Understanding Why Patients Delay Seeking Care for Acute Coronary Syndromes

Mark D. Sullivan, MD, PhD; Paul S. Ciechanowski, MD, MPH; Joan E. Russo, PhD; Laurie A. Soine, ARNP; Kier Jordan-Keith, ARNP; Henry H. Ting, MD, MBA; James H. Caldwell, MD

Background—Better insight into the psychosocial factors associated with prehospital delays in seeking care for acute coronary syndromes is needed to inform the design of future interventions. Delay in presenting for care after the onset of symptoms is common, limits the potential benefit of acute reperfusion, and has not been reduced by interventions tested thus far.

Methods and Results—Seven hundred ninety-six patients with suspected ischemic heart disease scheduled for clinically indicated imaging stress tests completed questionnaires concerning psychological distress and attachment styles (worthiness to receive care, trustworthiness of others to provide care). The primary dependent variable for this study was response to a question from the rapid early action for coronary treatment trial concerning intention to “wait until very sure” before seeking care for a possible “heart attack.” Responses to this question were strongly associated with actual emergency department–reported and self-reported care delay in the rapid early action for coronary treatment trial. In multivariable ordinal regression models, a more negative view of the trustworthiness of others, greater physical limitations from angina, and no previous revascularization were independently associated with increased intention to wait to seek care for a myocardial infarction. Intention to wait was not associated with inducible ischemia or self-perceived risk of myocardial infarction.

Conclusions—Intention to delay seeking care for acute coronary syndromes is associated with a patient’s view of the trustworthiness of others, previous experience with revascularization, and functional limitations, even after adjustment for objective and perceived acute coronary syndromes risk. These findings provide insight into novel factors contributing to longer delay times and may inform future interventions to reduce delay time. (Circ Cardiovasc Qual Outcomes. 2009;2:148-154.)

Key Words: prehospital delay ■ attachment theory ■ depression ■ anxiety ■ trust

Patients’ delay in presenting to the hospital promptly after the onset of an ST-segment–elevation myocardial infarction (MI) is one factor limiting the potential of acute reperfusion to further reduce cardiovascular mortality.1,2 In recent years, quality-improvement efforts have succeeded in improving door-to-balloon times.3,4 However, prehospital delays in seeking treatment for acute coronary syndromes (ACS) have changed little in recent decades despite increased public awareness of the benefits of reperfusion therapy.5 In the United States, median delay time from symptom onset to hospital arrival ranges from 1.5 to 6.0 hours.6,7 It is estimated that each additional 30 minutes of delay increases 1-year mortality by 7.5%.8 Delays before presentation to the hospital may offer the greatest opportunity for improved patient outcomes because they are also associated with longer door-to-balloon times and lower rates of primary reperfusion therapy.

Multiple randomized educational interventions have failed to reduce prehospital delay despite increasing knowledge.9–11 A recent trial using a nurse-counseling intervention for patients with documented coronary disease that focused on information, emotional issues, and social factors also failed to reduce prehospital delay in 3500 patients with documented coronary heart disease.12 These negative interventional trials suggest that understanding care delay primarily in terms of patients’ knowledge of or denial of heart disease may be inadequate.

Attachment theory is an empirically tested developmental model that outlines broad patterns of interpersonal functioning and ability to collaborate at times of distress. Importantly, it may offer a novel and unexplored alternative basis for understanding prehospital ACS care delay.13 Attachment
styles are cognitive maps that determine whether individuals typically deem themselves worthy of care (model of self) and whether others are deemed trustworthy to provide care (model of other), especially in times of crisis. A predominantly negative model of self is associated with anxiety and feelings of unworthiness, whereas a predominantly negative model of other is associated with low trust of others and poor collaboration.

We therefore interviewed patients at risk for ACS who were undergoing nuclear stress imaging to determine their attachment style, their angina frequency, and their intentions about seeking care for a possible ACS. We hypothesized that patients with a negative model of other (ie, low levels of trust in others) would report a greater intention to delay seeking care for a possible MI.

**WHAT IS KNOWN**

- Delay in presenting for care after the onset of symptoms of acute coronary syndrome is common, limits the potential benefit of acute reperfusion, and has not been reduced by educational and psychosocial interventions tested thus far.

**WHAT THE STUDY ADDS**

- Among 796 patients with suspected ischemic heart disease receiving imaging stress tests, self-reported intention to “wait until very sure” before seeking care for a possible “heart attack” was associated with a more negative view of the trustworthiness of others, greater physical limitations from angina, and no previous revascularization.

- This intention to delay was associated with more, not less, frequent angina in bivariate analyses and was independent of both objective (inducible myocardial ischemia) and subjective (self-reported) assessments of patients’ acute coronary syndrome risk.

- Previous educational efforts have focused on trying to make patients more aware and more fearful of the signs of acute coronary syndrome. But our study suggests that patients are delaying because of too much fear (of trusting others) rather than too little fear (of having an acute coronary syndrome).

---

**Methods**

**Subjects**

Patients with suspected ischemic heart disease who were more than 18 years of age, could read English, and were scheduled for clinically indicated rest or stress myocardial perfusion imaging at the University of Washington Medical Center and at the Seattle VA Medical Center were mailed and asked to complete questionnaires concerning their symptoms (including daily angina frequency) and psychosocial factors. Those who forgot their questionnaires were provided a copy to complete while waiting for their test. All subjects provided informed consent. The study was approved by the University of Washington/Veterans Administration Institutional Review Board.

**Independent Variables**

**Quantification of Stress-Induced Ischemia: Inducible Image Ischemia**

Rest and stress myocardial perfusion imaging was performed using either the dual isotope method (rest 201Tl and 99mTc-tetrofosmin) or as a 2-day study with 99mTc-tetrofosmin. Stress testing was performed using either the Bruce protocol or pharmacological stress with dipyridamole, adenosine, or dobutamine when patients were unable to exercise. Images were scored for severity and extent of abnormal myocardial perfusion using the 5-point scale/20-sector analysis recommended by the American Society of Nuclear Cardiology. The summed difference score between rest and stress images was used as the measure of inducible myocardial ischemia.

**Attachment Styles**

To assess patients’ underlying attachment styles, we used the Relationships Scales Questionnaire (RSQ), a 17-item questionnaire concerning the respondent’s feelings about close personal relationships from which the dimensions model of self and model of other can be derived. The items are associated with 4 attachment style categories (secure, fearful, dismissing, and preoccupied) which in turn comprise 2 underlying dimensions: a model of self and a model of other. Construct, convergent, and discriminant validities have been demonstrated with test-retest reliability ranging from $r=0.81$ to $0.84$ for model of self and from $r=0.72$ to 0.85 for model of other.

**Outcome Variables**

**Intention to Wait Before Seeking Care for Possible ACS**

To evaluate the association between attachment styles and delays in seeking medical care, we asked a question originally developed for the Rapid Early Action for Coronary Treatment (REACT) trial concerning intentions about seeking care for a possible ACS. This question asks: “If I thought I was having a heart attack, I would wait until I was very sure before going to the hospital.” Response options were strongly agree, agree, disagree, and strongly disagree.

The REACT trial was a 4-year study of 20 communities (10 matched pairs) in 5 geographic areas of the United States. All adults of age 30 years and older who presented to a hospital emergency department with a chief complaint of chest pain and who were evaluated for suspected acute coronary heart disease were included. Institutionalized individuals, those transferred from hospitals outside of the study areas, and those presenting with other causes of chest pain were not included. Delay time was defined as the time from self-reported acute symptom onset to arrival at the emergency department as recorded in the medical chart. A random subsample of patients were interviewed after discharge from the hospital at which time they were asked a series of questions about their behavior including “time from onset of symptoms to EMS [emergency medical services] call” and their intention “to wait until very sure they were having an MI” before going to the hospital in the future. In the REACT trial sample, there was a significant linear relationship between intention to wait and actual EMS-reported F(1,2681)=4.65 ($P=0.03$) and self-reported $F(1,2681)=9.71$ ($P=0.002$) delay times, confirming the importance of the “intention to wait” outcome in our study.

**Self-Reported Covariates**

Sociodemographic and clinical characteristics and patient-centered domains were prospectively measured for each patient. These included the following:
Angina-Related Health Status

Seattle Angina Questionnaire
The Seattle Angina Questionnaire is a valid, reliable, sensitive, and prognostically important disease-specific health status measure for patients with coronary artery disease. It quantifies patients’ angina frequency, physical limitations because of angina, and quality of life. The angina frequency scale has a range of 0, indicating that patients experience angina 4 or more times per day, to 100, indicating no episodes of angina during the prior 4 weeks. The physical limitations scale measures the degree to which the symptoms of angina limited patients’ abilities to perform physical activities ranging from those requiring little physical exertion to strenuous activities. Scores also range from 0, indicating severe physical limitations because of angina, to 100, indicating no limitations at all. The Seattle Angina Questionnaire physical limitation score is independently associated with mortality and ACS hospitalizations among outpatients with stable coronary artery disease. The quality-of-life scale assesses the overall effect of angina and its treatment on patients’ quality of life. The scale ranges from 0, indicating severe impairment of quality of life, to 100, indicating no impairment.

Perceived Risk of MI
We used the following item developed for use in the REACT trial to assess patient’s own sense of their ACS risk: “Compared to other [women or men] your age, how likely do you think it is that you could have a heart attack in the next 5 years? Would that be much less likely, somewhat less likely, about the same, somewhat more likely, or much more likely than other [women or men] your age?”

Psychosocial Distress: Depression
Depressive symptoms were evaluated using the Center for Epidemiological Studies Depression scale. This 20-item self-report scale has been validated in heart disease cohorts. Total scores can range from 0 to 60 according to the frequency that depressive symptoms are reported, with a score of 16 or above generally considered to indicate clinical depression.

Anxiety: Beck Anxiety Inventory
This is a 21-item scale with items rated none (0) to severe. Scores range from 0 to 63. A score of 8.5 on the Beck Anxiety Inventory has been found to have a sensitivity of 0.89 and a specificity of 0.97 for predicting panic disorder.

Statistical Methods
The questionnaire respondents were compared to nonrespondents using a t test for age and a χ² analysis for gender. Univariate analyses of variance (ANOVAs) were conducted to determine the significance...
of a linear trend across the 4 potential responses to the question concerning intention to wait. A significant linear trend would indicate that the variable of interest increased or decreased with the intention to delay care.

Ordinal regression analyses were performed to develop the best model for predicting our primary outcome “intention to wait until very sure.” Ordinal regression methods were used because of the ordinal nature of the dependent variable where differences between the response options might not be equal.25 Higher values on delay indicate an individual would not delay, as quantified by the question used in the REACT trial. A model was constructed by simultaneously testing all measures that were significantly related to the delay item in the bivariate analyses. Nonsignificant predictors were removed individually until a model was arrived at that contained only statistically significant predictors (P<0.05). Because the study sites cared for dissimilar populations, we assessed whether site (Seattle VA Medical Center versus University of Washington Medical Center) was significant in the model for the primary outcome. It was not significant in the model, nor were interactions with other variables in the model significant. For descriptive purposes, this analysis was redone by dichotomizing “intention to wait” into those who would wait and those who would not. Then a logistic regression was performed to give descriptive odds ratios and their 95% confidence intervals. Analyses were performed with SPSS-15 (Chicago, Ill) statistical software. The authors had full access to the data and take responsibility for its integrity. All authors have read and agree to the manuscript as written.

### Results

Questionnaires were mailed to 1030 patients, of whom 796 returned the questionnaires (77%) from December 2004 to October 2006. Responders (mean age, 61.6±11.2; 77% male) did not significantly differ from nonresponders (mean age, 60.2±10.5; 75% male) in age or gender. Table 1 displays clinical variables according to responses to the REACT “intention to wait” question. Age, gender, diabetes, smoking, and prior ACS were not associated with intention to wait, but prior revascularization was associated with less intention to wait. Patients reporting greater intention to wait also reported marginally more frequent angina, more physical limitations, and lower quality of life related to angina. There were no differences in inducible myocardial ischemia for those who were more and less likely to wait. There were small but statistically significant differences in peak and resting diastolic blood pressure values.

Table 2 displays the association of angina frequency and psychological variables by the REACT “intention to wait” question. There was a marginally significant linear trend for those with greater intention to wait to have higher self-perceived risk of ACS. There was a significant linear trend for greater depression and greater anxiety to be associated with greater intention to wait. The attachment dimensions of positive self (self more worthy) and positive other (others more trustworthy) were both associated with less intention to wait.

Table 3 displays the multivariable ordinal regression model for intention to wait. A more negative view of the trustworthiness of others, increased physical limitations, and no previous revascularization were independently associated with increased intention to wait. When the same variables were entered into a logistic regression model with a dichotomized outcome, revascularization was associated with decreased intention to wait (OR, 0.62; 95% CI, 0.42–0.92), as was trustworthiness of others (OR, 0.85; 95% CI, 0.78–0.94), whereas each additional point on the physical limitations scale was associated with increased intention to wait (OR, 1.02; 95% CI, 1.01–1.04).

### Discussion

We found that patients with low levels of trust in others to provide needed care reported a greater intention of delaying care for a possible ACS. In a multivariable logistic regression model, we found increased intention to wait independently associated with a more negative view of the trustworthiness of others, no previous revascularization, and more functional limitations from angina. Importantly, intention to wait was not significantly associated with lower angina frequency or with objective risk (inducible ischemia) or with subjective risk (self-perceived risk of MI) of MI. This suggests that care delay is unlikely to be primarily an issue of symptom frequency or actual or self-perceived risk of having an ACS. In fact, in bivariate analyses, patients reporting greater intention to wait also reported more frequent angina, greater physical limitations, and lower quality of life on the Seattle Angina Questionnaire. Clearly patients are not intending to delay because they have fewer symptoms. The importance of the

### Table 2. Psychological Variables by REACT Intention-to-Wait Question

<table>
<thead>
<tr>
<th>Variable</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>F Test for Linearity of Means F(1,618)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=57 (9.1%)</td>
<td>n=180 (28.7%)</td>
<td>n=206 (32.9%)</td>
<td>n=184 (29.3%)</td>
<td>P Value</td>
</tr>
<tr>
<td>Self-perceived ACS risk</td>
<td>4.0 (1.1)</td>
<td>3.4 (1.1)</td>
<td>3.6 (1.1)</td>
<td>3.4 (1.1)</td>
<td>0.052</td>
</tr>
<tr>
<td>Depression (CESD)</td>
<td>18.6 (12.8)</td>
<td>17.6 (11.5)</td>
<td>13.9 (11.4)</td>
<td>14.3 (11.1)</td>
<td>0.001</td>
</tr>
<tr>
<td>Anxiety (Beck Anxiety Inventory)</td>
<td>11.4 (13.8)</td>
<td>10.9 (10.5)</td>
<td>7.4 (9.3)</td>
<td>7.9 (10.2)</td>
<td>0.001</td>
</tr>
<tr>
<td>Attachment self</td>
<td>1.5 (2.0)</td>
<td>1.3 (1.5)</td>
<td>1.6 (1.6)</td>
<td>1.8 (1.7)</td>
<td>0.015</td>
</tr>
<tr>
<td>Attachment other</td>
<td>-0.86 (2.2)</td>
<td>-0.58 (1.8)</td>
<td>-0.06 (2.1)</td>
<td>0.15 (1.9)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Values are expressed as mean±SD. CESD indicates Center for Epidemiological Studies Depression Scale.

### Table 3. Multivariable Ordinal Regression for Intention to Wait Seeking Care for MI

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimate (SE)</th>
<th>Wald Test (df=1)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trustworthiness of others</td>
<td>0.15 (0.04)</td>
<td>13.24</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Any revascularization</td>
<td>0.55 (0.16)</td>
<td>11.02</td>
<td>0.001</td>
</tr>
<tr>
<td>Seattle Angina</td>
<td>0.007 (0.003)</td>
<td>5.59</td>
<td>0.018</td>
</tr>
<tr>
<td>Questionnaire physical limitations scale</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Goodness of fit $\chi^2=1643.43$, df=1643, $P=0.49$, pseudo $R^2=0.06$. 

Downloaded from http://circoutcomes.ahajournals.org by guest on January 29, 2018
patient’s view of the trustworthiness of others demonstrated in our data leads us to conceptualize delay in seeking care for a possible ACS as part of a patient’s general pattern of care seeking in times of distress or crisis. This may be important for the design of future interventions to reduce care delay among patients with coronary disease.26

In addition to previous experiences with revascularization, our study suggests that one’s general earlier experiences with care-seeking, as manifested in attachment style and views of the trustworthiness of others to provide needed care, are relevant to the intention to wait and possibly to delays in seeking care. Studies examining factors associated with longer delays in seeking treatment have identified several sociodemographic and clinical characteristics associated with greater delays. Older age, female sex, low education level, low socioeconomic status, black race, and diabetes have all been associated with longer delays in seeking treatment.27 In a subset of the REACT trial sample that underwent a telephone survey, intention to wait was significantly related to age, confidence in knowing the signs of an ACS, and having insurance that pays for an ambulance.16 It is unclear how intentions to reduce care delay among patients with coronary disease.26

In addition to previous experiences with revascularization, our study suggests that one’s general earlier experiences with care-seeking, as manifested in attachment style and views of the trustworthiness of others to provide needed care, are relevant to the intention to wait and possibly to delays in seeking care. Studies examining factors associated with longer delays in seeking treatment have identified several sociodemographic and clinical characteristics associated with greater delays. Older age, female sex, low education level, low socioeconomic status, black race, and diabetes have all been associated with longer delays in seeking treatment.27 In a subset of the REACT trial sample that underwent a telephone survey, intention to wait was significantly related to age, confidence in knowing the signs of an ACS, and having insurance that pays for an ambulance.16 It is unclear how our findings concerning psychological risk should be combined with previous data on these demographic and clinical risks for delay. We did not find a significant association with age and gender, but our sample was relatively homogeneous and we may have underpowered to find these associations. We did not have data on education, socioeconomic status, or race of our participants.

Our findings concerning attachment and trustworthiness suggest novel targets for clinical interventions that seek to reduce care delay among high-risk patients with coronary disease. Symptoms of depression and anxiety were significantly associated with greater intention to wait in bivariate analyses, but in the multivariable model, only attachment model of other or “trustworthiness of others” remained in the model. This suggests some similarity between these constructs. Previous educational efforts have focused on trying to make patients more aware and more fearful of the signs of ACS. But our study suggests that patients are delaying because of too much fear (of trusting others) rather than too little fear (of having an ACS). Focus groups of REACT trial participants suggest that patients need the “permission” of healthcare providers or family to seek care, but they have rarely discussed ACS symptoms and appropriate responses with them.28 In other chronic diseases, such as diabetes, the ability of patients to collaborate and trust others is often more important than their diabetes knowledge in determining the success of self-care and collaboration with healthcare providers.15 Attachment styles have been associated with poorer collaboration between doctors and patients with diabetes, nonadherence to diabetic medications and testing, worse glucose control, and more missed healthcare appointments.30 The effects of attachment style on the health behavior of patients with heart disease has not been previously explored.

Because previous randomized trials targeting knowledge of ACS symptoms and recommended care9 and patients’ personal assessment of their ACS risk have failed to reduce delay, these novel attachment style factors may be clinically important. A promising model for intervention development may be the use of “assisted-navigator” programs, which target education to selected high-risk patients about how to proceed in making contact with the healthcare system. Literature suggests that such “assisted navigation” is associated with improved rates of screening for cancer and lower clinical stage of presentation.33 For patients at high risk for MI who also have low levels of trustworthiness, assisted navigation targeted to the patient’s attachment style might prevent delay in seeking care for the symptoms of an ACS. A spouse or other peer, trained according to the patient’s attachment style, could be designated as an “assistant navigator” who helps to initiate contact with the healthcare system when possible ACS symptoms are first noted. Preventive efforts should focus on patients who are at high medical risk for ACS and high psychological risk for delay. High psychological risk should be conceived in terms of low trust of others and high rather than low levels of fear. Our findings suggest that patients delay seeking care because they are fearful of depending on others, not because they have inadequate knowledge or fear of ACS.

Our study has a number of important limitations that should be noted. First, this was a cross-sectional study that used a surrogate, the REACT trial’s assessment of intention to delay before presentation with a possible ACS, to assess potential delays in seeking care. Although it would have been better to quantify actual delays among our own study subjects, this would have required an exceedingly large and expensive trial with long follow-up. We have been able to demonstrate that this item was linearly associated with actual delay as recorded in the medical record or as reported by the patients in the REACT trial. In the REACT trial, this question was asked after a patient had an ACS, whereas in our sample of patients evaluated for myocardial ischemia only 21% had a previous ACS. As such, our study describes provocative associations but cannot define causal relationships. Second, our study population was mostly male and white. We did not have many members of the demographic groups defined as high risk for delay in other studies. We did not assess for all the demographic factors that have been shown to be associated with care delay in other studies such as patient education, socioeconomic status, and race. Therefore, it is not clear whether our results would generalize to these other groups. It is also not clear how large the effect size for these psychological factors is, relative to that for these demographic factors. However, the latest study of the effects of demographic factors on care delay noted that these factors accounted for only 10 to 30 minutes of the total average delay of nearly 120 minutes.27 Third, attachment style is a relatively stable trait for adults. It is not clear whether it can be changed through a brief clinical intervention such as might be possible in cardiology clinics. However, as noted above, it may be possible to adapt the care environment and patient education to a patient’s attachment style rather than trying to alter an individual’s attachment style per se.
In summary, we found that patients’ negative views regarding the trustworthiness of others as well as increased functional limitations and no previous experiences with revascularization were associated with increased intention to “wait until very sure” before seeking care for an ACS. In the REACT trial, this increased intention to wait was associated with actual observed and self-reported care delay. This intention to delay was associated with more, not less, frequent angina and was independent of both objective (inducible myocardial ischemia) and subjective (self-reported) assessments of patients’ ACS risk. We are the first to identify patients’ views concerning the trustworthiness of others as a risk factor for ACS care delay. This may provide new guidance for risk-stratification schemes and interventions to reduce delay.

Sources of Funding
This work was supported by a grant from the American Heart Association (0450094Z to M.S.).

Disclosures
None.

References
Understanding Why Patients Delay Seeking Care for Acute Coronary Syndromes
Mark D. Sullivan, Paul S. Ciechanowski, Joan E. Russo, Laurie A. Soine, Kier Jordan-Keith, Henry H. Ting and James H. Caldwell

Circ Cardiovasc Qual Outcomes. 2009;2:148-154; originally published online April 28, 2009; doi: 10.1161/CIRCOUTCOMES.108.825471
Circulation: Cardiovascular Quality and Outcomes is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2009 American Heart Association, Inc. All rights reserved.
Print ISSN: 1941-7705. Online ISSN: 1941-7713

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circoutcomes.ahajournals.org/content/2/3/148

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation: Cardiovascular Quality and Outcomes can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation: Cardiovascular Quality and Outcomes is online at:
http://circoutcomes.ahajournals.org//subscriptions/