Effect of Angina Under-recognition on Treatment in Outpatients with Stable Ischemic Heart Disease

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Saint Luke’s
MID AMERICA HEART INSTITUTE
Disclosures

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– John A. Spertus, MD MPH – Funding from Gilead, Copyright to SAQ

– All others - None
Importance of angina recognition

Patients with Stable CAD

Medical Therapy Optimization

Yes

Residual Symptoms?

No

Treatment escalation

Add Med

Diagnostic Testing (stress test)

Cath ± Revasc

Fihn et al. JACC Vol. 60, No. 24, 2012
Assessing angina by cardiologists

- The Angina Prevalence and Provider Evaluation of Angina Relief (APPEAR) involving 25 US outpatient cardiology practices
- Compare patient-reported and MD-reported angina

Patient

Assessed by SAQ

Providers

Assessed by MD Report

Agreement?
Seattle Angina Questionnaire

- SAQ Angina Frequency domain

- Daily
- Weekly
- Monthly
- None
Prior insights - Under-recognition of angina

- Overall agreement between patients and physicians...
  - kappa = 0.48

- Physicians reported no angina in...
  - 45% of patients reporting monthly angina
  - 26% of patients reporting daily/weekly angina

- The implications are unknown

Grodzinsky et al. Circ Cardiovasc Qual Outcomes. 2015;132: A18360
Shafiq et al. Circ Cardiovasc Qual Outcomes. 2015;8: A7
Objectives

• Study the implications of angina under-recognition on treatment escalation
Definitions

• Treatment escalation:
  – Intensification/addition of antianginal medications
  – Diagnostic/invasive tests:
    • stress test
    • coronary computed tomography angiography
    • coronary angiography
    • revascularization (percutaneous coronary intervention or bypass graft surgery)
Statistical analysis

• Hierarchical multivariable logistic regression model
  – Physician and site as random effects
  – Variables included...
    » Under-recognition on angina
    » Age
    » Gender
    » Race
    » Hx of CABG
    » SAQ AS and SS
    » On ≥ antianginal med on arrival
    » Physician specialty
    » Avoidance of care due to cost
Total in APPEAR N=1257

Patients with angina N=411 (33%)

No treatment escalation N=305 (74%)

Treatment escalation N=106 (26%)

Diagnostic/Invasive (62%)

Medications (27%)

Both (11%)
## Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Treatment Escalation N=106</th>
<th>No Treatment Escalation N=305</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y) (mean)</td>
<td>68</td>
<td>69</td>
<td>0.46</td>
</tr>
<tr>
<td>History of HF</td>
<td>10%</td>
<td>18%</td>
<td>0.057</td>
</tr>
<tr>
<td>History of MI</td>
<td>29%</td>
<td>41%</td>
<td>0.02</td>
</tr>
<tr>
<td>History of PCI</td>
<td>63%</td>
<td>55%</td>
<td>0.14</td>
</tr>
<tr>
<td>History of CABG</td>
<td>37%</td>
<td>29%</td>
<td>0.11</td>
</tr>
<tr>
<td>On ≥2 antianginal meds</td>
<td>43%</td>
<td>38%</td>
<td>0.36</td>
</tr>
<tr>
<td>SAQ Angina Frequency</td>
<td>70</td>
<td>75</td>
<td>0.01</td>
</tr>
<tr>
<td>SAQ Angina Stability</td>
<td>47</td>
<td>56</td>
<td>0.001</td>
</tr>
<tr>
<td>SAQ Quality of Life</td>
<td>57</td>
<td>64</td>
<td>0.001</td>
</tr>
<tr>
<td>SAQ Treatment Satisfaction</td>
<td>85</td>
<td>88</td>
<td>0.03</td>
</tr>
<tr>
<td>SAQ Summary Score</td>
<td>62</td>
<td>66</td>
<td>0.02</td>
</tr>
</tbody>
</table>
## Physicians Characteristics

<table>
<thead>
<tr>
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<th>Treatment Escalation N=106</th>
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<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>84%</td>
<td>86%</td>
<td>0.67</td>
</tr>
<tr>
<td>Practice years</td>
<td>20</td>
<td>20</td>
<td>0.99</td>
</tr>
<tr>
<td>Interventional cardiologist</td>
<td>31%</td>
<td>38%</td>
<td>0.20</td>
</tr>
</tbody>
</table>
Recognition of angina

- Correctly recognized and over-recognized angina had similar rates of treatment escalation ($p=0.23$)
Association of angina recognition with treatment escalation

Appropriate recognition of angina

Under-recognition of angina

P<0.001 for all
Daily/Weekly angina on <2 antianginal medications

- Appropriate recognition of angina
- Under-recognition of angina

50% of patients with treatment escalation

P<0.001

Daily/weekly angina on <2 antianginal medications
N=47

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### Predictors of treatment escalation

<table>
<thead>
<tr>
<th>Predictor</th>
<th>OR (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under-recognition of angina</td>
<td>0.10 (0.04-0.21)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age (per 5 years)</td>
<td>0.91 (0.79-1.04)</td>
<td>0.177</td>
</tr>
<tr>
<td>Male</td>
<td>1.04 (0.56-1.95)</td>
<td>0.889</td>
</tr>
<tr>
<td>White race</td>
<td>0.39 (0.14-1.07)</td>
<td>0.066</td>
</tr>
<tr>
<td>Self-reported avoidance of care due to cost</td>
<td>0.60 (0.20-1.83)</td>
<td>0.365</td>
</tr>
<tr>
<td>History of coronary bypass graft surgery</td>
<td>1.16 (0.59-2.27)</td>
<td>0.662</td>
</tr>
<tr>
<td>SAQ Angina Stability (per 25 point decrease)</td>
<td>1.32 (0.96-1.82)</td>
<td>0.087</td>
</tr>
<tr>
<td>SAQ Summary Score (per 10 point decrease)</td>
<td>0.96 (0.87-1.05)</td>
<td>0.358</td>
</tr>
<tr>
<td>On ≥2 antianginal medications on arrival</td>
<td>1.17 (0.61-2.22)</td>
<td>0.642</td>
</tr>
<tr>
<td>Physician specialty: interventional cardiology</td>
<td>1.09 (0.51-2.34)</td>
<td>0.827</td>
</tr>
</tbody>
</table>
Limitations

- Cross sectional study
- No follow up information on health status or clinical outcomes
- Physicians were aware of study
Conclusions

• Under-recognition of angina is common

• Under-recognition is strongly associated with a lack of treatment escalation
  – Patients with under-recognized angina were 10-fold less odds to get treatment escalation
Future directions

• Develop novel strategies to improve angina recognition
  – Study implementation of patient-reported outcome measures (e.g. SAQ) in cardiology outpatient practice

• Test the impact of improved recognition on PRO and clinical outcomes
Acknowledgments

• Many thanks to my mentors at MAHI for their great support
Thank you!
Development and Validation of a Short Version of the Seattle Angina Questionnaire

Paul S. Chan, MD, MSc; Philip G. Jones, MS; Suzanne A. Arnold, MD; John A. Spertus, MD, MPH

Comparison of the Seattle Angina Questionnaire With Daily Angina Diary in the TERISA Clinical Trial

Suzanne V. Arnold, MD, MHA; Mikhail Kosiborod, MD; Yan Li, PhD; Philip G. Jones, MS; Patrick Yue, MD; Luiz Belardinelli, MD; John A. Spertus, MD, MPH
Physician form

In the past 4 weeks, has the patient had chest pain, angina or angina-equivalent symptoms?  

○ Yes  ○ No

COMPLETE ONLY FOR SYMPTOMS OCCURRING IN THE PAST 4 WEEKS

Category (check one only):
- Typical angina
- Atypical angina/angina equivalent
- Non-cardiac chest pain

Frequency of symptoms (check one only):
- Daily
- Monthly
- Weekly
- Less than monthly
Variability among physicians

- After adjusting for clinical characteristics and physicians’ under-recognition rates
- The median odds ratio for variability across physicians was 1.96 (p=0.010)
- The odds of treatment escalation varies, on average, 2-fold between two randomly selected physicians seeing statistically similar patients.
## Reasons not to escalate treatment

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</thead>
<tbody>
<tr>
<td><strong>Systolic BP</strong></td>
<td>128.8 ± 19.7</td>
<td>125.8 ± 16.9</td>
<td>0.126</td>
</tr>
<tr>
<td><strong>Systolic BP (Median (IQR))</strong></td>
<td>127.0 (116.0, 142.0)</td>
<td>124.0 (114.0, 136.0)</td>
<td>0.088 W</td>
</tr>
<tr>
<td><strong>Diastolic BP</strong></td>
<td>72.2 ± 11.3</td>
<td>71.4 ± 10.7</td>
<td>0.518</td>
</tr>
<tr>
<td><strong>Diastolic BP (Median (IQR))</strong></td>
<td>70.0 (64.0, 80.0)</td>
<td>70.0 (64.0, 79.0)</td>
<td>0.432 W</td>
</tr>
<tr>
<td><strong>Heart rate</strong></td>
<td>70.3 ± 10.9</td>
<td>73.4 ± 54.7</td>
<td>0.566</td>
</tr>
<tr>
<td><strong>Heart rate (Median (IQR))</strong></td>
<td>68.5 (63.0, 79.0)</td>
<td>70.0 (62.0, 78.0)</td>
<td>0.958 W</td>
</tr>
<tr>
<td><strong>Insurance for medications</strong></td>
<td>102 ( 97.1% )</td>
<td>291 ( 96.0% )</td>
<td>0.768</td>
</tr>
<tr>
<td><strong>Avoid care due to cost (Occasionally or more often)</strong></td>
<td>8 ( 7.5% )</td>
<td>30 ( 9.9% )</td>
<td>0.472</td>
</tr>
</tbody>
</table>
Treatment Escalation - Medications

- Ranolazine: 10.3%
- Calcium Channel Blockers: 15.4%
- Beta-blockers: 28.2%
- Nitrate: 46.1%

Medications: 27%
Treatment Escalation – Diagnostic/Invasive tests

- Hospital Admission: 1.1%
- Refferal for CABG: 3.3%
- CCTA: 4.4%
- Refferal for PCI: 10%
- Coronary Angiography: 17.7%
- Stress test: 63.5%

Diagnostic/Invasive: 62%
Treatment escalation for daily/weekly angina on <2 anti-angina medications

- No change: 66%
- Both: 2%
- Diagnostic/Invasive: 20%
- Medications: 12%

N=42