The cost-effectiveness of point-of-care troponin testing to exclude acute coronary syndrome in primary care

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Background

The added value of a point-of-care (POC) troponin test in primary care to diagnose acute coronary syndrome (ACS) in patients presenting with chest pain is debated, because:

- The test is unlikely to be used in patients considered at high risk of ACS.
- Test sensitivity is considered inadequate shortly after symptom onset.

Aim: investigate the cost-effectiveness of diagnosing ACS in primary care when a POC troponin test is available versus current practice (without POC troponin).

Methods

- Patient-level simulation model, hypothetical Dutch patient cohort:
  - Chest pain patients, aged >35 years.
  - Societal perspective, lifetime horizon.
- POC troponin is not used in:
  a) patients <4 hours complaints;
  b) patients diagnosed with ST-elevation myocardial infarction;
  c) patients considered at high risk of ACS by the GP.
- Main outcome measures:
  - Incorrect hospital referral decisions (false-positives and false-negatives).
  - Costs per chest pain patient.
  - Health outcomes; expressed as Quality-Adjusted Life Years (QALYs).

Results

- POC troponin strategy costs €1,057 as compared to €1,097 in current practice (i.e. €-40, a decrease of 3.6%).
- QALYs remain (almost) unchanged.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Without POC (95% CI)</th>
<th>With POC (95% CI)</th>
<th>Absolute effect (95% CI)</th>
<th>Relative effect (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs per patient</td>
<td>€1,097 (€831 to €1,407)</td>
<td>€1,057 (€800 to €1,354)</td>
<td>€-40 (€-77 to €-7)</td>
<td>(-6.7% to -0.7%)</td>
</tr>
<tr>
<td>QALYs per patient</td>
<td>11.3 (9.4 to 13.4)</td>
<td>11.3 (9.4 to 13.4)</td>
<td>0.0 (0.0 to 0.0)</td>
<td>(0.0% to 0.0%)</td>
</tr>
<tr>
<td>Probability TP</td>
<td>3.1% (2.2% to 4.1%)</td>
<td>3.2% (2.3% to 4.2%)</td>
<td>0.1% (0.0% to 0.2%)</td>
<td>(-0.2% to 5.4%)</td>
</tr>
<tr>
<td>Probability FP</td>
<td>28.9% (26.3% to 31.4%)</td>
<td>26.0% (23.3% to 28.8%)</td>
<td>-2.9% (-3.5% to -2.2%)</td>
<td>(-12.8% to -6.8%)</td>
</tr>
<tr>
<td>Probability TN</td>
<td>67.5% (61.0% to 71.0%)</td>
<td>70.3% (63.6% to 73.1%)</td>
<td>2.9% (2.2% to 3.5%)</td>
<td>(3.2% to 5.2%)</td>
</tr>
<tr>
<td>Probability FN</td>
<td>0.5% (0.3% to 0.8%)</td>
<td>0.5% (0.3% to 0.7%)</td>
<td>-0.1% (-0.2% to 0.0%)</td>
<td>(-28.8% to 1.6%)</td>
</tr>
</tbody>
</table>

Cost-effectiveness acceptability curve:

- Probability of the POC troponin strategy to be cost-effective ranges from 99.1% to 81.1%, for a willingness to pay threshold of €0 to €200,000/QALY.
- When the POC test was required to provide equal or better health outcomes compared with current practice (non-inferiority), and required to be cost-effective, this probability decreased and ranged from 72.9% to 73.3% (figure 2).

Conclusion and Discussion

Use of the POC troponin test for diagnosing ACS in primary care is expected to be cost-saving and to slightly enhance the GP’s ability to safely rule out ACS.

In the considered diagnostic workup, it remains uncertain whether health outcomes are improved. However, it is clear that this impact will be very limited.