



ORIGINAL ARTICLE

## Mitral valve replacement combined with coronary artery bypass graft surgery in patients with moderate-to-severe ischemic mitral regurgitation

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### KEYWORDS

Mitral valve insufficiency;  
Coronary artery bypass;  
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### Abstract

**Introduction:** Ischemic mitral regurgitation (IMR) is associated with increased mortality. Even after coronary artery bypass grafting (CABG), IMR reduces survival. Several studies have shown increased perioperative mortality for mitral valve replacement (MVR) in this situation, but the subject remains controversial.

**Objective:** To investigate the impact of MVR on immediate outcomes in patients with moderate-to-severe IMR undergoing concomitant CABG compared with those undergoing CABG only.

**Methods:** We performed a retrospective study of 42 patients undergoing CABG + MVR (n=16) or CABG only (n=26) at the Division of Cardiovascular Surgery of PROCAPE, between May 2007 and April 2010. Preoperative clinical characteristics, procedural characteristics, major and minor complications after surgery, preoperative and postoperative left ventricular ejection fraction (LVEF) by echocardiography, and outcome (survivor or death) were assessed.

**Results:** Mean patient age was  $63.4 \pm 8.5$  years, and 64.8% (n=23) were male. The CABG + MVR group showed lower rates of postoperative low cardiac output (6.3% vs. 42.3%,  $p=0.014$ ) and atrial fibrillation (6.3% vs. 38.5%,  $p=0.021$ ). Both groups had higher mean LVEF in the postoperative compared with the preoperative period, but the average gain in LVEF in the CABG + MVR group was higher than in the CABG-only group ( $8.88 \pm 2.39$  vs.  $4.31 \pm 1.23$ ,  $p<0.001$ ). There was no significant difference in operative mortality (6.3% vs. 7.7%,  $p=0.679$ ).

**Conclusions:** CABG + MVR can be performed safely in patients with moderate-to-severe IMR. CABG + MVR resulted in lower rates of complications than CABG only. Both surgical approaches resulted in significant improvement of postoperative LVEF. However, there was greater improvement in the CABG + MVR group.

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**PALAVRAS-CHAVE**

Insuficiência da valva mitral;  
Ponte de artéria coronária;  
Isquemia miocárdica

## Substituição da valva mitral combinada com cirurgia de revascularização do miocárdio em pacientes com regurgitação mitral isquêmica moderada a grave

**Resumo**

**Introdução:** A Regurgitação mitral isquêmica (RMI) está associada ao aumento da mortalidade. Mesmo após a cirurgia de revascularização miocárdica (CRM), reduz a sobrevida. Vários estudos enfatizam o aumento da mortalidade perioperatória com troca valvar mitral (TVM) nesta situação, mas isto ainda é controverso.

**Objetivo:** Investigar o impacto da TVM nos resultados imediatos em pacientes com RMI moderada a grave submetidos à CRM em comparação com aqueles submetidos à CRM apenas.

**Métodos:** Estudo retrospectivo de 42 pacientes submetidos à CRM+TVM (n=16) ou CRM isolada (n=26) na Divisão de Cirurgia Cardiovascular do PROCAPE, de maio de 2007 a abril de 2010. Foram avaliadas características clínicas pré-operatórias, características do procedimento, complicações após a cirurgia, fração de ejeção do ventrículo esquerdo (FEVE) pré e pós-operatório pelo ecocardiograma e evolução (sobrevivência ou óbito).

**Resultados:** A idade média dos pacientes foi de 63,4 anos ( $\pm 8,5$ ), sendo 64,8% (n=23) do sexo masculino. O grupo CRM+TVM apresentou menores taxas de baixo débito cardíaco no pós-operatório (6,3 versus 42,3%, p=0,014) e fibrilação atrial (6,3% versus 38,5%, p=0,021). Ambos os grupos apresentaram maior média de FEVE no pós-operatório em comparação com o período pré-operatório; no entanto, o ganho médio da FEVE no grupo CRM+TVM foi maior em comparação com o grupo CRM isolada (8,88  $\pm$  2,39 versus 4,31  $\pm$  1,23, p < 0,001). Não houve diferença significativa nas taxas de mortalidade operatória (6,3 versus 7,7%, p=0,679).

**Conclusões:** CRM+TVM pode ser realizada com segurança em pacientes que têm RMI moderada a grave. CRM+TVM resultou em menores taxas de complicações do que a CRM isolada. Ambas as abordagens cirúrgicas resultaram em melhoria significativa da FEVE pós-operatória, por outro lado, houve maior ganho no grupo CRM+TVM.

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**Introduction**

Ischemic mitral regurgitation (IMR) is defined as mitral valve (MV) insufficiency precipitated by myocardial infarction, with normal leaflet and chordal morphology. IMR usually occurs with right or circumflex coronary infarction involving the posterior ventricular wall, posterior papillary muscle, and adjacent mitral annulus.<sup>1</sup> Common anatomic features include annular dilatation, displacement of papillary muscles, and varying degrees of leaflet restriction or tethering.<sup>1</sup> There is a clear association between IMR and increased late mortality.<sup>2-7</sup> Even after revascularization, IMR reduces late survival.<sup>2-7</sup>

Several studies have shown increased perioperative mortality for valve replacement in this situation, but the subject remains controversial.<sup>8-12</sup>

The objective of this study was to investigate the differences in immediate postoperative results (in-hospital complications and evolution) in patients with IMR undergoing coronary artery bypass grafting (CABG) with intraoperative correction of valve dysfunction by mitral valve replacement (MVR) compared with those undergoing CABG only.

**Methods****Study population**

We studied 42 consecutive patients with coronary artery disease associated with moderate-to-severe IMR

undergoing CABG at the Division of Cardiovascular Surgery of Pronto Socorro Cardiológico de Pernambuco (PROCAPE), between May 2007 and April 2010.

**Definition of ischemic mitral regurgitation**

IMR was defined as valve insufficiency caused by coronary artery disease. All patients had a history of myocardial infarction, ejection fraction <50% by echocardiography and moderate-to-severe functional MVR (without intrinsic changes in valve leaflets and/or subvalvular apparatus). All patients had one or more left ventricular (LV) segmental wall motion abnormalities and significant coronary disease in the territory supplying the wall motion abnormality.

**Exclusion criteria**

Patients with rheumatic, myxomatous, infectious, or congenital diseases of the mitral valve were excluded. Patients with mitral regurgitation due to papillary muscle rupture, torn or elongated chordae tendineae, or ballooning or scalloping of the mitral leaflets were not considered to have IMR. Patients with mild MVR were also not considered for the study.

**Study design**

We performed a retrospective study using medical records and initially generated two groups: CABG+MVR (biological valve prosthesis) or CABG only. In each instance, the

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