PATTERN OF PERFUSION DEFECTS IN NON-ST-ELEVATION MYOCARDIAL INFARCTION

Thesis
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بسم الله الرحمن الرحيم
وَأَنْزَلَ اللهُ
عَلَيْكَ الكِتَابَ
والْحِكْمَةَ
وَعَلَّمَكَ مَا لَمْ
تَكُنْ تَعْلَمُ
وَكَانَ فَضْلُ
اللهِ عَلَيْكَ
عَظِيمًا

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LIST OF ABBREVIATIONS

Abbrev. No.	Full term
ABP	: Arterial blood pressure
ACS	: Acute coronary syndrome
AMI	: Acute myocardial infarction
CABG	: Coronary artery bypass craft
CAD	: Coronary artery disease
CCU	: Coronary Care Unit
CHF	: Congestive heart failure
CK	: Creatine kinase
CK-MB	: Creatine kinase myocardial band
CK-MM	: Creatine kinase muscle
Cr	: Creatinine
CRP	: C-reactive protein
cTnT	: Cardiac troponin T
DM	: Diabetes Mellitus
ECG	: Electrocardiogram
EF	: Ejection fraction
GRACE	: Global registry of acute event
GUSTO	: Global Utilization of Streptokinase and Tissue plasminogen activator in Occluded arteries)
HR	: Hear rate
hr	: Hour
INI	: Cardiac troponin I
LAD	: Left anterior descending artery
LCX	: Left circumflex artery
LV	: Left ventricle

LIST OF ABBREVIATIONS (Cont...)

Abbrev. No.	Full term
MACE	: Major adverse cardiovascular events
MI	: Myocardial infarction
mv	: millivolt
NSTEACS	: Non ST-segment elevation acute coronary syndrome
NSTEMI	: Non ST-elevation myocardial infarction
NtBNP	: N-terminal Brain natriuretic peptide
PCI	: Percutaneous coronary intervention
PREDICT	: Patient Refined Expectations for Deciding Invasive Cardiac Treatments
PURSUIT	: Platelet GP II bIIIa in unstable angina: Receptor suppression using integrilin therapy
RCA	: Right coronary artery
SPECT	: Single photon emission tomography
STEMI	: ST-segment elevation myocardial infarction
SWMA	: Segmental wall motion abnormalities
TIMI	: Thrombolysis in myocardial infarction
UA	: Unstable angina
WBC	: White blood cell

INTRODUCTION

Worldwide, atherosclerosis is the leading cause of death in human being. Although, it has been traditionally considered a problem of developed nations, this picture has now changed, as it has been universally present in both developed & developing countries & accounting for major economic losses ***(Yousif et al., ٢٠٠٢).***

Atherosclerosis can be presented clinically in a diverse ways as: coronary heart disease, cerebrovascular disease & peripheral arterial disease ***(Yousif et al., ٢٠٠٢).***

In developed countries, coronary artery disease causes severe disability & more deaths than any other disease including cancer. It is manifested as angina, silent ischemia, unstable angina, myocardial infarction, arrhythmias, heart failure & sudden death ***(Krishnaswamy et al., ٢٠٠٩).***

Acute coronary syndrome (ACS) is divided into ST-elevation myocardial infarction (STEMI) & Non ST-elevation acute coronary syndrome (NSTE-ACS) which is further subdivided into non ST-elevation myocardial infarction (NSTEMI) & unstable angina differentiated by cardiac enzymes ***(Van De Werfet al., ٢٠٠١)***

The pathophysiology of (NSTE-ACS) encompasses a complex interplay of plaquerupture, platelet activation & aggregation leading to thrombus formation, and finally lead to partial vascular occlusion ***(Bonzel et al., ٢٠٠٨).***

It was found that patients with (NSTE- ACS) are older, have a higher incidence of cardiac risk factors and co- morbid conditions (e.g. D.M, hypertension, hypercholesterolemia) and a greater likelihood of prior myocardial infarction & revascularization procedures (i.e. PCI, CABG) than patients with STEMI ***(Wang et al., ٢٠٠٩).***

Despite its imperfect sensitivity, the ECG remains an important tool that helps rapidly establish a working diagnosis for patients with ischemic symptoms ***(Shmitt et al., ٢٠٠١).*** Other methods of risk stratification such as GRACE score can provide complementary prognostic information ***(Zia et al., ٢٠٠٧).***

Very early invasive strategy (angiography within٢٤ hours of presentation) reduced rate of recurrent ischemia & significantly reduced death, recurrent myocardial infarction & stroke rates in high risk NSTE-ACS patients ***(Antman et al., ٢٠٠٨).***

AIM OF THE WORK

The aim of the study was:

To find out the pattern of perfusion defects detected in NSTEMI as a step for localization of the culprit data.

NON-ST ELEVATION MYOCARDIAL INFARCTION

Acute coronary syndrome is divided into ST segment elevation myocardial infarction (STEMI) & non ST segment elevation acute coronary syndrome, which is further subdivided into non ST segment elevation myocardial infarction (NSTEMI) & unstable angina differentiated by cardiac enzymes ***(Bonzel et al., ٢٠٠٧).***

Myocardial infarction is defined as typical rise &/or fall in cardiac biomarkers associated with evidence of ischemia; any ischemic symptoms or electrocardiographic changes suggestive of new ischemia ***(Thygesen et al., ٢٠٠٧).***

Figure (١): Gross appearance of myocardial infarction ***(Pathology Museum, Ain Shams University).***

Pathophysiology of NSTEMI:

Five pathophysiological processes may contribute to the development of NSTEMI.

(١) Plaque rupture or erosion with superimposed non occlusive thrombus (by far the most common cause of NSTEMI).

(٢) Inflammation.

(٣) Dynamic obstruction (i.e., coronary spasm of an epicardial artery, as in Prinzmetal angina or constriction of the small muscular coronary arteries),

(٤) Progressive mechanical obstruction.

(٥) Secondary unstable angina related to increased myocardial oxygen demand or decreased supply (e.g., anemia).

(Morrow, ٢٠٠٣)

Clinical Presentation:

Patient with NSTEMI presented usually with chest pain which is severe in most of patients, and in some instances intolerable. The pain is prolonged, usually lasting for more than ٣٠ minutes and frequently for a number of hours. It is usually constricting, crushing or compressing; and sometimes as a stabbing, knife like, boring, or burning discomfort ***(Cannon et al., ٢٠٠٧).***

The pain is usually retrosternal, spreading frequently to both sides of the anterior chest, with predilection for the left side and usually radiates down the ulnar aspect of the left arm and the left wrist, hand, and fingers ***(Cannon et al., ٢٠٠٧).***

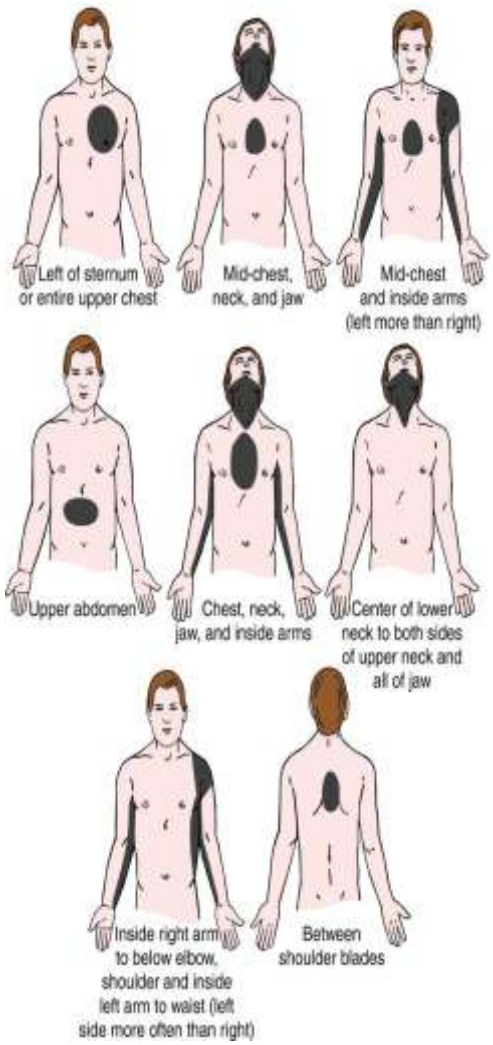

Figure (٢): Diagram showing localization of chest pain
(Cannon et al., ٢٠٠٧)

It may also radiate to the shoulders, upper extremities, neck, jaw, and interscapular region, again usually favoring the left side ***(Cannon et al., ٢٠٠٧).***

Women represent ٣٠-٤٥ percent of patients with unstable angina, ٢٥ to ٣٠ percent of patients with NSTEMI and approximately ٢٠ percent of patients with STEMI ***(Cannon et al., ٢٠٠٧).***

In comparison to the STEMI, patients with unstable angina also have higher rates of prior MI, angina, previous coronary revascularization, and extra cardiac vascular disease ***(Hochman et al., ١٩٩٩).*** Approximately ٨٠ percent of patients with NSTEMI have a history of cardiovascular disease and most have evidence of prior coronary risk factors ***(Khot et al., ٢٠٠٣).***

Diagnosis:

I-Electrocardiogram:

In NSTEMI, ST depression (or transient ST elevation) and T wave changes occur in up to ٥٠ percent of patients ***(Hamm et al., ٢٠٠٩).***

١- ST depression has only been considered significant if it is ≥٠,١ mV—as occurs in ٢٠ to ٢٥ percent of patients. However, an additional ٢٠ percent of patients will present with ٠,٠٥ mV ST depression, and they can have an adverse prognosis approaching that of patients with ٠,١ mv ST depression**.**