Combined Valvular and Ischemic Heart Disease
Cairo University Experience

Thesis
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By

Mohamed Ahmed Abdalla Keshk
(M.B., B.Ch. Cairo University)

Supervised by

Prof. Dr. Mustafa Mohamed Radwan
Professor of Cardiothoracic Surgery
Faculty of Medicine, Cairo University

Prof. Dr. Mohamed Ibrahim Sharkawy
Professor of General Surgery
Faculty of Medicine, Cairo University

Dr. Mohamed Ibrahim Sewailam
Lecturer of Cardiothoracic Surgery
Faculty of Medicine, Cairo University

Faculty of Medicine
Cairo University
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To Mom and Dad,
For the endless giving and invaluable love
With all my heart. . . .thanks

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List of Abbreviations

ABG: Arterial Blood Gases
ACS: Acute Coronary Syndrome
AMI: Acute Myocardial Infarction
AR: Aortic Regurge
AS: Aortic Stenosis
AVR: Aortic Valve Replacement
CABG: Coronary Artery Bypass Grafting
CAD: Coronary Artery Disease
CCS: Canadian Cardiovascular Society
COPD: Chronic Obstructive Pulmonary Disease
CPB: Cardiopulmonary Bypass
CRF: Chronic Renal Failure
CVD: Central Vascular Disease
CVS: Cerebrovascular Stroke
CX: Circumflex Artery
DVR: Double Valve Replacement
EAO: Affective Orifice Area
EF: Ejection Fraction
EF: Ejection Fraction
FS: Fraction Shortening
GEA: Gastro- Epiploic Artery
GSV: Great Saphenous Vein
IEA: Inferior Epigastric Artery
IHD: Ischemic Heart Disease
IMA: Internal Mammary Artery
IMR: Ischemic Mitral Regurge
ITA: Internal Thoracic Artery
LAD: Left Anterior Descending
LIMA: Left Internal Mammary Artery
LITA: Left Internal Thoracic Artery
LVEDD: Left Ventricular End Diastolic Dimension
LVESD: Left Ventricular End Systolic Dimension
MI: Myocardial Infarction
MR: Mitral Regurge
MS: Mitral Stenosis
MVA: Mitral Valve Area

MVR: Mitral Valve Replacement
NYHA: New York Heart Association
OM: Obtuse Marginal
PASP: Pulmonary Artery Systolic Pressure
PDA: Posterior Descending Artery
PTCA: Percutaneous Transluminal Coronary Angioplasty
PVD: Peripheral Vascular Disease
RA: Radial Artery
RCA: Right Coronary Artery
RIMA: Right Internal Mammary Artery
RWMA: Regional Wall Motion Abnormalities
SVG: Saphenous Vein Graft
SWI: Sternal Wound Infection
TEE: Transesophageal Echocardiography
V/CABG: Valve/ Coronary Artery Bypass Graft

Abstract

Background: The combination of valve and coronary artery disease(CAD) is a challenging pathology for surgical treatment. In recent years an increasing number of patients suffering from such coexisting pathologies have been offered cardiac surgery, mainly because of the aging of the population of coronary artery bypass grafting (CABG) candidates. **Patients and methods:** 30 patients subjected to concomitant surgery for their valvular and ischemic heart disease were included in the study. We documented their preoperative variables, the surgical technique followed, and the postoperative course during the ICU and ward stay, with associated mortality and morbidity. **Results:** The study included 19 males with a mean age of 44.2± 5 years (range 40 to77) and 11 females with a mean age of 46±5 years (range 42 to 72). For patients with IHD and isolated mitral valve disease, 12 patients had CABG + MVR; while 5 had CABG + MV repair. For those with IHD and isolated aortic valve disease, all the 10 patients had CABG + AVR. Concerning the 3 patients with IHD and both mitral and aortic valve pathologies, 2 of them had CABG + AVR + MV repair, while only 1 patient had CABG + double valve replacement (DVR). The total number of distal anastomoses was 58, 21 of them was LIMA to the LAD, while a SVG was used to bypass a critical stenosis in the LAD only 3 patients. A SVG was used to bypass a critical anastomosis in coronaries other than the LAD in 34 occasions. 37 proximal anastomoses were done, all in the form of an aorto- SVG anastomosis. **Conclusion:** combined V/CABG surgery carries a greater risk than surgery for either pathology alone. Risk increases with female sex and advanced age. Surgery for CABG and IMR carries the greatest risk.

Key words: combined – coronary – valve – surgery

Introduction

Introduction and aim of work

The combination of valve and coronary artery disease (CAD) is a challenging pathology for surgical treatment. In recent years an increasing number of patients suffering from such coexisting diseases have been offered cardiac surgery. One reason for this is the aging of the population of patients being candidates for coronary artery bypass grafting (CABG) **(Herlitz et al, 1997)**.

Risk factors determining early and late outcomes of operative correction of valvular abnormalities combined with coronary artery bypass grafting (CABG) are still incompletely defined. This is mainly due to the lack of extensive follow-up data of larger patient populations operated on in the same center and the use of multivariate analysis of the results, not only in terms of survival, but also in terms of postoperative events. Even studies on the results of a specific type of valve operation in combination with CABG are few. Continuous aging of the population of CABG candidates increases the proportion with associated valve disease requiring operative correction, and vice versa. Thus, knowledge about risk factors related to this type of complex cardiac operation is mandatory. **(Flameng et al, 1996)**

It is well established that the combination of mitral valve replacement (MVR) and coronary artery bypass grafting (CABG) has a higher mortality rate than either procedure alone. Analysis of early and late

results to date has provided differing conclusions. Some studies have suggested that the etiology of the mitral valve disease is correlated to early and late survival (in particular, ischaemic mitral regurgitation). Others have suggested that operative mortality is related to the extent of coronary artery disease, severity of mitral regurgitation and operative status (emergency of elective). **(Ashraf et al, 1994)**

Combined mitral valve surgery and coronary artery bypass grafting is associated with a reported hospital mortality of 7± 18% [1±9], which is higher than the hospital mortality of 3% in isolated coronary artery bypass grafting [9] and 4±7% in isolated mitral valve procedures. When both operations are performed concomitantly, the hospital mortality is substantially greater than the simple addition. The reason for such a higher mortality in the case of additional coronary artery bypass grafting is not clearly defined, and the predictive value of the etiology of mitral valve disease (MVD) on early and late survival is still uncertain. While in some studies, the risk increases considerably in patients whose MVD represents an acute or chronic complication of the coronary artery disease, the etiology of MVD was not related to hospital mortality in others **(Seipelt et al, 2001)**

During a 10-year period from 1992 to 2001, more than 120,000 combined procedures have been performed in the United States, which represents 6.3% of the adult cardiac surgical work. These patients represent a unique combination of pathologic entities resulting in a wide variety of clinical and hemodynamic lesions, often necessitating complex surgical

procedures. These procedures carry a significantly greater risk compared with isolated CABG or isolated valve surgery. **(Karthik et al, 2005)**

The aim of this work is to analyze the results of cardiac operations involving correction of both valvular and coronary artery disease, in our institute, comparing our results and experience with that published from other centres, stressing on the perioperative risk factors, operative management, with their influence on postoperative in-hospital mortality and morbidity.

Review of literature

Pathophysiology, Clinical Presentation, and Diagnosis

Aortic stenosis and coronary artery disease:

Aortic stenosis is one of the most frequently encountered valvular lesions in adult populations. Since degenerative calcific aortic stenosis is most common in patients in their 60s, 70s, and 80s, and since congenitally bicuspid valves that become stenotic are more frequent in men who are susceptible to coronary artery disease at an earlier age, it is not surprising that the combination of aortic stenosis and coronary artery disease is encountered frequently. **(Morris et al, 1993)**

Both diabetes and hypercholesterolemia are risk factors for development of degenerative calcific aortic stenosis. Aortic sclerosis as well as calcific aortic stenosis is associated with traditional risk factors for development of atherosclerosis: hypertension, cigarette smoking, and hypercholesterolemia. **(Otto, 1998)**

Pathophysiology:

Aortic stenosis, regardless of etiology, results in obstruction to left ventricular outflow. The stenotic process is usually gradual in onset and progression, allowing enough time for the adaptation of the left ventricle. Chronic pressure overload of the left ventricle with resulting increase in the ventricular pressure during systole causes hypertrophy of the left ventricular myocardium. This compensatory response maintains cardiac