described 59 aortic valve sparing procedures in Marfan's syndrome patients of whom 7 had mitral repair. There were also 4 AADTA patients in the report but they did not mention the concomitant double valve repair in any of acute dissection patient (5).

There are only a few papers, which report combined aortic and mitral valve repair and durability even under elective conditions. Gillinov et al. (6) reported an acceptable late survival, an excellent freedom from valve-related morbidity, but limited long-term durability with ten-year-freedom from reoperation of 65%. The risk factors for valve-related reoperation they reported were aortic stenosis, rheumatic valve disease, and anterior mitral leaflet pathology. Kazui et al. (7) reported excellent early results with the 30-day survival rate were 100% and there were no valve related morbidity during a one-year follow-up.

In our institution, mitral valve repair is attempted first regardless to the etiology of mitral insufficiency and the Cabrol commissure sutures have been the mainstay of aortic valve repair especially after AADTA.

Surgeons are generally more familiar with valve replacement then reconstruction. Prolonged operation time with expansion of aortic cross clamp and extracorporeal circulation time is another potential drawback for application of reconstructive techniques especially under AADTA. The benefits of double-valve repair should overcome the ongoing discussions and surgeons should increase their experiences with reconstructive techniques in elective cases. In conclusion, we believe that valve repair should be tried even in emergency conditions and double valve involvement whenever it is possible.

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References

1. Svensson LG, Deglurkar I, Ung J, Pettersson G, Gillinov AM, D'Agostino RS, et al. Aortic valve repair and root preservation by remodeling, reimplantation, and tailoring: technical aspects and early outcome. J Card Surg 2007; 22: 473-9.
2. Kallenbach K, Pethig K, Leyh RG, Baric D, Haverich A, Harringer W. Acute dissection of the ascending aorta: first results of emergency valve sparing aortic root reconstruction. Eur J Cardiothorac Surg 2002; 22: 218-22.
3. Erasmi AW, Stierle U, Bechtel JFM, Schmidtke C, Sievers HH, Kraatz EG. Up to 7 years' experience with valve-sparing aortic root remodeling/reimplantation for acute type A dissection. Ann Thorac Surg 2003; 76: 99-104.
4. Forteza A, De Diego J, Centeno J, López MJ, Pérez E, Martín C, et al. Aortic valve-sparing in 37 patients with Marfan syndrome: midterm results with David operation. Ann Thorac Surg 2010; 89: 93-6.
5. Kallenbach K, Baraki H, Khaladj N, Kamiya H, Hagl C, Haverich A, et al. Aortic valve-sparing operations in Marfan syndrome: what do we know after a decade? Ann Thorac Surg 2007; 83: 764-8.
6. Gillinov AM, Blackstone EH, White J, Howard M, Ahkrass R, Marullo A, et al. Durability of combined aortic and mitral valve repair. Ann Thorac Surg 2001; 72: 20-7.
7. Kazui T, Kin H, Izumoto H, Nakajima T, Ishihara K, Kawazoe K. Combined aortic and mitral valve repair. Asian Cardiovasc Thorac Ann 2003; 11: 319-22.

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Diagnostic importance of aVR derivation in exercise stress testing for interpreting of multivessel and proximal LAD disease

Egzersiz stres testinde aVR derivasyonunun çok damar ve LAD proksimal lezyonu için diyagnostik önemi

Exercise stress testing (EST) is the most frequently used diagnostic method for diagnosing stable coronary artery disease (CAD). EST has some deficiencies due to its relatively low specificity and sensitivity. Many studies have been performed to improve the diagnostic accuracy of EST. The other occupation has become definition the localization of ischemia. Herein electrocardiographic parameters especially ST segment elevation in aVR derivation have been evaluated for this subject. The importance of ST elevation in aVR has been demonstrated in the setting of acute coronary syndrome (1, 2) and latest studies investigated value of aVR derivation in EST. In a retrospective screening study reported that exercise-induced ST-segment elevation in lead aVR is a sensitive (92.9%), but not specific (48.6%), electrocardiographic finding of significant left main coronary artery (LMCA) disease (3). Michaelides et al. (4) reported that exercise-induced ST elevation in aVR and concomitant ST depression in V5, may detect left anterior descending artery (LAD) significant stenosis in patients with single vessel disease. In an another larger study, Uthamalingam et al. (5) reported that sensitivity for LMCA or ostial LAD stenosis was 75%, specificity was 81%, overall predictive accuracy was 80% for 1-mm ST elevation in lead aVR.

At this point, we want to share EST findings in terms of ST elevation in lead aVR of our study, which is going to be published at this journal and issue. The title of our study was '' Relationship between Heart-type Fatty Acid-Binding protein levels and coronary artery disease in Exercise Stress Testing: an observational study''. Our study enrolled 45 patients, while 19 of those having normal coronary anatomy were accepted as the control group; the remaining 26 patients had coronary lesions over 70% in at least in one major coronary artery. Treadmill EST was applied to all patients in accordance with Bruce's protocol. None of them had LMCA disease because LMCA stenosis is a relative contraindication for performing EST. Interpretations of conventional electrocardiographic parameters are summarized in Table 1. ST segment depression ≥1mm occurred in 19 patients in the CAD group and in 10 patients in the control group and the characteristic of ST depression was more prominently downsloping in the CAD group (Table 1). Calculated sensitivity, specificity, positive and negative predictive values (according to ST segment depression ≥1mm) in our study were 73%, 74%, 79% and 67%, respectively and these results were compatible with meta-analysis results. Our study was not designed to determine the diagnostic accuracy of ST elevation in lead aVR, so we selected the patients after coronary angiography as control and CAD group and then EST was applied. In our study, although we investigated the relation of the biochemical marker utilized in the study with myocardial ischemia parameters during EST, we also tried to evaluate the association between elevation in aVR and significant CAD in a secondary analysis.

Thirteen patients (50%) had ST segment elevation at least 1 mm in the aVR derivation in the CAD group and only one (5.3%) patient had in the normal coronary group. Sensitivity, specificity, positive and negative predictive value of ST elevation of in lead aVR were 50%, 94%, 92%, 58%, respectively. In our study, 8 of 13 patients having multivessel (≥2) disease and and 5 of 7 patients having proximal LAD stenosis had ST elevation in aVR in the CAD group.

As a result, even though there is limited number of patients enrolled in our study, these results call attention that the interpretation of ST

Table 1. The comparison of EST results

Variables	Control group (n=19)	CAD group (n=26)	p*
Maximum heart rate, beats/min	143.00±20.95	128.00±18.82	0.011
Maximal MET, units	9.7±2.1	9.30±2.21	0.555
ST segment depression ≥1mm, n (%)	10 (52.6)	19 (73.1)	0.157
ST segment depression, n (%)			
Downsloping	0 (0)	13 (68.4)	0.000
Upsloping	5 (50)	0 (0)	0.000
ST elevation in lead aVR (≥1mm), n (%)	1 (5.3)	13 (50)	0.004

Data are presented as mean±SD and proportions/percentages
*Chi-square test and unpaired Student's t-test

elevation in aVR derivation has great significance not only in making localization of LMCA lesions, but also in multivessel and LAD proximal lesions for improving the diagnostic performance of EST with high specificity and positive predictive value.

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References

1. Yamaji H, Iwasaki K, Kusachi S, Murakami T, Hirami R, Hamamoto H, et al. Prediction of acute left main coronary artery obstruction by 12-lead electrocardiography. ST segment elevation in lead aVR with less ST segment elevation in lead V(1). J Am Coll Cardiol 2001; 38: 1348-54.
2. Aygül N, Özdemir K, Tokaç M, Aygül MU, Düzenli MA, Abacı A, et al. Value of lead aVR in predicting acute occlusion of proximal left anterior descending coronary artery and in-hospital outcome in ST-elevation myocardial infarction: an electrocardiographic predictor of poor prognosis. J Electrocardiol 2008; 41: 335-41.
3. Tuna Katırcıbaşı M, Tolga Koçum H, Tekin A, Erol T, Tekin G, Baltalı M, et al. Exercise-induced ST-segment elevation in leads aVR and V1 for the prediction of left main disease. Int J Cardiol 2008; 128: 240-3.
4. Michaelides AP, Psomadaki ZD, Richter DJ, Dilaveris PE, Andrikopoulos GK, Stefanadis C, et al. Significance of exercise-induced simultaneous ST-segment changes in lead aVR and V5. Int J Cardiol 1999; 71: 49-56.
5. Uthamalingam S, Zheng H, Leavitt M, Pomerantsev E, Ahmado I, Gurm GS, et al. Exercise-induced ST-segment elevation in ECG lead aVR is a useful indicator of significant left main or ostial LAD coronary artery stenosis. JACC Cardiovasc Imaging 2011; 4: 176-86.

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