The AVOID Trial: Is this the Demise of “MONA”?

Karl B. Kern, MD
Professor of Medicine and
The Gordon A. Ewy, MD Distinguished Endowed Chair of Cardiovascular Medicine
University of Arizona
Co-Director, Sarver Heart Center,
Director, Cardiac Catheterization Laboratories
& the Interventional Cardiology Fellowship
Tucson, Arizona
Prospective, Randomized Controlled Trial of Oxygen Therapy for AMI in those without overt hypoxia.

Timely!

Needed!

Done in the modern era of primary PCI!
Oxygen therapy for acute myocardial infarction (Review)

Cabello JB, Burls A, Emparanza JJ, Bayliss S, Quinn T
Implications for Practice

The evidence in this area is sparse, of poor quality, and predates the advances in reperfusion techniques and trial methods of recent years. The evidence available is suggestive of harm but lacks power, so this could be due to chance. Current evidence neither supports nor clearly refutes the routine use of oxygen in people with AMI.
Implications for Research

Given the widespread use of oxygen for AMI, the inconsistencies in recommendations about when and to whom it should be given, and the fact that the best current evidence is suggestive of potential clinically significant harm, we believe there is an urgent need for an adequately powered randomized controlled trial to establish the effectiveness of, or harm from, the administration of oxygen to people with AMI. That trial must incorporate contemporary standards in design, conduct, analysis and reporting of trials and address the spectrum, population and sample size mentioned above to reflect contemporary diagnosis and care of the patient with AMI.

The Cochrane Library 2013, Issue 8
Major Lessons from AVOID

• Routine oxygen therapy for AMI not necessary for patients who are not hypoxic

• Unnecessary oxygen in such circumstances:
  – May be harmful
    • Increase MI size (Primary endpoint)
      – Peak CK levels and CK AUC data greater with O₂ Rx
        (p=0.01 & 0.04)
      – Peak TPI levels and AUC greater but not quite signif
        (p=0.17 &0.12)
      – 6 month CMR Infarct size
        » Greater with O₂ Rx (p=0.04)
## Baseline Characteristics Between Groups

<table>
<thead>
<tr>
<th></th>
<th>O₂</th>
<th>No O₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>74/min</td>
<td>72/min</td>
</tr>
<tr>
<td>SBP</td>
<td>130.0</td>
<td>130.0</td>
</tr>
<tr>
<td>Ant MI</td>
<td>38%</td>
<td>33.8%</td>
</tr>
<tr>
<td>DTB time</td>
<td>54.0 min</td>
<td>56.0 min</td>
</tr>
<tr>
<td>TIMI flow post PCI</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>ECG ST resolution</td>
<td>62%</td>
<td>69.6%</td>
</tr>
</tbody>
</table>
Clinical Endpoints (secondary)

• Few in General
  – Study powered for 1° endpoint (Cardiac enzymes)
    (underpowered for clinical endpoints)

• More recurrent MIs and arrhythmias with O₂
  – Evidence of increased reperfusion injury?

• Trend for better survival with O₂-Just Chance?
  – Mortality: 4/218 with O₂ and 10/223 without O₂ (p=0.11)
Yet, Unanswered Questions

Actual $P_aO_2$ differences (torr), instead of just $O_2$ Sats

Cardiac arrest literature suggests that > 300 torr oxygen detrimental. Wonder what the curves in AVOID would look like for $PaO_2$?
Yet, Unanswered Questions

• Details on:
  – Eligible pts/Randomized pts (unblinded)
  – Cross-overs (analysis was ITT)
  – Statistical correction for multiple testing of 1°endpt:
    • CK peak (2 ways: geometric, median)
    • CK AUC
    • Tpi peak (2 ways)
    • Tpi AUC 6 measurements for the primary endpoint
  – “Significant arrhythmias”-what were they?
Supplemental oxygen therapy in patients with STEMI but without hypoxia increased myocardial injury, recurrent myocardial infarction and major cardiac arrhythmia, and was associated with larger myocardial infarct size assessed at six months.

Is it really the right time to break-up with ‘MONA’ and move on...

The data is certainly getting stronger, but is it definitive...??

I’m not sure, ...

but I do know that “breaking up is hard to do”

Maybe we just date less often!