Primary PCI In Elderly

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Predictors for reperfusion strategy in STEMI

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Description</th>
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<tr>
<td>Time Since Symptom Onset</td>
<td>Time required for transport to a skilled PCI lab</td>
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<tr>
<td>Risk of STEMI</td>
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<tr>
<td>Risk of Fibrinolysis</td>
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<tr>
<td>Time Required for Transport</td>
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Reperfusion Therapy for Patients with STEMI

*Reperfusion Therapy for Patients with STEMI*

*Patients with cardiogenic shock or severe heart failure initially seen at a non-PCI-capable hospital should be transferred for cardiac catheterization and revascularization as soon as possible, irrespective of time delay from MI onset (Class I, LOE: B). Angiography and revascularization should not be performed within the first 2 to 3 hours after administration of fibrinolytic therapy.*
Goals

- Chest pain to call: 5 minutes
- Ambulance arrival: 8 minutes
- Transfer time: 30 minutes
- Door to needle time: less than 30 minutes
- Door to balloon time: less than 90 minutes
- Door In Door Out (DIDO): less than 30 minutes
- Transfer from non PCI Hospital to balloon time: 120 minutes
- PCI related delay time: less than 60 minutes
- Total ischemic time: less than 120 minutes

Primary PCI
Primary PCI in STEMI

Primary PCI should be performed in patients with STEMI and ischemic symptoms of less than 12 hours' duration.

Primary PCI should be performed in patients with STEMI and ischemic symptoms of less than 12 hours' duration who have contraindications to fibrinolytic therapy, irrespective of the time delay from FMC.

Primary PCI should be performed in patients with STEMI and cardiogenic shock or acute severe HF, irrespective of time delay from MI onset.

Primary PCI in STEMI

Primary PCI is reasonable in patients with STEMI if there is clinical and/or ECG evidence of ongoing ischemia between 12 and 24 hours after symptom onset.

PCI should not be performed in a noninfarct artery at the time of primary PCI in patients with STEMI who are hemodynamically stable.
PCI of a noninfarct artery may be considered in selected patients with STEMI and multivessel disease who are hemodynamically stable, either at the time of primary PCI or as a planned staged procedure.¹

1. Modified recommendation from 2013 Guideline (changed class from III: Harm to IIb and expanded time frame in which multivessel PCI could be performed).

**Primary PCI vs fibrinolysis**

- At any time from symptom onset, PCI is superior to fibrinolysis.
- 37% RR of mortality with PCI
- 65% RR of reinfarction
- 90% RR of stroke
- Higher LVEF
- Lower TVR
- Smaller infarct size
- Higher TIMI III flow
- Better healing
Reperfusion in the elderly

- It is estimated that 12% of STEMI patients are elderly.
- Scarce data about outcome of reperfusion strategies in elderly with STEMI
- Elderly were usually excluded from clinical trials
- Conflicting data about benefits of fibrinolysis
- PPCI still better than fibrinolysis even in elderly

PPCI VERSUS FIBRINOLYSIS
PPCI VS THROMBOLYSES

- Few small trials have been performed to specifically address the question of fibrinolytic therapy or PCI in elderly STEMI patients.

- One of these trials showed that patients >75 years treated with PCI had lower rates of death, MI, or stroke at 1 year (20% versus 44%; P=0.003) compared to streptokinase.

- The mortality difference was not a consistent finding across the studies, but PCI derived greater benefits both in terms of efficacy (lesser need for subsequent revascularization, reinfarction) and safety (lesser rates of stroke and bleeding).
PPCI VS THROMBOLYSIS

- PCI advantages were confined to patients 70 to 80 years of age. Among those >80 years, there was no advantage of one strategy over the other.

- A recent multicenter study evaluated the short and long term outcomes of nonagenarians with STEMI systematically treated with primary PCI.

- Their results on in-hospital mortality rate (19%) and predictors for 6 month mortality (cardiogenic shock at presentation, TIMI flow after PCI and abciximab), suggested that selected nonagenarians with AMI might also benefit from successful primary angioplasty.

PPCI VS THROMBOLYSIS

- Pooled trials analyses can provide statistical confirmation of the mortality advantage with PCI in individual trials.

- The PCAT-2 investigators included analysis of 22 randomized trials of PCI versus fibrinolytic therapy.

- There was a benefit with PCI, particularly if the patient arrived 2 hours after symptom onset or if the patient was ≥65 years of age.

- A subgroup analysis found that the absolute mortality advantage of PCI increased with age from 1% at 65 years to 6.9% at ≥85 years of age.
Figure 3: PCAT-2 collaborators [95]. Absolute mortality benefit of PCI with increasing age according to reperfusion strategies. The absolute mortality benefit increases from 1% at 65 years to 6.9% at ≥85 years of age. The number of patients includes with increasing age.

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<tr>
<td>Stroke in 6-month</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
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**PPCI vs Thrombolysis**

Table 5. Considerations for selecting reperfusion therapy in the elderly

<table>
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<tr>
<th>PCI</th>
<th>Fibrinolytics</th>
<th>No reperfusion</th>
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<tbody>
<tr>
<td>• Normal renal function</td>
<td>• Diminished renal function</td>
<td>• Too risky</td>
</tr>
<tr>
<td>• PCI can be performed without excessive delay (&lt;1h) compared to fibrinolysis</td>
<td>• Delay to PCI would be excessive (&gt;1h) compared to fibrinolysis</td>
<td>• Too late</td>
</tr>
<tr>
<td>• Presentation &gt;6h of symptom onset</td>
<td>• Can have the lytic within 2-3h from symptom onset</td>
<td>• Too small infarct (stable patient)</td>
</tr>
<tr>
<td>• Not known or suspected severe, diffuse vascular disease</td>
<td>• Intrinsic fibrinolytic therapy</td>
<td></td>
</tr>
<tr>
<td>• Increased risk of ICH</td>
<td>• Absence ST elevation/pain</td>
<td></td>
</tr>
<tr>
<td>• Shock at presentation</td>
<td>• Contraindications to fibrinolytic therapy</td>
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*Absolute benefits of PCI are greater in correlation to baseline risk*  
*The greater benefit of fibrin specific agents may be offset by more ICH compared to SK*
Challenges of PPCI in elderly

- **General challenges**
  - Prolonged time from symptom onset to admission.
  - Atypical symptoms
    (According to the National Registry of Myocardial Infarction, chest pain at presentation occurred in **89.9%** of STEMI patients <65 years of age versus **56.8%** of those ≥85 years of age)

- LBBB is more common in elderly ( **1/3 of patients > 85 years**)
- Multiple comorbidities including chronic kidney disease, anemia and cancer, which increase the risks associated with PCI
- Higher risk of CIN, bleeding, cholesterol embolism
Challenges of PPCI in elderly

- **Technical challenges**
  - Difficult puncture due to PVD
  - Tortuous iliofemoral, abdominal aorta
  - Aortic aneurysm
  - Severe coronary calcification.
  - Complex multivessel disease
  - Tortuous vascular anatomy which make coronary and vascular approaches difficult.
  - Less likely to achieve TIMI III flow, MBG III, ST resolution
  - More PCI related complications
  - Poor collaterals

Outcomes of PPCI in elderly

- **Elderly versus young**
  - In-hospital mortality (14.5% vs. 3.5%).
  - Heart failure (20.7% vs. 10.5%).
  - Major hemorrhage (9.5% vs. 3.3%).
  - Mechanical complications (3.4% vs. 0.7%).
  - Contrast-induced nephropathy (CIN) (31.8% vs. 12.2%)
  - Stroke (4% vs 0.7%)
How to improve outcome of PPCI in elderly

• Early detection of anemia and kidney dysfunction

• Reduce volume of contrast during PPCI.

• Good hydration.

• Non ionic contrast

• Avoid access site bleeding (closure devices, Angioseal, Starclose)

How to improve outcome of PPCI in elderly

• **Radial approach** (RIVAL trial): reduced mortality, overcome peripheral VD problems during femoral approach, improve catheter support.

• Bivaluridin during intervention, avoid LMWH, Fondaparinux.

• ACT guided PPCI if UFH was used

• ACT guided sheath removal < 180 sec

• Avoid prasugrel if > 75 years or prior stroke
CONCLUSION

• CV care of elderly STEMI patients should take place within the context of their multidimensional health status.

• Physicians should be aware of the atypical clinical presentations, as well as altered pharmacokinetics and the often altered cognitive and functional status of elderly patients.

• Up to 85 years of age, studies suggest a benefit associated with reperfusion strategies.

CONCLUSION

• The choice between fibrinolytics or PCI is determined by the presence or absence of cardiogenic shock, time from presentation, and comorbidity, which often tip the balance towards PCI in the elderly.

• The safety and efficacy of reperfusion, specifically fibrinolytic therapy, in the very elderly (≥85 years of age) are issues that require further investigation.
Thank you