Prehospital nitroglycerin in the tachycardic chest pain patient: risky or not?

A Retrospective Cohort Study

Marie-Hélène Proulx, MSc, PCP
Urgences-santé, Montréal, Canada

Authors and affiliations
Marie-Hélène Proulx, MSc, PCP
Dave Ross, MD
Charlene Vacon, EMT-CC, PhD
Louis Enock Juste, MA
Eli Segal, MD
Luc De Montigny, PhD

Conflicts of interest
• None
Background

• Quebec prehospital Nitroglycerin (NTG) protocol
  • American Heart Association guidelines
• Indication:
  • Chest pain
• Contraindications:
  • Tachycardia (> 100 bpm)
  • Drop in systolic pressure (≥ 30 mmHg)
  • Bradycardia, hypotension, ...

Guidelines - Rationale

• NTG could provoke hypotension in tachycardic patients
• Lack of scientific evidence to support this contraindication

Primary objective

• Is NTG administration more likely to cause hypotension (< 90 mmHg) in:
  
  patients with tachycardia (HR > 100)

  compared to

  patients without tachycardia (50 < HR ≤ 100)
Secondary objectives

• Is NTG administration for chest pain in tachycardic patients associated with:
  • Drop in systolic pressure (≥ 30 mmHg)
  • Bradycardia
  • Reduced level of consciousness
  • Cardiac arrest

Methods

• Retrospective chart reviews: 2010-2012
  • Computerized database
  • Data validation
  • Missing data extracted by trained reviewers
  • Concordance rate: 93.8%

• Chi square + Multivariate logistic regression

Methods

Inclusion

Exclusions

n = 1020
Other medications administered (except AAS and O₂)

n = 924
Vital signs repeated > 15 min. (primary objective)

n = 10,414

N = 12,358
Chest pain and NTG charts
Results (primary objective)

\( n = 10,414 \) (p=0.026)

<table>
<thead>
<tr>
<th>HR Range</th>
<th>N</th>
<th>Hypotension &lt; 90 mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 ≤ HR ≤ 100</td>
<td>8335</td>
<td>249 (3.0%)</td>
</tr>
<tr>
<td>HR &gt; 100</td>
<td>2079</td>
<td>82 (3.9%)</td>
</tr>
</tbody>
</table>

Results (secondary objectives)

Adjusted odds ratios for tachycardia*

\( n = 11,338 \)

<table>
<thead>
<tr>
<th>Event</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure drop</td>
<td>1.28 (1.16-1.42)</td>
</tr>
<tr>
<td>Bradycardia</td>
<td>0.28 (0.14-0.58)</td>
</tr>
<tr>
<td>Reduced level of consciousness</td>
<td>1.00 (0.50-2.02)</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>0.37 (0.09-1.57)</td>
</tr>
</tbody>
</table>

* Adjusted by age, sex and comorbidities (diabetes, hypertension, cardiac condition, dyslipidemia)

Conclusion

• In tachycardic patients, there is a statistically significant increase in the relative risk of hypotension after NTG administration.

• The absolute risk of NTG-induced hypotension was low:
  • the absolute difference in risk was 1%.
Conclusion

• EMS medical directors reviewing PCP chest pain protocols should weigh the potential benefits of NTG administration against its known risks.

Next Steps

• Identify elevated heart-rate threshold that minimizes number needed to harm.
• Explore the relationships between pre-NTG heart-rate and pre-NTG blood-pressure, and post-NTG blood-pressure.

Questions?

Thank you!

marie-helene.proulx@urgences-sante.qc.ca