Early Platelet Response to Thienopyridine Loading in ST-Elevation Acute Myocardial Infarction at the Time of Primary Angioplasty: Predictors and Effect on Myocardial Reperfusion

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Disclosures:

No disclosures
Background

Data regarding the immediate effect of thienopyridine pre-treatment in STEMI patients undergoing primary percutaneous coronary intervention (PPCI) are scarce.
Aims

• Evaluate the immediate anti-platelet effect of thienopyridine pre-treatment in STEMI patients undergoing PPCI, and its predictors

• Assess the impact of early thienopyridine anti-platelet effect (@ PPCI) on markers of reperfusion.
Platelet Aggregation in Response to Thienopyridine in Patients Undergoing PPCI for STEMI

Patients STEMI undergoing PPCI, n=112

Clopidogrel loading (600 mg, n=54) or Prasugrel loading (60 mg, n=58) upon diagnosis @ ER

PPCI (before GPIIb/IIIa inh.)

Pre-discharge (≥72 h post loading)

Door to Balloon Time: 48 ± 22 min
Methods (cont.)

ADP and AA induced platelet aggregation (PA) was studied by light transmitted aggregometry (LTA) in 3 time points:

– Presentation
– PPCI
– After 72 hours

Early Platelet Response to Thienopyridine was defined as ADP – induced PA < 70% @ PPCI
Methods (cont.)

Markers of reperfusion and myocardial damage were evaluated:

- TIMI myocardial perfusion (TMPG)
- ST segment resolution (STR)
Results

STEMI Patients Undergoing PPCI
N=112

Early Responders
ADP-induced PA < 70% @ PPCI
[n=46 (41%)]

Early Non-Responders
ADP-induced PA ≥ 70% @ PPCI
[n=66 (59%)]

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Tel Hashomer

The Leviev Heart Center
Platelet Reactivity by Time from Loading

ADP-platelet aggregation at PPCI (%)

Time from thienopyridine loading to PPCI (min)

- Clopidogrel
- Prasugrel
### Patient Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Non-Responders (n=66)</th>
<th>Responders (n=46)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years ± SD)</td>
<td>62 ± 10</td>
<td>57 ± 13</td>
<td>0.04</td>
</tr>
<tr>
<td>Male (%)</td>
<td>89</td>
<td>80</td>
<td>0.19</td>
</tr>
<tr>
<td>Smoking (%)</td>
<td>39</td>
<td>48</td>
<td>0.38</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>45</td>
<td>24</td>
<td>0.02</td>
</tr>
<tr>
<td>Hyperlipidemia (%)</td>
<td>50</td>
<td>39</td>
<td>0.26</td>
</tr>
<tr>
<td>Diabetes mellitus (%)</td>
<td>23</td>
<td>22</td>
<td>0.90</td>
</tr>
<tr>
<td>BMI</td>
<td>27 ± 4</td>
<td>27 ± 4</td>
<td>0.87</td>
</tr>
<tr>
<td>Prior ischemic heart disease (%)</td>
<td>15</td>
<td>17</td>
<td>0.75</td>
</tr>
<tr>
<td>Clopidogrel (%)</td>
<td>56</td>
<td>37</td>
<td>0.05</td>
</tr>
<tr>
<td>Time from symptom onset to admission (minutes ± SD)</td>
<td>212 ± 191</td>
<td>177 ± 122</td>
<td>0.3</td>
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</table>
## Characteristics of Clopidogrel Patients

<table>
<thead>
<tr>
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<th>Non-Responders (n=37)</th>
<th>Responders (n=17)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years ± SD)</td>
<td>63 ± 11</td>
<td>57 ± 16</td>
<td>0.14</td>
</tr>
<tr>
<td>Male (%)</td>
<td>86</td>
<td>76</td>
<td>0.37</td>
</tr>
<tr>
<td>Smoking (%)</td>
<td>30</td>
<td>47</td>
<td>0.22</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>46</td>
<td>29</td>
<td>0.26</td>
</tr>
<tr>
<td>Hyperlipidemia (%)</td>
<td>46</td>
<td>35</td>
<td>0.47</td>
</tr>
<tr>
<td>Diabetes mellitus (%)</td>
<td>22</td>
<td>12</td>
<td>0.40</td>
</tr>
<tr>
<td>BMI</td>
<td>26 ± 4</td>
<td>26 ± 4</td>
<td>0.89</td>
</tr>
<tr>
<td>Prior ischemic heart disease (%)</td>
<td>14</td>
<td>18</td>
<td>0.70</td>
</tr>
<tr>
<td>Time from symptom onset to admission (minutes ± SD)</td>
<td>236 ± 206</td>
<td>158 ± 99</td>
<td>0.17</td>
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### Characteristics of Prasugrel Patients

<table>
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<tr>
<th>Characteristic</th>
<th>Non-Responders (n=29)</th>
<th>Responders (n=29)</th>
<th>P-Value</th>
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</thead>
<tbody>
<tr>
<td>Age (years ± SD)</td>
<td>60 ± 8</td>
<td>57 ± 11</td>
<td>0.29</td>
</tr>
<tr>
<td>Male (%)</td>
<td>93</td>
<td>83</td>
<td>0.23</td>
</tr>
<tr>
<td>Smoking (%)</td>
<td>52</td>
<td>48</td>
<td>0.80</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>45</td>
<td>21</td>
<td>0.05</td>
</tr>
<tr>
<td>Hyperlipidemia (%)</td>
<td>55</td>
<td>41</td>
<td>0.30</td>
</tr>
<tr>
<td>Diabetes mellitus (%)</td>
<td>24</td>
<td>28</td>
<td>0.28</td>
</tr>
<tr>
<td>BMI</td>
<td>28 ± 4</td>
<td>28 ± 5</td>
<td>0.60</td>
</tr>
<tr>
<td>Prior ischemic heart disease (%)</td>
<td>17</td>
<td>17</td>
<td>1.00</td>
</tr>
<tr>
<td>Time from symptom onset to admission (minutes ± SD)</td>
<td>183 ± 170</td>
<td>189 ± 136</td>
<td>0.90</td>
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</tbody>
</table>
Platelet Aggregation: Clopidogrel vs. Prasugrel

- **Clopidogrel**
- **Prasugrel**

- **Baseline**
  - **Clopidogrel:** P=0.8
  - **Prasugrel:** P<0.01

- **PPCI**
  - **Clopidogrel:** P<0.01
  - **Prasugrel:**

- **3rd Day**
  - **Clopidogrel:** P<0.01
  - **Prasugrel:**
Clopidogrel Group Platelet Aggregation: Early Responders vs. Non-Responders

p < 0.001
p < 0.001
p = 0.004

Baseline PPCI 72 hr
Prasugrel Group Platelet Aggregation: Early Responders vs. Non-Responders

- Early Responders: p<0.04
- Non-Responders: p<0.001
- p=0.9
Markers of Myocardial Reperfusion

- **ST Resolution >50%**
  - Non Responders: 68%
  - Responders: 89%
  - P = 0.01

- **TMP ≥2**
  - Non Responders: 52%
  - Responders: 83%
  - P < 0.001
Limitations

- Single center, non randomized study
- Small group of patients to discuss clinical outcomes – hypothesis generating study
Conclusions

- Thienopyridine pre-treatment in STEMI patients is associated with a significant reduction in platelet aggregation at the time of PPCI.
- Early response to thienopyridine is associated with improved tissue perfusion and ST resolution.
- Predictors of early response to thienopyridine include lower age and low baseline platelet reactivity.
- Longer loading to balloon time is associated with lower platelet reactivity.
- Further research needed to establish thienopyridine pre-treatment clinical impact on STEMI patients.
Thank You