Healthy Heart

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Honorary Editor :
Dr. Tejas V. Patel

From the Desk of Hon. Editor:

Dear Friends,

Nearly 3 million patients with ST-segment elevation myocardial infarction(STEMI) are estimated to occur in India per year. The incidence of CAD in young population in Western countries is 2–5%, whereas it is 11–16% in Asian Indians. Young Indians had ten times more risk of developing Myocardial Infarction(MI) as compared to the white population. Higher proportion of STEMI patients in India have delayed presentation, are less likely to get evidence-based treatments and have greater 30-day mortality. Reducing the time to reach hospital and offering affordable optimal therapy could reduce morbidity and mortality. Recently a consensus statement regarding management of STEMI has been published jointly by STEMI-INDIA, Cardiology Society of India (CSI) and Association of Physicians of India (API). This article will update you regarding this Indian guideline for the best possible ways to treat STEMI patient in Indian scenario.

Warm regards,

- Dr. Tejas V. Patel

Best Management of STEMI: Indian perspective

Challenges in management of STEMI in India

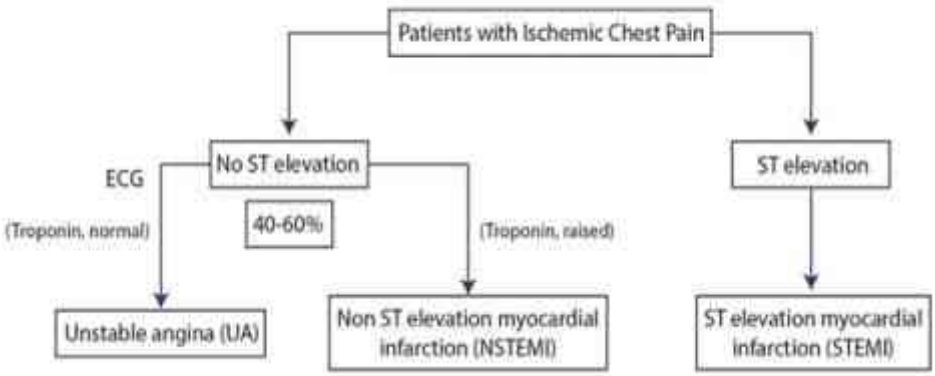
Economic and geographic diversities along with infrastructural differences make the management of STEMI in India both challenging and discrepant. There are six metro cities and more than thirty big cities in India, which have world class healthcare facilities. But a vast majority of population lives in villages and smaller towns where only basic primary healthcare is available. Infrastructures especially transport systems and hospitals with modern facilities are far from optimal in many remote townships; which delays time to reperfusion time in STEMI patients.

Only 20% of the population has the affordability to take proper medical care either with government supported schemes or private insurance. The total spending on healthcare is around 4.6% of GDP in India which is much lesser than countries like USA (17.1%),UK (9.1%) and China (5.5%). In this scenario it is difficult to deliver modern evidence based management of STEMI to the majority of the population.

Delayed presentation time – Average time delay from the onset of symptoms to the first medical contact in the various ACS Registries from India is 6-10 hrs. Reperfusion strategies are underutilized – Primary PCI in STEMI has been proven worldwide as the gold standard of treatment by way of establishing high percentage of complete and lasting reperfusion. However, this treatment modality is available to a very small proportion of STEMI patients in India.

Diagnosis of STEMI and early risk stratification

STEMI is the most common form of Acute Coronary Syndrome (ACS) in India, accounting for 40–60% of ACS cases.



ECG changes in STEMI :

The task force for the universal definition of MI defines STEMI as new ST elevation at the J point in at least 2 contiguous leads

Typical
ST Elevation (at least 2 contiguous leads)
• 2 mm (0.2 mV) in men or 1.5 mm (0.15 mV) in women in leads V2-V3
• 1 mm (0.1 mV) in other contiguous chest leads or the limb leads
New or presumably new LBBB
Atypical
STEMI in Evolution
• Hyperacute T-wave changes
Evolving/Evolved STEMI
• Q waves with T wave inversion with variable ST elevation
Posterior wall MI
• ST depression in 2 precordial leads (V1-V3) + positive T waves in V1
Left main or proximal left anterior descending artery occlusion
• ST depression in multiple leads with ST elevation in lead aVR and V1(aVR > V1: left main, V1 > aVR: proximal LAD)

Criteria to diagnose STEMI in presence of LBBB – proposed by Sgarbossa

- ST-elevation ⩾ 1 mm and concordant with QRS complex - 5 points
- ST-segment depression ⩾ 1 mm in lead V1, V2, or V3 - 3 points
- ST-elevation ⩾ 5 mm and discordant with QRS complex - 2 points

  A score of ⩾3 has a specificity of 98% fordiagnosing STEMI.

Recommendations for ECG -

- **Indications:** Chest pain, Acute pain anywhere from jaw to umbilicus (beyond 20 years of age), Atypical symptoms of STEMI
- Presentation to ECG diagnosis of STEMI – < 10 min
- Repeat ECG – 10 min, 30 min and as needed
- Right precordial leads (V3R, V4R)&lateral chest leads V7 – V9 in appropriate case

STEMI Risk stratification:

Killip Classification & TIMI risk score

Killip's Classification-

- Class I: No evidence of heart failure
- Class II: Findings of mild to moderate heart failure (S3 gallop, rales< half-way up lung fields or elevated jugular venous pressure
- Class III: Pulmonary edema with rales> half-way up lung fields
- Class IV: Cardiogenic shock defined as systolic blood pressure < 90 mmHg and signs of hypoperfusion such as oliguria, cyanosis, and sweating

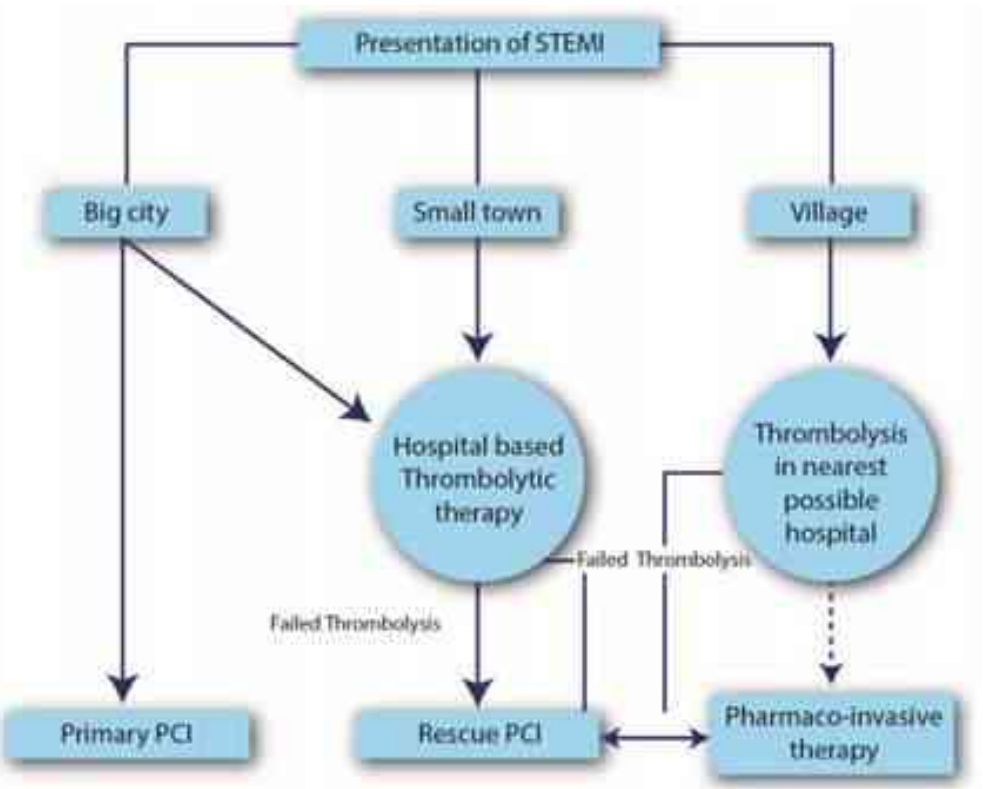
Reperfusion Strategies in STEMI

- Primary PCI
- Thrombolysis
- Pharmaco-invasive [PI]

PRIMARY PCI

It is the gold-standard in the management of STEMI. Primary PCI reduces mortality by 25%, re-infarction by 64%, ICH by 95% and stroke by 53% when compared to thrombolytic therapy. Primary PCI results in TIMI 3 flow of Infarct related artery in over 90% of patients. However, the major disadvantage of primary PCI is the delay in commencing the reperfusion treatment labeled as the 'PCI-related delay', defined as “the theoretical difference between the time of FMC (first medical contact) to balloon inflation. minus the time from FMC to start of Thrombolytic therapy” (i.e. 'door-to-balloon' minus 'door-to-needle') and longer delay to primary

Proposed Triage plan for patients of STEMI: Rural and Urban



PCI are associated with worse clinical outcomes. PCI related delay of >60 min negates any mortality benefit compared to immediate thrombolysis.

Current international guidelines recommend primary PCI in patients with STEMI, presenting with symptoms of less than 12 h duration, 12–24 h with ongoing clinical/ electro cardiographic evidence of ischemia and those who present with cardiogenic shock or acute heart failure, irrespective of time delay from the onset of symptoms.

THROMBOLYSIS

Thrombolytic therapy has greater benefit in patients treated within 1 h of symptom onset, with a sharp drop off after 3 h. A meta-analysis of thrombolytics showed that this was a good way of reperfusion with improved outcomes across subsets except in those presented beyond 12 h of symptom onset. Below are the Thrombolytic Agents Approved For The Treatment of STEMI.

Benefit of thrombolysis in STEMI is not yet established in patients over 85years of age. Failed thrombolysis can be diagnosed by persisting or worsening chest pain or less than 50% resolution of ST-segment elevation after 90 min of thrombolysis in the lead

Agent	Bolus	Dose	Adverse Effects	Fibrin Specificity	Efficacy (TIMI 2 or 3 flow at 90 min)
Streptokinase (STK)	No	1.5 million unit given intravenously over 30–60 minutes	Might cause severe hypotension. Allergic reaction. (+nce of anti-Bodies) Avoid re exposure within 6 months.	No	60 to 68%
Tenecteplase (TNK)	Yes	30 mg for weight 60 kg; 35 mg for 60–69 kg; 40 mg for 70–79 kg; 45 mg for 80–89 kg; and 50 mg for 90 kg	-	+++	85%
Reteplase (rPA)	Yes (double bolus)	10U + 10U intravenous boluses given 30 min apart	-	++	84%
Alteplase (rt-PA)	No	Bolus 15 mg, followed by infusion 0.75 mg/kg (maximum 35) over the next 60 min; total dose should not exceed 100 mg	-	++	75–84%

Contraindications to Thrombolysis.

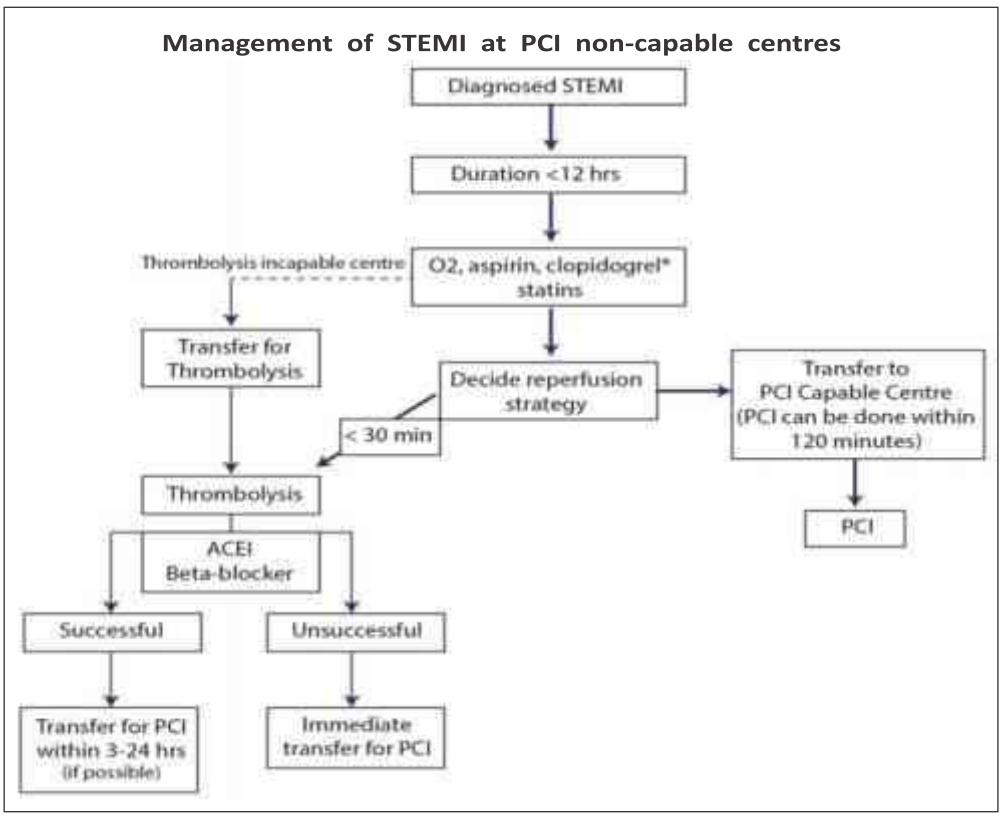
Absolute	Relative	No Contraindication
Previous ICH or stroke of unknown origin at any time Ischemic stroke in the preceding 6 months	Transient ischemic attack in the preceding 6 months Oral anticoagulant therapy	Menstruation Acute Ischemic stroke within 4.5 h
CNS damage or neoplasms or AV malformation Recent major trauma/surgery/head injury (within the preceding 3 weeks) GI bleeding within the past month Known bleeding disorder (excluding menstration) Aortic dissection Non-compressible punctures in the past 24 h (e.g. liver biopsy, lumbar puncture)	Pregnancy or within 1 week postpartum Refractory hypertension (systolic >180 mmHg and/or diastolic >100 mmHg) Advanced liver disease Infective endocarditis Active peptic ulcer Prolonged or traumatic resuscitation	

showing maximum ST-segment elevation at presentation. Rescue PCI is advocated for such patients and patients should be transferred to a PCI-capable centre immediately.

PHARMACO-INVASIVE [PI] STRATEGY

PI strategy consists of early thrombolysis followed by either rescue PCI for patients with failed thrombolysis, or non-urgent coronary angiography to determine the need for additional revascularization within 3–24 h. Initial timely thrombolysis to open the Infarct related artery and early PCI if required, to improve the patency rates, is an attractive option of reperfusion in STEMI and has gained momentum recently. It differs from a 'facilitated' approach which consists of an immediate PCI following fibrinolysis and has shown adverse outcomes. PCI performed 3 h after thrombolysis precludes the early pro-thrombotic phase and reduces the chances of reocclusion. Furthermore, this delay may also be the reason for decrease in bleeding complications that were seen with facilitated approach.

Multiple studies have subsequently shown that this strategy reduces the rate of re-infarction and reducing overall morbidity and mortality. In Tamil Nadu STEMI INDIA Project [Spoke & Hub model], standalone thrombolytic treatment had 9.0% mortality while the PI strategy had 1.7% mortality. Hence, PI strategy is appropriate for patients with STEMI who are eligible for treatment with thrombolytic drugs and in whom FMC to balloon time is >120 min.



Brief overview of Antiplatelet Pharmacotherapy

- In all patients of STEMI, DAPT is must.
- Loading of chewable Aspirin with 325mg followed by Lower dose of Aspirin preferred (75–100 mg/day)
- Ticagrelor : preferred for STEMI patients planning for Primary PCI and STEMI patients with late presentation not undergoing thrombolysis; do not give if planning for thrombolysis.
- Prasugrel : Not a drug for clinicians, should be started only in cath lab after angiography
- Clopidogrel: STEMI patients if undergoing thrombolysis
- GPIIb/IIIa inhibitors : should be started only after angiography, if high thrombus burden or no-reflow in appropriate patients
- Dual anti-platelet therapy [DAPT] for 12 months. Consider shorter (3-6 months) or longer (up to 30 months) duration based on ischemic vs bleeding risk
- Triple therapy [DAPT + anticoagulation] for only 6 weeks when must [Newer antiplatelets / anticoagulants not well tested]
- Compulsory non-cardiac surgical procedure that cannot be postponed : Minimum DAPT duration
  - For BMS - 1 month
  - For DES - 3 months
- Prior to elective surgery STOP :
  - Ticagrelor or Clopidogrel - 5 days
  - Prasugrel - 7 days

Reference :

Indian Heart J. 2017 Apr;69 Suppl 1:S63-S97

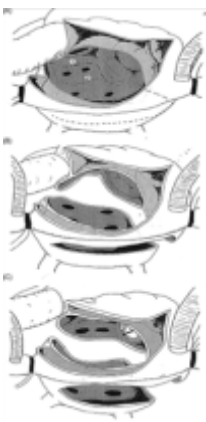
SUGIKI'S SPIRAL RESECTION AND LEFT ATRIAL REDUCTION FOR GIANT LEFT ATRIUM (GLA)

PRESENTER NAME: Dr. Manan Desai, Dr. Dhaval Naik, Dr. Dhiren Shah, Dr. Shaunak Shah, Dr. Niren Bhavsar, Dr. Hiren Dholakia, Dr. Chintan Sheth.

INTRODUCTION: Various techniques have been described for LA reduction in cases of giant left atrium (Giant LA). These use various permutations and combination of cut & sew and plication. We successfully performed Sugiki's spiral resection in our patient of double valve disease with ventricular dysfunction.

METHODS:

A 55-year-old woman with a known history of rheumatic heart disease presented in emergency with severe shortness of breath. On Examination, she was tachypnoeic and hypotensive. There was reduced air entry on both sides with basal crepitations. ECG was showing fast ventricular rate with atrial fibrillation. Echocardiography showed Mitral stenosis;MVA:0.9cm2 ,PG/MG;32/16 mm hg and severe MR. There was Moderate Aortic stenosis : PG/MG 65/35 mm hg and moderate AR. LA was hugely dilated (143- 88 mm). LVEF was 45 % with moderate PAH along with AF. Coronary angiography was normal.



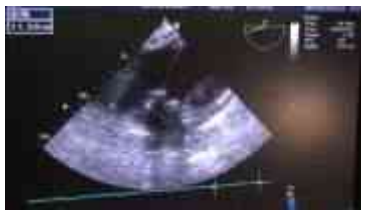
Sugiki's Technique

Surgical management:

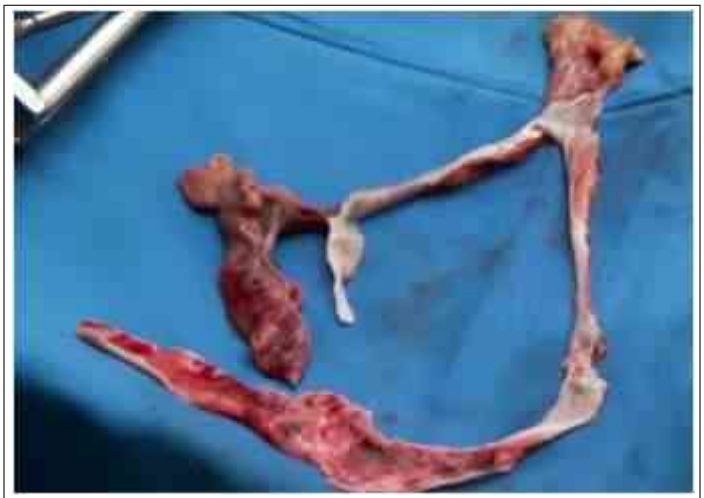
Post of ECG : Regular Sinus Rhythm

After stabilization patient was taken up for surgery. The excision of spiral piece was started by exposing mitral valve through the Berreklouw trans-septal method. The incision was extended in the left atrial wall adjacent to left pulmonary veins (between the veins and mitral valve). The incision was further extended in the entire inferior wall later reached the right atrial wall, (surgeon side). Thus a strip of spiral tissue involving Left atrium, Right atrium and Inter-atrial septum was resected. Mitral (#25 St. Jude) and aortic valves (#17 St. Jude Regent)were replaced. Patient was weaned of CPB uneventfully. CPB time was 290 min & Aortic cross clamp time was 240 min. Post op recovery was uneventful. LA size was reduced to 5 cm and regular rhythm achieved.

Pre Op Echo : LA 14 x 8.5 cm



Post Op Echo : 5 x 6 cm



Excised Spiral Specimen

REFERENCE:

Sugiki H., Murashita T., Yasuda K., Doi H.. Novel technique for volume reduction of giant left atrium: simple and effective 'spiral resection' method, Ann Thorac Surg , 2006, vol. 81 (pg. 378-380)

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