Incidence and Predictors of Post Percutaneous Coronary Intervention Local Access Site Vascular Complications

Thesis

Submitted for Partial Fulfillment of the Master Degree

In Cardio Vascular Medicine

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2013

سورة البقرة الآية: ٣٢

First thanks to **ALLAH** *to whom I relate any success in achieving any work in my life.*

I wish to express my deepest thanks, gratitude and appreciation to Prof. Ramzy Hamed El-Mawardy, *Professor of Cardiology for his meticulous supervision, kind guidance, valuable instructions and generous help.*

I am deeply thankful to Dr. Wael Mostafa El-Nammas, *Assistant professor of Cardiology for his great help, outstanding support, active participation and guidance.*

Weal Abou El Naga

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List of Abbreviations

Abb.	Full term
ABI	: Ankle-brachial index
ACC	: American College of Cardiology
ACT	: ActivIated clotting time
AHA	: American Heart Association
aPTT	: activated partial thromboplastin time
AV block	: Atrioventricular block
AVF	: Arterio-venous fistula
BMS	: Bare metal stent
BUN	: Blood urea nitrogen
CABG	: Coronary artery bypass grafting
CAD	: Coronary artery disease
CFA	: Common femoral artery
CHF	: Congestive heart failure
CIN	: Contrast induced nephropathy
CK-MB	: Creatinine kinase-myocardial band
DES	: Drug eluting stent
DM	: Drug eluting stent
GFR	: Glomerular filtration rate
GPIIb/IIIa	: Glycoprotein IIb/IIIa
HTN	: Hypertension
ICU	: Intensive care unite
INR	: International normalized ration
IV	: Intravenous
IVUS	: Intravascular ultrasound
LBBB	: Left bundle-branch block
LHC	: Left heart catheterization
LMCA	: left main coronary artery
LMWH	: Low molecular weight heparin
MI	: Myocardial infarction
NSTEMI	: Non-ST-segment elevation myocardial infarction
NYHA	: New York Heart Association classification
PC	: Prothrombin Concentration
PCI	: Percutaneous coronary intervention

PO	: per oral
PSA	: Pseudoaneurysm
PTCA	: Percutaneous transluminal coronary angioplasty
PT	: Prothrombin time
PTT	: Partial Thromboplastin Time
RCA	: Right coronary artery
SFA	: Superficial femoral artery
SPSS	: Statistical package for Social Science
STEMI	: ST-Segment-Elevation Myocardial infarction
TIA	: Transient ischemic attack
TIMI	: Thrombolysis in myocardial infarction
Tpa	: tissue plasminogen activator
UA	: Unstable angina
UH	: Unfractionated heparin
US	: United States
VASC	: Vascular access site complications
VF	: Ventricular fibrillation
VT	: Ventricular tachycardia

INTRODUCTION

Percutaneous coronary intervention (PCI), previously called percutaneous transluminal coronary angioplasty (PTCA), has evolved into an effective revascularisation strategy for coronary artery disease since the first procedure in 1977.(1, 2, 3) The rapid technological advances in PCI therapy means that new techniques, together with their new complications, are seen ever more frequently. Therefore, there is a great need for explore the incidence and predictors of post PCI vascular complication.

Access site complications are the most common type of complications following cardiac catheterization procedures. (4)

Vascular access-site complications remain a major cause of morbidity and mortality with cardiac catheterization and percutaneous intervention using the femoral approach. (4) The femoral approach is the most commonly used site of vascular access. (4, 5, 6)

The incidence of access-site complications varies by the population studied. Femoral access-site complications are generally higher for interventional procedures than diagnostic procedures, which is likely related to anticoagulant therapy and sheath diameter. Femoral access-site complications have been

reported to range from 0 to 17% in patients undergoing diagnostic and interventional cardiovascular procedures. (4)

Numerous patient-related and procedure-related risk factors have been associated with vascular access-site complications. Transfemoral access site complications include haematoma, pseudo-aneurysm, arterio-venous (AV) fistula formation, lower limb ischaemia, femoral artery dissection, infection, and retroperitoneal bleeding. (7)

Just as important to the reduction of bleeding events is an understanding of ways to reduce bleeding through appropriate vascular access techniques. When using the femoral artery approach, proper location of arterial puncture and sheath insertion can significantly reduce bleeding events, including retroperitoneal hematomas.(7) Alternate access sites, the use of fluoroscopic guidance, focus on anticoagulant and antiplatelet therapy, and arterial closure devices are all methods being investigated to prevent and reduce complications.(7)

An increasing number of interventional procedures, along with intense anticoagulation regimens increase the need to identify predictors of vascular access site complications in order to minimize the risks. (4, 7) In a prospective study design we will try to explore the incidence and predictors of post PCI vascular complications

AIM OF THE WORK

Our study aims at determining the incidence and potential predictors of local access site vascular complications after percutaneous coronary interventions (PCI).

I - PERCUTANEOUS CORONARY INTERVENTION

• Introduction:

In 1958, Dr. Mason Sones and his colleagues at the Cleveland Clinic performed the first selective coronary arteriographic procedure. Despite the advent of other imaging modalities, coronary angiography remains the criterion standard for diagnosing coronary artery disease (CAD) and is the primary method used to help delineate coronary anatomy. (8)

The commonest indications of cardiac catheterization today are to evaluate coronary artery disease as well as for coronary interventions. Of note, there is often a tendency, once a lesion is noted on coronary arteriography, to proceed with percutaneous intervention. Therefore, before left heart catheterization is performed there should be a plan regarding how to use the information obtained. (8)

The great pandemic of industrialized countries, i.e. coronary atherosclerosis, started within the latter half of the 20th century. Selective coronary angiography, initiated by Mason Sones (9), allowed an understanding of coronary atherosclerosis.

Coronary atherosclerosis may result in a flow-limiting stenosis that leads to myocardial ischemia and/or myocardial infarction (MI).(10) Andreas Gruntzig (11- 13) first managed these lesions percutaneously on September 16, 1977, when he advanced a fixed- wire, distensible balloon across a coronary stenosis and briefly inflated it. This procedure was termed percutaneous transluminal coronary angioplasty (PTCA).

With the advent of stents and other therapeutic coronary devices, these procedures are now more broadly termed percutaneous coronary intervention (PCI). It is estimated that more than 1 million PCI procedures are completed in the United States (14) and approximately 2 million worldwide annually.

The field of interventional cardiology continues to rapidly evolve as a result of many important advances in equipment, strategies, and adjunctive medication. These advances have been paralleled by a concomitant improvement in the safety and efficacy profile of PCI.

- Indications of PCI:

Although there is no substitute for sound clinical judgment, PCI is generally reserved for patients in whom there is an objective demonstration of myocardial ischemia or

symptoms as well as angiographic demonstration of obstructive coronary disease.

PCI may not be indicated for asymptomatic or mildly symptomatic patients who have only a small area of viable or jeopardized myocardium, have no objective evidence of myocardial ischemia, have other life- limiting disease processes, or have lesions that have a low likelihood of success.

The American Heart Association (AHA)/American College of Cardiology (ACC) recommend guidelines for the use of PCI for ST elevation myocardial infarction (STEMI), unstable angina (UA) with non-ST-segment elevation myocardial infarction (NSTEMI) and stable ischemic heart disease. (15-17)

A. ST-Segment-Elevation MI (STEMI)

Primary PCI should be the preferred treatment strategy for patients presenting with STEMI to a facility experienced with and capable of performing PCI. (15, 16)

- Primary PCI is indicated in patients presenting with STEMI less than 12 hours from symptom onset (or more than 12 hours with persistent symptoms), provided that the door-to-balloon time is anticipated to be less than 90 minutes and is

performed by an experienced operator at a high volume center (Class I, level of evidence A).

- Primary PCI is also indicated inpatients presenting with an appropriate clinical history and presumed new left bundle-branch block (LBBB).
- Patients younger than 75 years old presenting with STEMI complicated by cardiogenic shock within 36 hours of symptom onset who are otherwise candidates for revascularization within 18 hours of onset of shock should be considered for primary PCI unless otherwise contraindicated (Class I, level of evidence B). Primary PCI is reasonable in selected patients younger than 75 years old presenting with shock complicating non-ST-segment elevation myocardial infarction (NSTEMI) within 36 hours if the patients are known to have good prior functional status, agree to invasive management strategy, and are otherwise suitable for revascularization (Class IIa, level of evidence B)
- Primary PCI is indicated for patients with STEMI complicated by severe congestive heart failure (CHF) and/or pulmonary edema (i.e., Killip class III) presenting within 12 hours of symptom onset (Class I, level of evidence B).