Short-term Outcome of Manual Thrombus Aspiration for Patients Undergoing Primary PCI for Acute STEMI Showing Large Thrombus Burden

Thesis

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Michael Nabil penjameen

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List of Abbreviations

- ACC American College of Cardiology
- ACAD Atherosclerotic coronary artery disease
- ACS Acute coronary syndrome
- AHA American Heart Association
- ASA Acetyl-Salicylic Acid
- AT Aspiration thrombectomy
- CABG Coronary artery bypass grafting
- CAD Coronary artery disease
- CHF Congestive heart failure
- CMR Cardiac Magnetic Resonance
- CVD Cardiovascular disease
- DAPT Dual antiplatelet therapy
- DM Diabetes mellitus
- DES Drug-eluting stent
- D1 First diagonal branch
- DBT Door to ballon time
- DEAR-MI Dethrombosis to enhance acute reperfusion in MI
- ECG Electrocardiogram
- EXPIRA Thrombectomy with Export catheter in infarct – related artery during primary PCI
- FMC First Medical Contact
- GPII bIIIa Glycoprotein IIb/IIIa inhibitor
- GRACE Global Registry of Acute Coronary Events
- HDL High Density Lipoprotein
- HORIZONS-AMI Bivalirudin during primary PCI in AMI
- IRA Infarct-Related Artery
- IABP Intra-Aortic Ballon Pump
- IHD Ischaemic heart disease
- INFUSE-AMI Intra-coronary abciximab and aspiration thrombectomy in patients with large anterior MI
- IMR Index of microcirculatory resistance
- ISR Instent restenosis
- ICD Implantable Cardioverter Defibrillator
- LAD Left anterior descending artery
- LCX Left circumflex artery
- LDL Low Density Lipoprotein
- LGE –CMR Late Gadolinium Enhancement cardiac magnetic resonance
- LIMA Left internal mammary artery
- LM Left main coronary artery
- MACE Major Adverse Cardiac Events

- MBG Myocardial Blush Grade
- MVD Multi-vessel disease
- MI Myocardial infarction
- MVO Micro Vascular Obstruction
- NSTEMI Non ST segment elevation myocardial infarction
- OMB1 First obtuse marginal branch
- OMB2 Second obtuse marginal branch
- PAD Peripheral arterial disease
- PCI Percutaneous coronary intervention
- PPCI Primary percutaneous coronary intervention
- PET Positron Emission Tomography
- PDA Posterior descending artery
- PTCA Percutaneous trans luminal coronary angioplasty
- RAD Radial approach
- RCA Right coronary artery
- REMEDIA Randomized evaluation of effect of mechanical reduction of distal embolization by thrombus aspiration and rescue angioplasty
- RI Ramus intermediate branch
- RT Rheolytic thrombectomy
- SPECT Single Photon Emission Tomography
- STEMI ST segment elevation myocardial infarction
- SVG Saphenous venous graft
- SCAD Spontaneous Coronary Artery Disease
- ST Stent thrombosis
- STR ST-segment resolution
- TA Thrombus aspiration
- TIMI Thrombolysis In Myocardial Infarction
- TAPAS Thrombus aspiration during PCI in AMI study
- TASTE Thrombus aspiration during PCI in AMI study
- TB Thrombus Burden
- TRL Target lesion revascularization
- TOTAL Randomized trial of Primary PCI with or without routine manual thrombectomy study
- TVAC Trans-vascular aspiratin catheter
- TVR Target vessel revascularization
- UA Unstable Anginae
- UFH Unfractionated Heparin
- VAMPIRE Vacuum aspiration thrombus removal

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Introduction

The care of STEMI patients has transformed in conjunction with major shifts in re-perfusion therapy strategies , from primarily pharmacological to catheter- based strategies. With simultaneous advances in medical therapy, the case fatality rate for STEMI patients has continued to decline(336).

The final outcome of STEMI patients is influenced by many variables such as co-morbidities, time delay to treatment, bleeding complications and resulting left ventricular ejection fraction. Another decisive factor is the TIMI flow and, even more importantly, myocardial re-perfusion after PCI (myocardial blush). The initial thrombus load at the culprit lesion site may increase the risk of distal embolization of thrombotic material, either spontaneously or peri-procedurally, which could reduce distal flow or lead to no-reflow, thus impairing reperfusion of viable myocardium(337).

While routine use of distal protection devices does not promote beneficial out-come and is thus not recommended, thrombus aspiration (TA) has recently shown mixed results. The objective of several prospective trials within the last few years was to clarify whether routine TA in STEMI patients, contributes to a reduced mortality. After the first promising results , mainly based on the single center (TAPAS trial) , routine TA has been integrated into ESC & American STEMI guidelines likewise as a class IIa recommendation , although not all studies have shown positive effects(338-340) .

TAPAS, however, was not powered to clinical endpoints. Recent results of the largest randomized trials to date (TASTE) study and (TOTAL) study , have not shown any significant differences in all-cause mortality , re-hospitalizations or stent thrombosis after a maximum of one-year follow-up period . These results suggest that routine use of TA is not

necessary as a standard procedure in STEMI patients , and actually contra-. indicated , but may be considered in selected patients according to operator opinion , as recommended in 2014 ESC guidelines(341-344) .

But thrombus aspiration (TA) might have a potential role in STEMI patients with heavy thrombus burden, remains to be considered & a more thorough removal of thrombus is beneficial to patients with large thrombus burden, which can be achieved by more effective aspiration thrombectomy devices with effective antithrombotic therapy .Because those patients with the most residual thrombus before stenting have poorer micro-vascular function and greater myocardial damage(345).

Aim of the work

- It is a comparative study to study the in-hospital & short term out-come of using manual thrombus aspiration in STEMI patients undergoing primary PCI & showing large thrombus burde

Review Of literature

Chapter 1

Acute Coronary Syndrome

Coronary artery disease falls in the center of the spectrum of myocardial ischemia, which ranges from stable angina pectoris to acute myocardial infarction (MI) associated with ST-segment elevation on the electrocardiogram (ECG) i.e. STEMI [1] . The latter is usually caused by acute, total obstruction of a coronary artery [2,3], and urgent reperfusion is the mainstay of therapy. In contrast, unstable angina/non-ST-segment-elevation myocardial infarction (UA/NSTEMI) is usually associated with a severe (but non occlusive) lesion in the culprit coronary artery(3).

The clinical spectrum of non-ST-elevation ACS (NSTE-ACS) may range from patients free of symptoms at presentation to individuals with ongoing ischaemia, electrical or haemodynamic instability or cardiac arrest. The pathological correlate at the myocardial level is cardiomyocyte necrosis [NSTE-myocardial infarction (NSTEMI)] or, less frequently, myocardial ischaemia without cell loss (unstable angina). A small proportion of patients may present with ongoing myocardial ischaemia , characterized by one or more of the following: recurrent or ongoing chest pain, marked ST depression on12-lead ECG, heart failure and haemodynamic or electrical instability. Due to the amount of myocardium in jeopardy and the risk of malignant ventricular arrhythmias, immediate coronary angiography and, if appropriate, revascularization are indicated (4).

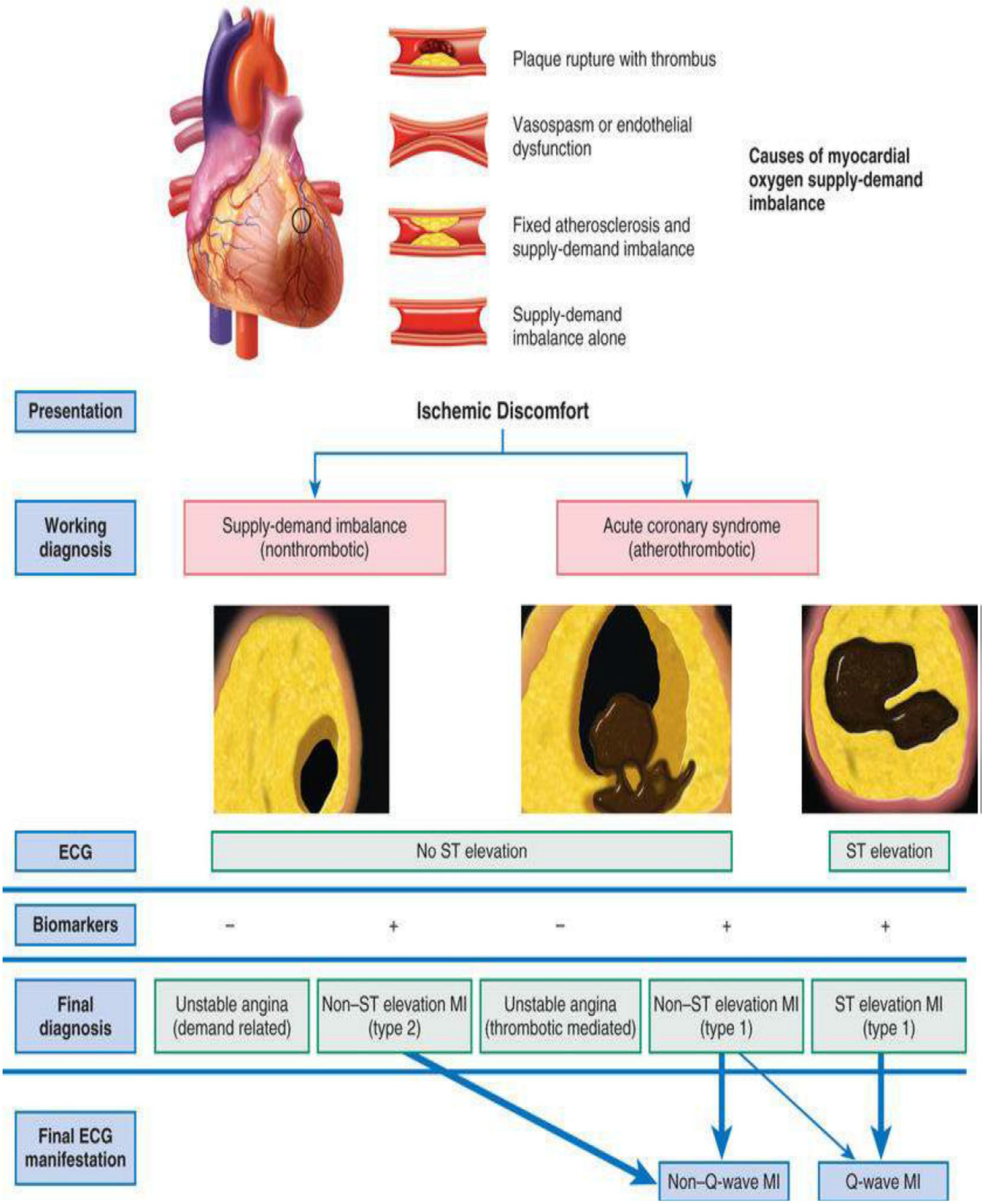

Figure (1) Myocardial Ischaemia and Infarction can result from various disease processes (5).