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Columbia Presbyterian Medical Center
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2nd Year ICCR, IRB proposal

Thrombectomy Prior to Stent Implantation in Patients with acute ST elevation MI versus conventional PCI: A RCT evaluating the prevention of MACCE.

A. Study Purpose and Rationale

Percutaneous Coronary Intervention (PCI) often leads to macro- and microvascular embolization distally in the coronary network. [1] It has been observed that Distal embolization may occur as much as 16% of patients undergoing PCI. [2] These microvascular obstruction during PCI leads to diminished myocardial perfusion, resulting in increased infarct size, decrease left ventricular function recovery and increase mortality. [3] The efficacy of mechanical reperfusion and myocardial salvage is thereby reduced.

A more specific approach to the problem of microcirculation embolization during PCI includes thrombectomy. Thrombectomy performed prior to primary percutaneous intervention is a controversial issue. There have been several trials that have been conducted with different thrombectomy devices that have shown conflicting results. [4-14] Negative results have been observed in two large Trials. [4, 12] The TAPAS study is the most recent study that showed better reperfusion and clinical outcomes with the utilization of thrombectomy than conventional PCI.

Hypothesis:

Thrombectomy prior to PCI versus conventional PCI leads to better outcomes and will reduce MACCE (Major Adverse Cardiac and Cerebrovascular Events) over a 6 months follow up.

B. Study Design and Statistical analysis

Patient Selection:

Patients with Acute ST elevation MI, defined as ST segment elevation in two or more consecutive leads and symptoms suggesting myocardial ischemia lasting more than 30 minutes, the onset of Symptoms less than 12 hours. Exclusion criteria include rescue PCI after thrombolysis, known disease with life expectancy of less than six months and lack of informed consent. Baseline Characteristics will be gathered retrospectively and will include age, sex, past medical history, BMI, vitals at time of procedure, ect....

Intervention:

Patients that meet eligibility criteria will be randomized to conventional PCI (balloon angioplasty and stent) versus Thrombectomy (thrombus aspiration with conventional PCI). Randomization will occur prior to diagnostic angiography. Time of procedure will also be captured.

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Outcomes Measured:

Study participants will be followed by their private outpatient cardiologist or by a cardiologist at CUMC at no cost. They are required to participate in a follow up visit at 30 days post procedure, 60 day then at six months. The non-CUMC cardiologist will be contacted via telephone and questioned regarding medical follow up, hospitalizations, medications, and symptoms. Hospitalizations will be reviewed to determine the nature of the admission, workup, relevant laboratory data, imaging and discharge diagnoses.

Primary outcomes measures will be MACCE at 3 and 6 months, defined as death from all cause; stroke, transient ischemic attacks, and reversible ischemic neurological deficits; documented nonfatal myocardial infarction; and repeated revascularization by percutaneous intervention or surgery.

- Death From all cause mortality
- MI: Repeat hospitalization for ACS with EKG documenting new STEMI/Q wave MI, or serologic evidence of MI in the absence of these findings
- CVA: any radiographically confirmed ischemic or hemorrhagic stroke manifesting as a new neurological impairment
- Coronary Revascularization: subsequent PCI for any indication
- CHF: new diagnosis with document of LVEF < 40%

Secondary outcomes captured:

- Thrombolysis in Myocardial Infarction (TIMI) flow grade, Coronary angiography was performed before and after the PCI
- Angiographic evidence of a thrombus
- Complete resolution of ST-segment elevation
- Absence of persistent ST-segment deviation

**The ST-segments on the post procedural ECG will be compared with those on the ECG at presentation. The degree of resolution of ST-segment elevation will be categorized as complete (>70%), partial (30 to 70%), or none (<30%). Persistent ST-segment deviation, defined as the sum of the ST-segment depression and the ST-segment elevation, will be categorized as less than 2 mm, 2 to 10 mm, and more than 10 mm. The presence or absence of pathologic Q waves will also be recorded

C. Design:

Single-center at CUMC, prospective Randomized Control Trial, interventional, involving the blinded evaluation of end points.

Possible crossover can occur

D. Statistical Analysis:

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Estimated 30 day incidence of MACCE after PCI in STEMI based on the prior study by Keeley: 8%

Effect Size set at 20% reduction, leading to a 2% decrease incidence of MACCE at 30 days

For testing $P = 0.05$, approximation of 80% power suggest randomization of approximately 5000 patients in each arm.

Chi-square test to evaluate the proportions of clinical outcomes observed between the two arms

Kaplan-Meier curves to illustrate the patterns of event survival

Multi-regression analysis of the baseline characteristics will be performed to determine the presence of confounders

E. Study Procedure:

- A 12-lead ECG was acquired at presentation and 30 to 60 minutes after PCI
- After establishing a diagnosis of STEMI, patients were randomly assigned to undergo thrombus aspiration during PCI or conventional PCI before diagnostic angiography
- For all patients, the first procedural step was the passing of a floppy, steerable guide wire through the target lesion. In patients in the conventional-PCI group, this step was followed by balloon dilation to establish antegrade flow.
- In patients in the thrombus-aspiration group, this step was followed by the advancing of the 6-French Export Aspiration Catheter (Medtronic) into the target coronary segment during continuous aspiration;
- When necessary for stent delivery, balloon dilation was performed before stenting
- All placed stents were bare-metal stents.

F. Study Drugs:

Pharmacologic treatment before PCI included the administration of aspirin (a loading dose of 500 mg), heparin (5000 IU), and clopidogrel (a loading dose of 600 mg). Patients also received the glycoprotein IIb/IIIa inhibitor abciximab, with the dose based on body weight, unless contraindicated, and additional heparin, with the dose based on the activated clotting time.

Standard therapies after PCI included aspirin, clopidogrel, beta-blockers, lipid-lowering agents, and angiotensin-converting-enzyme inhibitors or angiotensin-II-receptor blockers, according to current guidelines

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G. Medical Devices

Rheolytic Thrombectomy (RT) with the AngioJet catheter (Possis Medical Inc) use in the thrombectomy arm. Commercially available.

H. Study Subjects:

All consecutive patients presenting to the CUMC with a possible myocardial infarction with ST-segment elevation.

The inclusion criteria and exclusion criteria previously mentioned.

Recruitment of Subjects:

Informed consent will be obtained at the time ST elevation MI diagnosis and emergent catheterization is felt to be warranted.

J. Confidentiality of Study Data

All study data will be coded using a number identifier and will be single blinded such that only the practitioner performing the procedure knows who received thrombectomy. All data will be stored in a secure location, accessible to only to investigators.

K. Potential Conflict of Interest:

No potential conflict of interest at this time

L. Study Location:

This study will be conducted at the Milstein hospital at Columbia Presbyterian Medical Center.

M. Potential Risks:

Compared to conventional PCI, Thrombectomy has added procedural time in order to perform the thrombectomy. This can potentially increase pre-myocardial perfusion time, which is widely known lower times affect myocardial salvage.

Increase complexity of procedure, which can potentially place subjects at a higher risk for complications from PCI. These include bleeding, occlusion, dissection, pseudoaneurysm, and arteriovenous fistula.

N. Potential Benefits:

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Potential benefits include reduction of cardiovascular events and possible improvement in mortality as described in study rationale.

O. Alternative therapies:

Alternative therapies include thrombolysis and Medical management for Acute STEMI however all have been shown to be inferior to PCI in prior studies.

P. Compensation to Subjects:

No compensation will be provided

Q. Cost to Subjects:

No additional costs to subjects other

References:

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