

Coronary artery revascularization combined with server ischemic mitral valve repair early and midterm outcome

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Abstract

Functional ischemic mitral regurgitation (MR) occur in up to 40% of patients after myocardial infraction. Chronic ischemic mitral regurgitation (IMR) is a frequent and important complication after myocardial infarction. This is a single center, retrospective, single cohort study, during two year period (2018–2020). It included all the cases of combined operation of MV repair and CABG. Follow-up of patients was performed through clinical visit. The patients were followed up for a median duration of (six months to 1 year). All patients underwent transthoracic echocardiography (TTE) and preoperative coronary angiography. Carotid Doppler study was requested for those patients with previous stroke and/or peripheral vascular disease (PVD). The followings were obtained; socio-demographic data, information regarding clinical courses, intraoperative findings, and post-operative follow up data. The study included 68 cases, the mean age was 58 years (ranging from 45 to 78 years), 36 (52.9%) were males and 32(47%) were female. The most common comorbidity was hypertension which was found in 22(32.3%) patients. The mean preoperative ejection fraction was 54%. Twenty-two patients had single graft, 29 patients underwent 3-vessel grafting, 17 patients had 2- vessel grafting. The CPB duration ranged from 120 to 140 min with a mean of 120 min and cross-clamp time ranged from 40 to 80 min. The average duration of admission to the intensive care unit was ranging from 48 h to 72 h. The patients stayed at hospital a mean of 8 days (ranging from 7 to 10 days). The most common complication was Arrhythmia which occurred in 8 cases and managed (Table 2). Overall mortality was 4.4% (3 patients), the

causes were as the followings; CVA in one case, multi-organ failure in one case and cardiac tamponade in one case who was presented two weeks after operation. In conclusion, early mortality was less, quality of life better, but no reduction in late mortality.

Keywords: mitral regurgitation, peripheral vascular disease, coronary angiography, Carotid Doppler study, coronary artery revascularization

Introduction

Functional ischemic mitral regurgitation (MR) occur in up to 40% of patients after myocardial infarction [1]. Chronic ischemic mitral regurgitation (IMR) is a frequent and important complication after myocardial infarction. Its pathophysiologic mechanisms account for remodeling of segmental/global left ventricle (LV) inducing papillary muscle displacement and leaflet tethering [2]. The combination of MVR with CABG is generally considered to have a greater early and late mortality than either procedure alone. CAD is often associated with mitral valve disease, but may not be the cause of the valve dysfunction. Current guidelines recommend mitral valve surgery for severe IMR, but do not demonstrate a specific type of procedure [3,4].

Patients and methods

Design and setting

This is a single center, retrospective, single cohort study, during two year period (2018–2020). It included all the cases of combined operation of MV repair and CABG. Those patients with double valvular intervention were excluded from the study. Follow-up of patients was performed through clinical visit. The patients were followed up for a median duration of (six months to 1 year).

Preoperative intervention

All patients underwent transthoracic echocardiography (TTE) and preoperative coronary angiography. Carotid Doppler study was requested for those patients with previous stroke and/or peripheral vascular disease (PVD).

Operative intervention

Standard cardiac surgery monitoring was used. The operation was performed through a median sternotomy. Before the institution of cardiopulmonary bypass (CPB) the grafts were harvested. The left internal mammary artery (LIMA) was harvested in the pedicle fashion.

The saphenous vein was harvested in the standard fashion. After heparin administration CPB was instituted then, distal anastomosis done on beating heart after that aortic cross clamping. Delnido, blood cardioplegia was used in all cases, induction was commenced by antegrade root. Venting the left ventricle was established through superior pulmonary vein. Left atriotomy. The anterior

leaflets were examined as well as posterior one. All of the patients underwent rigid anuloplasty some of them need plication of posterior leaflet, resection of leaflet or neochordea. The proximal anastomoses were done lastly. Then weaning from CPB and TEE done for all patient. Mild residual regurgitation was accepted.

Data collection

The data were collected from hospital records and registers of hospital statistics. The followings were obtained; socio-demographic data, information regarding clinical courses, intraoperative findings, and post-operative follow up data.

Result

The study included 68 cases, the mean age was 58 years (ranging from 45 years to 78 years), 36 (52.9%) of them were males and 32(47%) were female. The most common comorbidity was hypertension which was found in 22(32.3%) patients (Table 1). The mean preoperative ejectionfraction was 54% (ranging from 42% to 60%). Twenty-two patients had single graft, 29 patients underwent 3-vessel grafting, 17 patients had 2- vessel grafting.The CPB duration ranged from 120 to 140 min with a mean of 120 min and cross-clamp time ranged from 40 to 80 min. The average duration of admission to the intensive care unit was ranging from 48 h to 72 h. The patients stayed at hospital a mean of 8 days (ranging from 7 to 10 days). The most common complication was Arrhythmia which occurred in 8 cases and managed (Table 2).Overall mortality was 4.4% (3 patients), the causes were as the followings; CVA in one case, multi-organ failure in one case and cardiac tamponade in one case who was presented two weeks after operation.

Table 1. Comorbidities of the participants.

Comorbidities	No.	%
Hypertension	22	32.3
Diabetes mellitus	20	29.4
Dyslipidemia	18	26.4
Atrial fibrillation	10	14.7
Chronic obstructive airway disease	4	5.8
Stroke	2	2.9
Percutaneous coronary intervention	2	2.9

Table 2. Postoperative complications.

Complications	No.	%
Arrhythmia	8	11.76
Heart block	4	5.8
Renal impairment	4	5.8
Respiratory complication	6	8.8
Pericardial effusion	2	2.9
Deep sternal wound infection	2	2.9
Re exploration	2	2.9
Gastrointestinal bleeding	2	2.9
Stroke	2	2.9

Discussion

In our study, only severe mitral regurgitation has been operated on. Practice guidelines recommend consideration of mitral valve repair or chordal-sparing replacement for patients with severe ischemic mitral regurgitation. These guidelines, however, do not specify whether to repair or replace the mitral valve, because conclusive evidence is lacking to indicate which of these interventions is superior [5].

Regarding moderate MR, Fattouch et, al favoring a conservative approach believe that CABG alone can be sufficient to obtain a reduction in MR postoperatively and to improve clinical symptoms. These authors suggest that myocardial revascularization alone, restoring a good myocardial perfusion, leads to an enhancement of left ventricular segmental and global kinesi, to a reduction in left ventricular dimensions, and finally to significant reduction in MR because of restored valvular function. Fattouch et, believe that these findings are partially true because in many patients with scarce area of myocardium after infarction, CABG could not be effective in myocardial functional improvement, left ventricular remodeling can be maintained, and postoperative reversal remodeling is not predictable [6].

Mortality in our study was 4.4% Comparable to Karima et al study that show 6.9% Also Karima et al showed that among preoperative criteria, only congestive heart failure (CHF) was a risk factor for in-hospital mortality of concurrent CABG with MVR operation, whereas age, history of other major predisposing factors for CAD, and NYHA score did not influence on in-hospital mortality [7,8].The Society of Thoracic Surgeons reports MVP+CABG group had approximately 5% (4.8%

in-hospital mortality and 5.3% operative mortality) nationwide mortality rates in contrast with 8% (7.8% in-hospital mortality and 8.5% operative mortality) for MVR+CABG group [8], while M.P.B.O. Sá et al, mortality was 6.3% [9].

In Wang et al meta-analysis of eleven studies, which included patients undergoing repair or replacement electively with CABG surgery, no differences were found regarding peri-operative mortality and long-term survival. Mitral valve replacement was associated with lower incidence of mitral regurgitation in patients with IMR during CABG [10].

CPB and aortic cross-clamp durations were found to be significantly higher in patients undergoing CABG þ MV surgery. This is an intuitive finding given the increased complexity of a combined procedure. Longer CPB and aortic cross-clamp durations have been linked with a number of complications, including micro emboli, increased transfusion requirements, coagulation defects, and immunosuppression [11, 12, 13].

Acker et al. found that comparison between chordal-sparing mitral valve replacement and repair in patients with severe ischemic mitral regurgitation did not show significant differences. This conclusion was based on the absence of a significant difference in left ventricular reverse remodeling and in the rate of major adverse cardiac or cerebrovascular events at 12 months. Mitral valve replacement provides a considerably more durable correction of mitral regurgitation, which may have an important effect on long-term outcomes [14].

Ahmed, O.F., Kakamad, F.H et al , found that CABG and chordal-sparing and posterior leaflet replacement has favorable outcome, as well as minimizes the need of redo surgery as in repair. one of the best options for CAD and sever MR [15].

Larger trials with longer follow-up duration are required to further assess overall survival and freedom from reintervention, as well as the impact of both surgical approaches on quality of life and health care costs.

The most important limitations for this study that cannot be neglected; small sample size, study design (no comparison group), single center.

Conclusions

Early mortality was less, quality of life better, but no reduction in late mortality.

Funding

None

Conflict of interesting

None

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