Early Outcome of Complete versus Incomplete Revascularization in Patients with Multi Vessels Disease Undergoing Coronary Artery Bypass Grafting

Thesis
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا

سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

سورة البقرة الآية: ٣٢

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List of Abbreviations

Abb.	Full term
ACS	Acute Coronary Syndrome
AHA	American Heart Association
AMI	Acute Myocardial Infarction
AV	Atrio-Ventricular
BARI	Bypass Angioplasty Revascularization Investigation
BMS	Bare-metal stent
CABG	Coronary Artery Bypass Graft
CAD	Coronary Artery Disease
CASS	Coronary Artery Surgery Study
CBC	Complete Blood Count
CCS	Canadian Cardiovascular Society
CHF	Chronic Heart Failure
CK	Creatinine Kinase
CKD	Chronic Kidney Disease
COPD	Chronic obstructive pulmonary disease
CR	Complete Revascularization
CRI	Chronic renal insufficiency
cTn	cardiac troponin
DAPT	dual antiplatelet therapy
DES	Drug Eluting Stent
DM	Diabetes mellitus
ECG	Electrocardiography
EMS	Emergency Medical Services
FFP	Fresh frozen plasma
GDMT	Guideline Determined Medical Therapy
GP	Glycoprotein

List of Abbreviations *(Cont...)*

Abb.	Full term
H	Hour
hs-cTn	Highly sensitive cardiac troponin
ICU	Intensive care unit
IR	Incomplete Revascularization
IV	Interventricular
JVP	Jugular Venous Pressure
LAD	Left Anterior Descending
LCA	Left Coronary Artery
LCX	Left Circumflex
LFT	Liver Function Test
LIMA	Left internal mammary artery
LV	Left Ventricle
MACCE	Major Adverse Cardiac and Cerebrovascular Event
Mg	Miligram
MI	Myocardial Infarction
MIDCAB	Minimally Invasive Direct Coronary Artery Bypass
Min	Minute
ng/mL	Nanogram / millimeter
N-STEMI	Non–ST-segment elevation myocardial infarction
NTG	Nitroglycerin
NYHA	New York Heart Association
PA	Posterior-anterior
PCI	percutaneous coronary intervention
pg/mL	picogram / milliliter
PTCA	Percutaneous Trans luminal Coronary Angioplasty
RBCs	Red blood cells
RCA	Right Coronary Artery

List of Abbreviations *(Cont...)*

Abb.	Full term
RCTs	Randomized Clinical Trials
RFT	Renal function test
RV	Right Ventricle
SIHD	Stable Ischemic Heart Disease
STEMI	ST-segment elevation myocardial infarction
TECAB	Totally Endoscopic Coronary Artery Bypass
TIMI	Thrombolysis in Myocardial Infarction
UA	Unstable angina
Wk	Weak
Yr	Year

ABSTRACT

Background: There are conflicting data regarding the benefits of CR in patients with multivessel coronary artery disease.

Aim of the Work: to evaluate the impact of incomplete coronary surgical revascularization on patients with multi-vessels coronary heart disease in comparison to patients with complete coronary revascularization regarding early outcomes.

Patients and Methods: this prospective study was conducted at Cardiac Surgery Department; Shebin El-Kom Teaching Hospital, from January 2018 to November 2018 on 60 patients who underwent open heart surgery for coronary artery bypass grafting divided into: group A (30 patients) who underwent complete revascularization and group B (30 patients) who underwent incomplete revascularization .We excluded patients with other cardiac lesions as valvular lesions and patient with previous CABG surgery.

Results: the results of our study showed significant difference in survival rate between group A and group B. Also, improvement of left ventricular ejection fraction in patients who underwent complete revascularization, and there was a highly significant difference (P <0.001) between two groups regarding cross lamp time, number of grafts done and use of inotropes.

Conclusion: complete revascularization is associated with lower rates of adverse outcomes and good prognosis.

Keywords: *Revascularization - Vessels Disease - Coronary Artery*

INTRODUCTION

Coronary artery disease remains the most common pathology with which cardiologists and cardiac surgeons are faced. In addition to the coronary anatomy, the clinical presentation and results of non-invasive studies of myocardial perfusion and function are necessary to characterize the pathophysiologic implications of the angiographic disease and its impact on prognosis and therefore to make a clinically appropriate recommendation [1].

The objective of coronary artery bypass grafting is to achieve complete revascularization. All significant stenosis affecting coronary artery vessels should be bypassed; ideally there should be good distal run-off [2].

Zimarino and colleagues in 2005 proposed a contemporary definition of 3 different types of revascularization as follows:

1) Complete anatomic revascularization, defined as treatment of all coronary artery segments >1.5 mm in diameter and ≥50% diameter stenosis.

2) Incomplete anatomic but functionally adequate revascularization, defined as treatment of all coronary segments with ≥50% diameter stenosis supplying viable myocardium.

3) Incomplete functional revascularization consequentially, defined as the inability to treat all coronary segments that supply viable myocardium and have a >50% diameter stenosis [3]

The Coronary Artery Surgery Study demonstrated that more complete revascularization (i.e. bypassing ≥3 vessels versus 1 or 2) was associated with improved survival among patients with triple vessel disease and severe preoperative angina, it has been perennially believed that complete revascularization is superior to incomplete revascularization in patients with multi-vessel disease undergoing coronary artery bypass grafting [4].

Predictors of incomplete revascularization include: unstable angina, diffuse disease or small vessels, inaccessible location, infarct territory and the number of lesions. In a study analysis of 140 patients, the right coronary artery was the most common artery not bypassed (52%), with 48% for the circumflex artery [4].

A diseased LAD territory was bypassed in all patients. The most common reasons for not bypassing the circumflex artery was small vessel and location, whereas reasons for not grafting the right coronary artery were small vessel and diffuse disease [5].

AIM OF THE WORK

The aim of this study is to evaluate of the impact of incomplete coronary surgical revascularization on patients with multi-vessels coronary heart disease in comparison to patients with complete coronary revascularization on early outcomes.

Chapter 1
ANATOMY AND PHYSIOLOGY OF THE CORONARY ARTERIES

Coronary arteries supply blood to the heart muscle. Like all other tissues in the body, the heart muscle needs oxygen-rich blood to function. Also, oxygen-depleted blood must be carried away. The coronary arteries wrap around the outside of the heart. Small branches dive into the heart muscle to bring it blood [6].

Why are the coronary arteries important?

Since coronary arteries deliver blood to the heart muscle, any coronary artery disorder or disease can have serious implications by reducing the flow of oxygen and nutrients to the heart muscle. This can lead to a heart attack and possibly death. Atherosclerosis (a buildup of plaque in the inner lining of an artery causing it to narrow or become blocked) is the most common cause of heart disease [2].

Anatomy of coronary circulation:

The coronary arteries, the first branches of the aorta, supply the myocardium and epicardium. The right and left coronary arteries arise from the corresponding aortic sinuses at the proximal part of the ascending aorta, just superior to the aortic valve, and pass around opposite sides of the pulmonary trunk. The coronary arteries supply both the atria and the ventricles as shown in **fig; 1** [6].