Cardiology-driven Observation Protocol Leads to Over-use of Stress Testing Among Patients Younger than 40 Years Presenting to the Emergency Department with Chest Pain


Department of Emergency Medicine, NYC Health + Hospitals/Queens
Department of Emergency Medicine, Icahn School of Medicine at Mount Sinai

INTRODUCTION

- American College of Cardiology/American Heart Association guidelines for low-risk chest pain patients recommend serial cardiac biomarkers followed by cardiac stress test
- Recent literature shows routine cardiac stress testing has limited utility for patients under 40 years old presenting to the Emergency Department (ED) with chest pain
- At NYC Health + Hospitals/Queens (QHC), the ED Observation Unit (EDOU) chest pain protocol replaces routine stress testing for all patients with cardiology consultation
- Does QHC’s cardiology-driven observation protocol still lead to over-use of stress test in low-risk patients younger than 40 years of age?

QHC EDOU chest pain protocol

Chest pain patient considered for EDOU
- Initial work-up in ED: EKG, CXR, biomarkers

Any high risk features of ACS?
- Abnormal EKG: STEMI, LBBB with anginal symptoms, STD ≥ 1mm in 2 or more contiguous leads, TWI ≥ 3 or more leads, pathologic Q-waves without prior work-up, Wellsen’s sign
- Persistent/recurrent symptoms with known CAD
- Known unstable ischemic heart disease
- History of abnormal stress test
- Prior history of PVD, ESRD, CVA with anginal symptoms
- Positive biomarkers
- Rales on lung exam
- Systolic BP < 100 mmHg

EDOU work-up
- Telemetry
- Serial cardiac biomarkers
- Echocardiogram

Cardiology consult
- Decision for stress test, vs cath, vs admit, vs discharge ...

EDOU Excluded from EDOU
- No
- Yes

OBJECTIVES

- Assess ED observation protocol for chest pain in which decision for stress test is dependent upon cardiology consult
- Compare the use of cardiac stress testing between the EDOU and inpatient medicine service for patients < 40 years old presenting with chest pain
- Compare the use of cardiac stress testing between patients < 40 years old and patients ≥ 40 years old placed in EDOU for chest pain

RESULTS

Comparison of stress testing among EDOU patients < 40 years old vs. inpatients < 40 years old

<table>
<thead>
<tr>
<th>All patients age &lt; 40</th>
<th>Stress Test Done</th>
<th>No Stress Test Done</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDOU Observation</td>
<td>29</td>
<td>10</td>
<td>39</td>
</tr>
<tr>
<td>Inpatient Admission</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>34</td>
<td>15</td>
<td>49</td>
</tr>
</tbody>
</table>

- Out of 49 patients under age 40 either admitted to inpatient medicine or placed in EDOU for chest pain, 34 received cardiac stress tests; all 34 stress tests were negative
- 74.5% of EDOU patients aged < 40 received stress tests, compared to 50% of inpatients aged < 40
- OR = 2.90 ($p = 0.2468$, two-tailed Fisher’s exact test)

Comparison of stress testing among EDOU patients < 40 years old vs. EDOU patients ≥ 40 years old

<table>
<thead>
<tr>
<th>EDOU Patients</th>
<th>Stress Test Done</th>
<th>No Stress Test Done</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt; 40</td>
<td>29</td>
<td>10</td>
<td>39</td>
</tr>
<tr>
<td>Age ≥ 40</td>
<td>267</td>
<td>137</td>
<td>404</td>
</tr>
<tr>
<td></td>
<td>296</td>
<td>147</td>
<td>443</td>
</tr>
</tbody>
</table>

- 74.5% of EDOU patients aged < 40 received stress tests, compared to 66.1% of EDOU patients aged ≥ 40
- OR = 1.49 ($p = 0.3739$, two-tailed Fisher’s exact test)

CONCLUSIONS

- Patients aged < 40 were more likely to undergo stress testing when following a cardiology-driven protocol in the EDOU as compared to usual care in an inpatient setting
  - OR for this comparison not statistically significant at $\alpha = 0.05$ level, limited by the small sample size
- Out of all patients placed in EDOU for chest pain, patients aged < 40 were more likely to undergo stress testing compared to patients aged ≥ 40
  - OR for this comparison not statistically significant
  - Lack of statistical significance for this OR indicates that patients under age 40 received stress tests at least as often, if not more often than, older patients in EDOU
- Possible reasons behind over-use of stress tests in younger patients in EDOU may include:
  1. Lack of prior cardiac workup or stress test.
  2. Lack of PCP or reliable follow-up.
  3. Perception that patients < 40 will more safely tolerate a stress test
- An EDOU protocol explicitly de-emphasizing stress testing among patients < 40 years old may decrease over-testing in this low-risk patient group

REFERENCES