INTRODUCTION

It has been proved beyond doubt that in close to 85% of patients, the cause of ST elevation myocardial infarction (STEMI) is an occluding thrombus. Such an occluding thrombus is composed of fibrin, platelets and thrombin. For well over 25 years, fibrinolytics have become an important and useful part of treatment by lysing the fibrin in the clot, restoring a brisk TIMI 3 blood flow in 60% of patients thus salvaging myocardium in patients who present in less than 3 hours and are not in cardiogenic shock (1). Various trials have demonstrated a mortality reduction of approximately 30%. However fibrinolytics have a short “time window” and about 40% patients do not achieve the desired TIMI 3 flow. 10 to 16% the culprit vessel reocclude (2). Primary angioplasty (PAMI) has a great advantage over fibrinolytics since one can achieve TIMI 3 flow in 95% of patients and there is distinct mortality benefit as compared to fibrinolytics. Mortality reduction is dependent upon the myocardial perfusion at the microvascular and tissue level. Patients having myocardial perfusion Grade III i.e. excellent flow at tissue level will have lower mortality as compared to those who have less (Grade II) or no perfusion (Grade 0 – I). PAMI has proved to be the choice of treatment in cardiogenic shock. PAMI also achieves better myocardial perfusion at the tissue level as compared to fibrinolytics. However, for PAMI to be useful, the door to balloon time must be kept at less than 90 minutes. Even in advanced countries like USA, only 25% of emergency catheterization laboratories are equipped to perform PAMI on call and keep the door to balloon time of less than 90 minutes. Interventional Council of India PTCA Registry reported over 60000 PTCA procedures during 2007. Out of this, only 5516 i.e. about 8% patients belonged to PAMI procedure group. A very dismal number, since these numbers are not of total STEMI patients but rather those of patients undergoing percutaneous coronary intervention. Thus, there may be several thousand other cases of STEMI who have had either fibrinolytics or no reperfusion at all.

Therefore, inspite of the demonstrated superiority of PAMI more than 90% patients of STEMI in our country receive fibrinolytic treatment. Because of the cost constraints, streptokinase remains the most widely prescribed fibrinolytic agent. This is despite the fact that it can achieve TIMI 3 flow only in 40% of cases as opposed to 58% and 65% TIMI3 patency rates achieved by tPA and TNK respectively (3). One can surmise that we have a very large number of post fibrinolytic failure patients.

Post Fibrinolytic scenarios:

It is very natural for a clinician to ask “What should be the next step after fibrinolytics in the survivors”?

While there can be several post fibrinolytic scenarios, in general one can encounter the following situations:

1. Failed fibrinolysis
2. Fibrinolysis has been successful with complete lysis of the thrombus
3. Fibrinolysis has partially opened the infarct related vessel with TIMI 3 flow but leaving behind critical residual lesion
4. Successful lysis with reocclusion
5. Fibrinolysis with or without GPIIb/IIIa blockers and immediate transport to PCI centre for PCI
6. Totally occluded vessel referred late to PCI center

1. Failed thrombolysis: It is said to occur if there is a persistent and ongoing chest pain after fibrinolytic administration with less than 50% resolution of ST segments at the end of 90 minutes. Several of these patients may be in left ventricular failure or cardiogenic shock.

Such a situation warrants transferring the patient to a tertiary care centre with emergency facilities for performing rescue PCI. Various trials have shown rescue PCI in patients who have failed thrombolysis to be better form of therapy than conservative approach or administering additional or repeat dose of fibrinolytics (4,5). This is true for all patients who are high risk, with reduced LV ejection fraction, are in left ventricular failure or in cardiogenic shock. REACT trial compared rescue angioplasty versus repeat thrombolysis or con-
servative management in patients who had less than 50% ST segment resolution within 90 minutes. Patients who underwent rescue angioplasty had event free survival rate of 84.6 percent as compared to 70.1 percent among those receiving conservative therapy and 68.7 percent for those treated with repeat thrombolysis

2. **Successful thrombolysis:** When thrombolysis is successful in achieving TIMI3 flow without leaving behind critical or significant narrowing the treatment is basically directed towards antiplatelets, statins and ACE inhibitors for plaque stabilization and preventing left ventricular remodeling.

3. **Residual Critical Lesion:** Large number of patients achieve TIMI3 flow in the epicardial artery and have a residual critical lesion. In this subset of patients there was a considerable controversy. Whether a conservative strategy with an advice to perform angiography and PCI routinely even if the patient is asymptomatic or to subject only those patients who have subjective or objective evidence of ischaemia to coronary angiography, and PCI.

The current weight of evidence is in favour of a routine angiography and PCI in these subset of patients. The adverse event rates are lower in the invasive strategy group than in ischaemia guided intervention group. In CARESS-in-AMI study, patients after receiving thrombolysis with Abciximab were transferred immediately to hospitals with interventional facility and randomized to a) immediate PCI b) standard care and if needed rescue PCI. Immediate PCI group had adverse event rate of 4.4% while the standard care rescue PCI group had an event rate of 10.7%. (6)

One can draw a conclusion that it is a reasonable and recommended approach to administer thrombolytic at a community hospital and to transfer patients immediately to an interventional center for immediate PCI.

4. **Reocclusion:** By angiographic definition reocclusion has been shown to occur in about 10 to 16% of patients. It is most likely to occur within 15 days. The treatment involves antiplatelet drugs including GPIIb/IIIa receptor blockers and PCI if the symptoms of reocclusion threaten reinfarction. The mortality can be very high in this subset of patients.

5. **Totally Occluded vessel:** In patients who have totally occluded infarct related artery and have passed the window period of myocardial salvage and are totally asymptomatic, it appears that there is no evidence for performing PCI. In OAT trial 2166 stable patients with STEMI who presented 3 to 28 days later, were assigned to PCI with stenting with optimal medical treatment and the other group to only optimal medical treatment. There was no significant difference in composite end points of death, myocardial infarction or heart failure between two groups (7).

**Conclusions:** Fibrinolytic treatment continues to remain an important and easily available form of treatment for myocardial salvage in vast majority of STEMI patients worldwide and particularly in emerging market economy country like India.

Following fibrinolysis, clinical parameters should be carefully watched for failure of thrombolysis. Immediate rescue PCI significantly reduces adverse cardiac events of death, myocardial infarction and readmissions. It is also therapeutically beneficial, if the patient can be transferred immediately post thrombolysis to a PCI center for PCI since such a strategy has been shown to reduce the incidence of death and MI. In stable patients presenting late with totally occluded vessel, there is no indication of opening up the infarct related artery by PCI.

**REFERENCES**