Incidence of left main coronary artery disease Among patients with acute coronary Syndrome In Ain shams catheterization Laboratory

Thesis submitted for partial Fulfillment of Master degree In cardiology

By

Diaa Hosny Aly El Afify

M.B.,B.Ch

Supervised by

Dr. Mohamed Khairy Abdel Dayem

Professor of cardiology

Faculty of medicine, Ain shams university

Dr. Basem Wadee Habib

Assistant Professor of Cardiology

Faculty of medicine , Ain shams university

Dr.Wael Mahmoud El Kilany

Lecturer of Cardiology

Faculty of medicine, Ain shams university

Ain shams university

2010

Acknowledgement

*All gratitude is due solely to **Allah** the most merciful for the inestimable blessing which He has bestowed upon His slaves.*

*I would like to express my endless gratitude and appreciation to **Prof. Dr/ Mohamed khairy Abdel Dayem**, Professor of Cardiology, Faculty of Medicine, Ain Shams University, for giving me the honor of working under his supervision and for his great effort ,his precious recommendations and his valuable guidance to direct me to the right way in the scientific research althrough the course of the thesis.*

*My deep thanks are to**. Dr/Bassem Wadee Habib** , assistant professor of Cardiology, Faculty of Medicine, Ain Shams University and to **Dr/wael Mahmoud El kilany,** Lecturer of Cardiology, Faculty of Medicine, Ain Shams University, for their support during the whole period of the study.*

At last I would like to thank my family ; my father , my mother & my wife for being always there for me.

List of contents

List of tables

List of figures

List of Abbreviations

ACC……American College of cardiology.

ACCP …….American College of Chest Physicians.

ACE…….....Angiotensin converting enzyme.

ACS…….Acute coronary syndromes

AHA……..……American Heart Association.

AHF……..……Acute heart failure.

AMI……..Acute myocardial infarction.

BMS…….Bare- metal stenting

CA……Coronary angiography.

CABG……...Coronary artery bypass graft.

CAD……..……Coronary artery disease.

CSA…….....Cross sectional area.

CT…….Computed tomography.

DCA……. . Direct coronary atherectomy.

DES …….Drug - eluting stenting.

DM ……..Diabetes mellitus.

ECG …… Electrocardiogram.

EF…….Ejection fraction.

ESC……. European Society of Cardiology.

FDA …….Food and drug association

FFR……. .Fractional flow reserve

HF…….Heart failure.

HTN……..Hypertension.

IHD…..... ……Ischemic heart disease .

ISR……In sten re-stenosis.

IVUS…….. …… Intravascular ultrasonography.

LAD……...Left anterior descending.

LCX……Left circumflex.

LMCAD……Left main coronary artery disease

LMS ……Left main stenosis

LV ……Left ventricle.

LVEF…….....Left ventricular ejection fraction.

LVH …… Left ventricular hypertrophy.

MACCE……Major adverse cardiac and cerebro vascular events.

MACE…….. ……Major adverse cardiac events.

MI ……..Myocardial infarction.

MLD…….Minimum lumen diameter.

MRI……...Magnetic resonance imaging .

MSCT…… Multi-slice computed tomography.

NYHA……...……New York heart association.

PCI…….Percuateneous coronary intervention.

PTCA…….Percuateneous coronary agioplasty

QCA…… Quantitative coronary angiography

RCA…….Right coronary artery.

RV …….. …Right ventricle

SCD……Sudden cardiac death.

SKS…….Simultaneous kissing stent.

TEE…….Trans-esophageal echocardiography

Introduction

Left main coronary artery (LMCA) disease is a serious clinical condition. Despite its low incidence, the prognosis is grave. It may present as sudden death, complete heart block, shock and/or acute coronary syndrome (ACS). Surgery is usually too late to initiate, so that percutaneous coronary intervention (PCI) is utilized to obtain immediate vessel patency. However, this modality is associated with a high mortality and re-stenosis rate.(Spiecker et al 1994; Lee wt et al 2000)

The prevalence of LMCA stenosis in patients undergoing coronary angiography ranges from 2.5% to 10%.(Ellis et al 1997; Lenzen et al 2005)

It is widely accepted that coronary artery disease with greater than 50% left main coronary artery stenosis is a strong indication for early CABG. Many previous studies over the last several years have reported on the safety and feasibility of LMCA stenting.(Park, et al., 1997)

Recent evidence is emerging to suggest that PCI with DES may offer a treatment strategy that is both less invasive and

Has a potentially lower risk for selected patients, and particularly for those patients who are not ideal candidates for CABG because of their co-morbidities or advanced age, and also for those patients suffering with acute myocardial infarction(AMI) or cardiogenic shock, and even for the good surgical candidates if there is favorable anatomy for angioplasty.(Ellis et al 1997, Baim et al 2006)

Aim of the work

To detect The incidence of left main coronary artery disease (significant and non significant LMCAD) among patients with acute coronary syndromes undergoing cardiac catheterization in Ain shams cath . lab. as well as the incidence of associated significant disease in other coronary arteries and the incidence of complications . also comparison between patients with and without left main stem stenosis as regards risk factors , age , and clinical presentation .

Anatomy of Left main coronary artery

The LMCA arises from the mid-portion of the superior margin of the left aortic sinus of Valsalva . Typically, it runs leftward, superior, and anterior. It consists of three portions: the ostium, the portion of the left main arising from the aorta; the shaft or midportion; and the distal segment. It ends by bifurcating into the left anterior descending and circumflex artery. In 30%of cases, it may also give rise to a ramus intermedius vessel. Congenital anomalies for LMCA are infrequent, i.e. it may originate from the right coronary cusp or the non-coronary cusp. In this latter situation, there may be acute angulation of the origin.(James et al., 1961)

The maximum length of the LMCA is usually 4 to 6 cm.Its caliber varies depending on the gender and the size of the individual (small women have smaller arteries). In men, the diameter of the non diseased left main is 4.5±0.5 mm, while in women it is slightly smaller at 3.9±0.4 mm. Regardless of body surface area, the LMCA is smaller in women than in men. The aortic wall at the origin of the left main artery is 2 to 4 mm in thickness; accordingly, the ostium and proximal portion (first 2 to 4 mm) of the LMCA are within the aortic

wall and are subject to conditions that affect the aorta.(Dodge et al., 1992)

Histologically, the LMCA ostium lacks adventitia and has considerable smooth muscle and elastic tissue, with aortic smooth muscle arranged perpendicular to and surrounding the ostium . The LMCA has the most elastic tissue of all the coronary vessels.(Bergelson et al., 1995)

These histological properties make the LMCA unique among all coronary arteries .The most common site of LMCA stenosis is the midportion or distally at the bifurcation.(Sasagury et al., 1991)

The majority of patients with significant LMCA stenosis have, in addition, significant narrowing of at least one of the other major coronary vessels. Isolated LMCA disease is an unusual clinical entity, and when seen, is predominantly at the ostium.(Topaz et al., 1991)

Pathophysiology of Left Main Stenosis and implications for revascularization with stents or surgery

Significant LMS disease is defined as any lesion exceeding 50% of the vessel diameter. In a recent study, LMS stenosis was reported to be present in 4–6% of patients undergoing coronary angiography.(Ragosta et al 2006; Jonsson et al 2003)

However, its incidence is even higher in patients undergoing CABG, being present in up to 30% of such patients. Furthermore, its incidence appears to be increasing and in the UK the proportion of CABG patients with LMS stenosis increased from 15% to 30% in the past decade.(Keogh et al., 2003)

The proximal location of the left main coronary artery and its relatively large diameter make it, in theory, an attractive target for PCI. However, in reality, several anatomical features severely diminish the likelihood of a successful long-term outcome with PCI. Firstly, up to 90% of stenosis extend from the distal LMS artery into the proximal left anterior descending and/ or circumflex coronary arteries.(De Lezo et al 2004; Palmerini et al 2006)

and such bifurcating lesions are at notoriously high risk of restenosis.(Tanabe et al 2004; Valgimigli et al 2006)

Secondly, around half the lesions are calcified which also reduces the chance of a successful outcome with PCI. Finally, up to 80% of patients with LMS also have multi-vessel coronary artery disease.(De Lezo et al 2004; Palmerini et al 2006)

where coronary revascularisation with CABG already offers a survival advantage. This is because, in contrast to PCI where the short and long-term success is critically dependent on the precise anatomical location and complexity of the lesion, these features are of little relevance to CABG as the bypass grafts are to placed to the mid coronary arteries, thereby offering prophylaxis to whole territories of proximal myocardium. (Hoffman et al 2003; Taggart et al 2005)