Consequence of moderate ischemic mitral regurgitation after isolated coronary revascularization in patients with low ejection fraction

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Backgrounds;
Ischemic mitral regurgitation (IMR) is a predictor of adverse cardiac events after coronary artery bypass grafting (CABG). Patients' selection for mitral valve procedure concomitant with CABG may be crucial, especially in the era of off-pump surgery. The aim of this study was to delineate the impact of isolated CABG on moderate IMR.

Methods;
We retrospectively reviewed clinical records of 41 patients who had moderate IMR with ejection fraction (EF) < 35%, and underwent isolated CABG between since 2007. Off-pump CABG was performed in 37/41(90%). M:F = 29:12.
These patients were divided to three groups. Group A(acute) consisted of 10 patients who were within a month after the onset of acute coronary syndrome or myocardial infarction (ACS/MI). Group S(subacute) consisted of 12 patients who were within 6 months after initial episode of congestive heart failure(HF). Group C(chronic) included remaining 19 patients. Improvement of IMR was defined as mild or less at latest postoperative echocardiography. Interval between CABG and latest echocardiography was 6.3 ± 10.8 months.

Results;
In group A, IMR was improved in 7(70%) patients, while IMR worsened to severe in 3 (30%) due to progression of tethering, postoperatively. There was no significant difference in EF, location of asynergy and Q wave, dimension of left ventricle and coaptation depth, and interval between ACS/MI and CABG between patients with improvement of IMR and those without. Of 12 patients in group S, improvement was found in 10(83%) patients. Of 3 patients whose interval between initial HF and CABG was 3 months or more, 2(67%) patients had moderate IMR postoperatively. In group C, 7(88%) of 8 patients with postoperative moderate IMR had asynergy in RCA region, while all of 5 patients with asynergy in LAD region presented improvement of IMR.

Conclusions;
For moderate IMR with EF<35%, possible candidates for mitral valve procedure may be patients within a month after ACS/MI of RCA region, and those who were 3 month or more after initial HF with asynergy of RCA region. On the contrary, improvement of IMR could highly predicted in patients with asynergy of LAD region, or less than 2 months after initial HF.

Methods

Between 2007 and December 2020
41 patients who had EF < 35%, CAD and moderate mitral regurgitation, underwent coronary artery bypass grafting (CABG) alone.

on-pump : off-pump = 4 : 37
41 patients were divided to 3 groups,
Acute (ACS or cardiogenic shock within 1 month); 10
Subacute (with 6 months after initial CHF); 12
Chronic (others); 19

Definitions:
"Improve" was defined as mild or less MR at latest UCG.
Interval between CABG and latest UCG was 6.3 ± 10.8 months
Correlations between improvement of MR and preoperative factors, such as
Preoperative history of CHF,
Interval between preoperative CHF or MI and CABG
Akinetic or severe hypokinetic area,
LAD and/or RCA area,
+/- Q wave II III aVf on electrocardiogram
echocardiogram; LV Dd/Ds, LVEF, coaptation depth,

Results - Subacute group-

Of 12 patients of the Subacute group,
mild or less MR; 10 pts (83%)
Moderate MR; 2 pts (17%)

	Moderate ~	Mild or less	P value
RCA asynergy	2/2	8/10	1.0
II III aVf	1/2	3/10	1.0
PW thickness	8.5±0.7	10.1±1,7	0.09
LAD asynergy only	0/2	2/10	1.0
LAD+RCA	1/2	2/10	0.45
Interval between CHF and CABG	4.5±2.1 3-6m	1.9±1.5 1-5m	0.31
> 3 months	2/2	2/10	-
EF	29.0±5.6	32.5±2.1	0.20
Post-EF	31.5±3.5	36.6±6.6	0.22

Summary

Within 1 month after AMI (Acute group),
Moderate MR could become severe, probably due to **progression of tethering**.
Within 6 months after initial CHF (Subacute group),
Improvement of MR could be highly expected in patients who were within 2 months after initial CHF.
3 months or more, improvement was seen in 50%.
In the Chronic group,
Improvement of MR could be expected after CABG alone, in patients with **asynergy in the LAD region only**.
MR was not improved in patient with **asynergy in the RCA** region, even without Q wave.

Results - Acute group-

Of 10 patients of the Acute group,
Mild or less MR; 7 pts (70%)
Severe MR; 3 pts (30%).

	severe	Mild or less	P value
RCA asynergy	3/3	6/7	1.0
Q wave in II III aVf	2/3	2/7	0.55
PW thickness	8-11	8-11	-
LAD asynergy only	0/3	1/7	1.0
LAD+RCA	0/3	3/7	0.48
Interval MI and CABG	4d-4W	0-4W	-
EF	24-28	19-33	0.45
Post-EF	27-34	29-46	0.04

Results - Chronic group-

Of 19 patients of the Chronic group,
Mild or less MR; 11 pts (53%)
Moderate MR; 8 pts (47%)

	Mod-	Mild or less	P value
RCA asynergy	7/8	6/11	1.0
Q wave in II III aVf	1/8	2/11	1.0
PW thickness	9.1±2.5	10.2±1,7	0.14
LAD asynergy only	0/8	5/11	1.0
LAD LCX asynergy	1/8	0/11	1.0
LAD+RCA	1/8	2/11	0.45
Coaptation depth (mm)	10.6±2.5	10.3±2.1	0.43
LVDd	62.1±7.2	62.7±5.2	0.42
EF	24.1±7.0	22.8±3.8	0.30
Post-EF	30.1±6.8	30.0±5.8	0.45

Conclusions

possible candidates for concomitant MVP may be as following;
EF < 35% and moderate MR
within 1 month after STEMI of RCA region
3 months or later after initial CHF (with RCA asynergy)
with severe hypokinesis ~ akinesis in RCA region
irrespective of Q wave
Even during on-pump CABG, indication for MVP should carefully determined.