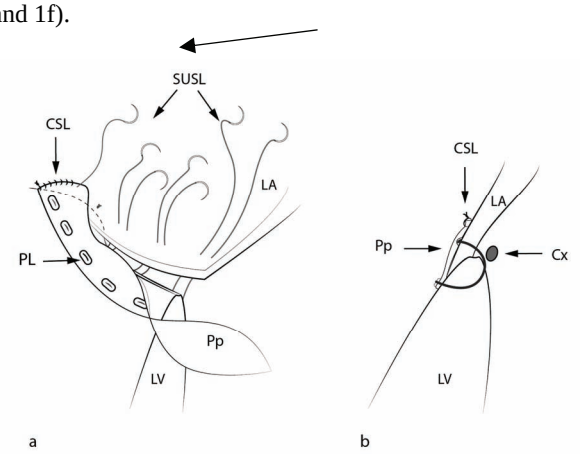

Fig. 2 – Posterior atrioventricular defect reconstruction with autologous pericardium.

a) First suture line is performed with single pledgetet „U“ stitches passed through the patch, myocardium and pulled out high on the atrial side. In that way, the atrial tissue is slided down to close atrioventricular defect, and prevent circumflex artery entrapment - atrial sliding technique (b). Second running suture line reinforces the repair and covers the first lineknotes.

CSL – continious suture line; SUSL – single „U“ stitch line; Pp – pericardial patch; LV – left ventricle myocardium; LA – left atrial wall; Cx – circumplex artery; PL – pledget on a single „U“ stitch.

Discussion

Barlow disease is one of the most complex pathologies in the mitral repair surgery. When present, annular calcifications makes mitral reconstructive surgery even more demanding. Although there is a quite enough leaflet tissue for the repair in these patients, leaflet mobility, pliability and overal repair durability as well, could not be fully achieved without the posterior annulus decalcification [4]. This is a complex and risky procedure for two reasons. Firstly, we must take care to protect circumflex artery in the atrioventicular (AV) groove (Figure 2b). Secondly, we have to keep in mind that decalcification at this level creates an AV defect [5, 6], which, if not repaired properly, results in catastrophic bleedeng afterwards. We reduced a possibility to entrap the circumflex artery by placing every single „U“ stitch under direct vision.

An additional support for such a large AV defect repair was achived by the additional runing suture. Therefore, we found that the double stitch line pericardial patch technique we decribed, is effective in preventing both adverse events (Figure 2). Furthermore, pliability of the new posterior annulus we created, provides elastic and solid base for the leaflet sliding suture as well as annuloplasty ring stitches. Such a solid, but elastic annular reconstruction allows a surgeon to acheive full leaflet mobility after the sliding plasty and to reduce the stress on a leaflet base.

Conclusion

Annulus calcifications in Barlow mitral valve disease has to be removed in order to obtain the pliable and durable valve repair. Atrioventricular defect upon decalcification could be safely reconstructed with autologous pericardium reinforeced by the double suture line technique.

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Received on March 12, 2017.
Revised on May 23, 2017.
Accepted on August 14, 2017.
Online First September, 2017.