

# Coronary Artery Bypass Grafting Associated Endarterectomy In Three-vessel Coronary Artery Disease. Factors Influencing The Early Morbidity And Mortality: Initial Experience

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## Abstract

CABG associated coronary endarterectomy is a high-risk procedure, RCAS was the most frequently approached (52,17%); 1,94 endarterectomy/ patient were performed, 7 patients suffered myocardial infarction (6,14%), mortality was 4,38%. Age > 60 years, LMCAD, 6 or more CABG, diabetes mellitus, LVEF < 0,30; LVEDP > 20 mm Hg and triple endarterectomy were significantly associated to mortality.

## INTRODUCTION:

After the first report of the coronary endarterectomy by Bailey et al (1,2), the preference for this surgical procedure has decreased due to the increased morbidity and mortality rates (1,2,3,4,5,6,7,8,9,10,11,12). The groups of Johnson, Cooley, Jacoub and Minale coincide to report an increased incidence in post operative myocardial infarction and mortality rates (3,8,9), but in patients with total or subtotal large coronary artery obstructions in which there is no possibility to receive a conduit as graft for myocardial revascularization in an area of viable ischemic myocardium the need of an endarterectomy overtakes its disadvantages (1-12). The present report evaluates the factors influencing early morbidity and mortality in our initial experience with this procedure associated to coronary artery bypass grafting.

## PATIENTS AND METHODS:

### PATIENTS:

114 patients with three vessels coronary artery disease (CAD) undergone coronary artery bypass grafting (CABG) in whom coronary endarterectomy was performed between 1990-2000 in the Cardiovascular Center of Villa Clara.

### THORACIC APPROACH:

Median sternotomy in all patients (100%)

## MYOCARDIAL PROTECTION:

Atenolol: 100 mg. Im the morning of the surgery, moderated systemic hypothermia and cardioplegic arrest with intermittent cold crystalloid cardioplegia administered antegradely (through the aortic root) and retrogradely (through the coronary sinus)

## ARTERIAL CANNULATION:

Distal ascending aorta in all patients (100%)

## VENOUS CANNULATION:

With a unique two steps cannula placed through the right atrial appendix in all patients (100%).

## LEFT VENTRICULAR DECOMPRESSION:

Through the aortic root cannula

## INDICATIONS FOR CORONARY ENDARTHERECTOMY:

### TECHNIQUE FOR CORONARY ENDARTHERECTOMY:

Once the heart has been arrested and entirely decompressed, the coronary arteriotomy is performed an distally widened to expose the lesion in its complete length, otherwise is to perform two coronary arteriotomy, the first at its proximal extremity and the other one at its distal extremity, with the aid of a dissector clamp the cleavage way between the

adventitial and medial layers is achieved, then the lesion is dissected completely and extracted from the coronary artery, in the second technique the cleavage way is reached proximally and distally with the aid of the dissector clamp and the lesion is then disattached and tracted out gently through the proximal arteriotomy, after the atheromatous plaque has been extracted from the coronary artery the vessel is reconstructed with a venous patch or enlarging the distal extremity of a venous graft to be anastomosed to the wide arteriotomy, a conduit for CABG is anastomosed to an opening in the venous patch to perform revascularization.

Preoperative data appear in table 1.

{image:1}

Legend: COPD: Chronic obstructive pulmonary disease, NYHA: New York Heart Association, LVEF: Left ventricular ejection fraction, LVEDP: Left ventricular end diastolic pressure, LMCAD: Left main coronary artery disease

#### **VARIABLES STUDIED:**

Coronary arteries endarterectomized, unique and multiple endarterectomies, CABG/ coronary endarterectomy, coronary endarterectomy/ patient, early postoperative complications, hospital mortality and factors influencing morbidity and mortality.

#### **STATISTIC STUDY:**

Total, subtotal and mean number, percentages, and X2 distribution.

#### **RESULTS:**

From a total number of 114 patients, 222 endarterectomies were performed, the most frequently approached coronary system was the right coronary with 114 endarterectomies (52,17%), followed by 84 on the left anterior descending (37,83%) and 24 on the circumflex (10,8%), all patients were undergone triple coronary artery bypass grafting (CABG) or more, CABG 3 was the most frequent (48 patients; 42,10%) (table 2), but hospital mortality significantly increased when 6 or more than coronary artery bypass grafts were performed, 84 patients were undergone multiple coronary endarterectomy; 60 of them double (52,63%) and 24 triple (21,05%), the number of endarterectomy/ patient was 1,94.

{image:2}

Legend: LADCAS: Left anterior coronary artery system, CXS: Circumflex system, RCAS: Right coronary artery system, CABG: Coronary artery bypass grafting

The table 3 describes early postoperative complications, the most frequent of them were supraventricular dysrhythmias (23 patients, 20,17%), low cardiac output (20 patients; 17,54%) and myocardial infarction (7 patients; 6,14%), all them were significantly related to coronary artery endarterectomy, 5 patients died (4,38%); the main factors affecting hospital mortality were age older than 60 years, diagnosis of diabetes mellitus, FE-VI under 0,30, LVEDP over 20 mm Hg, LMCAD, triple endarterectomy and 6 or more coronary artery grafts (0,025)

{image:3}

#### **DISCUSSION:**

Coronary endarterectomy is a surgical procedure indicated in large, total or subtotal coronary artery lesions (1-12), there are two patients categories: in one of them unstable angina pectoris is refractory to the medical treatment, exists adequate LVEF, with viable myocardium and large, total or subtotal coronary artery lesions are angiographically demonstrated, in the other category such coronary artery lesions are not angiographically demonstrated and the indication of coronary endarterectomy is detected at the time of coronary arteriotomy, anyway these lesions are inappropriate for receiving a coronary bypass graft (CABG) unless previous endarterectomy is performed.

Currently between 5 and 20% of patients undergone coronary artery bypass grafting require coronary endarterectomy. The most frequently approached coronary system is the right one, followed by the left anterior descending and the circumflex (3-9). Minale et al. have reported the same frequency order with 60% for right coronary artery system (RCAS), 23% for left anterior descending (LAD) and 17% for circumflex system (Cx) (9). According to Livesay et al. from the Texas Heart Institute, reported an 83% for RCAS, 9% for LAD and 4% for Cx (6,7.). Hospital morbidity increases post CABG with endarterectomy, postoperative myocardial infarction is the most frequent complication dependent on this procedure (1-12), Qureshi et al. reported a 12% incidence (7), Brenowitz et al. from Milwaukee obtained a 5,6% incidence when CABG was performed without endarterectomy and a 6,5%, when endarterectomy was associated to CABG multiple coronary endarterectomy morbidity and hospital

mortality rates significantly increases; this author also reported a 4% mortality for patients undergone CABG without endarterectomy; 6,3% for those who were undergone CABG with unique coronary artery endarterectomy and 10,4% for the group of patients undergone CABG and multiple coronary artery endarterectomy (4,5). Livesay et al. reported lower hospital mortality rates; 2,6% for patients undergone CABG without coronary endarterectomy and 4,4% for those who received CABG with endarterectomy (6). The need of this procedure indicates high-complexity coronary artery lesions, a group of high-risk patients in whom CABG is not possible unless previous coronary endarterectomy is performed and morbidity and hospital mortality rates increases in comparison with CABG without endarterectomy (1-12). In our modest series the results were similar to those from the other consulted series.

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