

Is Isolated Coronary Artery Bypass Grafting Sufficient to Treat Moderate Chronic Ischemic Mitral Regurgitation?

Orta Derecede Kronik İskemik Mitral Yetersizliği Tedavisinde İzole Koroner Arter Bypass Grefti Yeterli mi?

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Abstract

Objective Approach to ischemic mitral regurgitation is one of the most challenging areas of cardiovascular surgery. Since it is primarily due to left ventricular disturbances rather than mitral valve pathologies itself, interventional approach to IMR has always been controversial: To touch or no- touch. In this study we aimed to research prognosis of IMR in patients underwent isolated coronary arter bypass surgery that had IMR preoperatively.

Materials and Methods Thirty patients suffering from coronary artery disease and 2+/ 3+ IMR who underwent isolated- CABG included to the study. Postoperative IMR degrees were compared to preoperative values in respect to left ventricular diameters/ volumes and ejection fraction.

Results Postoperative 12th. mount trans-thoracic echocardiographic measures revealed Postoperative 12 th. mount TTE findings; LVEF and IMR degrees were significantly decreased. On the other hand, LVEDD, LVESD and left atrial diameter did not changed statistically.

Conclusion We thought that isolated CABG has an decreasing effect on IMR degree and it's safe and effective intervention in selected patients having CAD and concomittant 2+/ 3+ IMR preoperatively.

Keywords Mitral regurgitation, Coronary artery disease, Trans-thoracic echocardiographin, Ejection fractio,

Öz

Amaç İskemik mitral yetmezliğine yaklaşım, kalp- damar cerrahisinin gri alanlarından biri olmaya devam etmektedir. İskemik mitral yetmezliği, mitral kapağının kendi patolojisinden kaynaklanmak yerine bir sol ventrikül hastalığı olması nedeniyle, nasıl bir yaklaşımda bulunulacağı hala tartışılmaktadır: Girişimde bulunmak mı, dokunmamak mı? Bu çalışmamızda, preoperatif dönemde İMY olan ve izole CABG uyguladığımız hastalarda post operatif dönem İMY setrini inceledik.

Gereç ve Yöntemler Çalışmamıza 2+/ 3+ İMY olup izole CABG uyguladığımız 30 hasta dahil edildi. Preoperatif ve postoperatif İMY dereceleri, EF, LV çapları ve volümleri mukayese edildi.

Bulgular Postoperatif dönemde EF ve İMY derecelerinde anlamlı ölçüde azalma olduğu buna karşılık sol ventrikül çap ve volümlerinde anlamlı farklılık olmadığı görüldü.

Sonuç 2+/ 3+ İMY olan koroner arter hastalarına yapılacak izole CABG girişiminin seçilmiş hasta grubunda İMY üzerinde iyileştirici etkisi olduğuna inanıyoruz.

Anahtar Kelimeler Mitral yetmezlik, Koroner arter hastalığı, Transtorasik ekokardiyografik, Ejeksiyon fraksiyonu,,

INTRODUCTION

Ischemic mitral regurgitation (IMR), is a disease of left ventricle and occurs as a result of myocardial ischemia or infarction. It's not an anatomical but a physiological pathology owing to left ventricular remodeling and subsequent changes in geometry. Although it causes poor quality of life and long-term survival, optimal management of IMR is yet absolute.

Between 10.9 and 19.0% of patients with symptomatic coronary artery disease who have cardiac catheterization and (1), average 5 % of patients who have myocardial revascularization have generally 1+ to 2+ IMR. (2- 5) Although severe (4+) mitral regurgitation is accepted to be intervened, and (1+) mitral regurgitation to be left untouched; the optimal management of mild to moderate (2+ and 3+) mitral regurgitation remains controversial.

In this study we investigated the patients prognosis in regard to MR, who had moderate IMR+ CAD and underwent isolated CABG.

MATERIAL AND METHODS

Between January and February 2012, 30 patients who had 2+, and 3+ ischemic mitral regurgitation and underwent isolated CABG were included to the study. Preoperative and postoperative transthoracic echocardiography was performed to reveal degree of mitral regurgitation in those patients. IMR degree was classified as mild 1+, moderate 2+, moderate-to- severe 3+, and severe 4+. Left ventricle ejection fraction, left ventricle systolic and diastolic diameters and bi- atrial diameters also measured via transthoracic echocardiography. Functional capacity of patients were also evaluated according to NYHA classification.

Statistical Analysis

Statistical analysis was performed using, IBM SPSS version 20.0 (SPSS Inc., Chicago, IL, USA). The Kolmogorov-Smirnov test were used to examine whether the data were suitable for normal distribution. Descriptive data were expressed in mean \pm standard deviation (SD), median (min./max.) or number and frequency, where applicable.

The Student t-test was used to analyze parametric variables. The Kruskal-Wallis test was used to analyze variables that did not meet normal distribution assumption. A p value of <0.05 was considered statistically significant.

RESULTS

Thirty patients who had 2+, and 3+ ischemic mitral regurgitation that underwent isolated CABG were included to the study. (Table 1)Twenty-one patients were male (% 70) and 9 female (% 30). Average age of them was 65,26 y. (37- 80 y.). Mean preoperative LVEF was 40 %. Preoperative IMR degree was 2+ in 40% and 3+ in 60 % of them. Mean preoperative LVESD and LVEDD were 3,60 \pm 0,82 cm. and 5.23 \pm 0.65 cm. respectively. (Table 2)

Table 1. Patients Demographic Characteristics.

Patients Characteristics	Number	%
Age	37-80	65,26
Male	21	70
Female	9	30
Dispnea	12	40
Angina Pectoris	19	63,3
DM	14	46,7
Hypertension	16	53,3
COPD	3	10
CRF	2	6,66
Family Story	8	26,6
Smoking	12	40

DM: Diabetes mellitus, COPD: Chronic obstructive pulmonary disease.
 CRF: Chronic renal failure.

Table 2. Preoperative and postoperative TTE findings.

	PREOPERATIVE TTE	POSTOPERATIVE TTE	p value
Ejection Fraction	40.00 (35.00-45.00)	30.00 (30.00-45.00)	0.047
LVEDD	5.23 \pm 0.65	5.29 \pm 0.64	0.567
LVESD	3.60 \pm 0.82	3.58 \pm 0.92	0.897
LAD	4.35 (4.00-4.40)	4.45(4.30-4.70)	0.077
MR degree	2.00(2.00-2.00)	1.5(1.00-2.00)	0.034

TTE: Transthoracic echocardiography. LVEDD: Left ventricle end diastolic diameter. LVESD: Left ventricle end systolic diameter. LAD: Left atrial diameter. MR: Mitral regurgitation.

DISCUSSION

In 11 and 55% of patients suffering from an acute coronary syndrome, a mitral systolic murmur that disappears before discharge, might be revealed. In one study, 19% of 11,748 patients who had elective cardiac catheterization for symptomatic coronary artery disease (CAD) had ventriculographic evidence of mitral regurgitation (MR) (1). It means that chronic IMR can sustain or might later develop. Chronic IMR is a process resulting from complex geometrical alteration of the mitral valve apparatus as a result of ischemic left ventricular remodeling (6).

In chronic IMR, reasons for incomplete mitral valve closure were left ventricular remodeling and papillary muscle displacement. Remodeling causes annular dilatation with papillary muscle and chordal restriction of leaflet motion.

In ischemic left ventricular remodeling, asymmetric annular dilatation and leaflet tethering result in the annulus shape disturbance and produce chronic IMR (7). Unlike reported before, the anterior portion of the annulus also dilates as posterior portion (8). What should be done in the case of IMR and CAD are present together? It's agreed that concomitant severe (4+) mitral regurgitation must be corrected at the time of CABG, since revascularization alone is not enough to reveal severe mitral regurgitation.

Also, it's agreed that mild (1+) mitral regurgitation is to be left untouched because it will not adversely affect long-term symptomatology or prognosis.

What if moderate (2+) or moderate-to-severe (3+) mitral regurgitation is present? It's controversial. IMR has a negative impact on long-term survival. Several studies reported the negative impact of IMR on long-term survival (9-12). Isolated CABG performed in patients with chronic IMR has a higher hospital mortality than in patients without IMR (5).

Mild (1+) IMR increases operative mortality from 3.4 to 4.5% (72-74, 80) and moderate (2+) IMR raises operative mortality from 6 to 11% (3-5,13). Two-year survival for revascularization alone in patients with 1+ and 2+

mitral regurgitation is 78 and 88%, respectively (14). Five-year survival rates for patients with mild mitral regurgitation range between 70 and 80% (1,3,15,16). For moderate mitral regurgitation, 5-year survival ranges between 60 and 70% (17,18). Many surgeons argue that concomitant IMR should be addressed during CABG to affect survival.

On the contrary, those who advocate the conservative approach of revascularization alone, argue that revascularization will improve regional wall motion abnormalities, papillary muscle function, and potentially correct IMR (2,19,20). We also found in our study that isolated CABG had a corrective effect on 2+, 3+ IMR cases. Moreover, there are data that survival and long-term functional status are not improved with concomitant mitral valve intervention (21, 22).

Surgeons who advocate mitral valve intervention for moderate IMR during CABG reported that revascularization does not correct IMR (23), and that uncorrected IMR may result in late symptoms and decreased long-term survival (10, 14). Previous studies suggest that CABG alone improves IMR grade and functional status (2,19,20). However, in contrast, recent reports have suggested that CABG alone is not the optimal therapy for moderate IMR (23, 24, 25).

A study reported that moderate (2+) IMR does not resolve with isolated CABG, and is associated with reduced survival (26). Several studies have compared the results of CABG alone versus CABG with concomitant mitral valve intervention in the setting of moderate IMR (27-32). They suggest that post-operative mitral regurgitation is improved with CABG and concomitant mitral valve intervention. In summary, patients with CAD with concomitant severe (4+) IMR should undergo CABG/mitral valve intervention, and mild (1+) IMR should be left untouched. In gray zone patients with moderate (2+) IMR, recent studies may suggest that CABG/mitral valve intervention may be justified, given the lower rate of morbidity and mortality in the modern surgical era, but this remains to be determined (6).

In patients with left ventricular dysfunction, increased left ventricular dimension, and in patients with symptoms of congestive heart failure and especially in the case of incomplete revascularization IMR worsens postoperatively. In this particular group of patients, CABG/ mitral valve intervention should be performed (6).

Limitations of this study

Not to compare our study group with another one underwent concomitant CABG/ mitral valve intervention is the limitation of this study.

CONCLUSION

Even though its limitations mentioned above we thought that isolated CABG and no-touch approach to 2+/ 3+ IMR has a healing effect on IMR degree. Also, it's a safe and effective intervention in selected patients having CAD and concomitant 2+/ 3+ IMR preoperatively.

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