

Role of the Nurse in the Triage of Patients with Acute Coronary Syndrome Based on the Symptoms and ST-Segment Changes

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Abstract

Introduction: Due to the early identification of high-risk patients in the triage process by nurses, it is essential to understand the relationship between early symptoms and acute coronary syndrome. This study aimed to determine the relationship between the reported symptoms of acute coronary syndrome and ST elevation or the absence thereof.

Methods: This cross-sectional study randomly recruited 446 patients with a primary diagnosis of acute coronary syndrome who were admitted to the cardiac intensive care units of 8 hospitals in Tehran. Data collection instrument was a checklist of the presenting symptoms of acute myocardial infarction. The chi-squared test was used to determine the association between the symptoms of acute coronary syndrome based on ST elevation or non-ST elevation and logistic regression was performed to determine the odd ratios of early symptoms based on ST elevation or non-ST elevation using SPSS (version 16).

Findings: Mean age was 67.13 ± 8.79 years, 256 patients (58.4%) were male, 238 patients (41.29%) had acute coronary syndrome with ST-segment elevation, and 208 patients (58.71%) had acute coronary syndrome without ST-segment elevation. Chest symptoms were more reported in acute coronary syndrome with ST elevation, and diaphoresis was more in acute coronary syndrome without ST-segment elevation. Among the atypical symptoms, the frequencies of nausea /vomiting and palpitation were higher in acute coronary syndrome without ST elevation. The odd ratios of chest symptoms, diaphoresis, and nausea / vomiting were higher in acute coronary syndrome with ST elevation, and palpitation was more frequent in patients without ST elevation.

Conclusions: Emergency nurses should know that the reported symptoms in acute coronary syndrome patients differ based on ST elevation or non-ST elevation. (*Iranian Heart Journal 2014; 15 (2): 26-32*)

Keywords: ; symptoms, ; acute coronary syndrome, ; ST elevation, ; triage

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Acute coronary syndrome (ACS) is a life-threatening emergency⁽¹⁾. The highest mortality rate for this syndrome is for ST-elevation myocardial infarction (STEMI) and non-ST-elevation myocardial infarction (NSTEMI), respectively. Early diagnosis and treatment of NSTEMI can decrease

myocardial necrosis and improve prognosis⁽²⁾. ACS patients with NSTEMI are at risk of early death. This may be reduced by early assessment and treatment. This study revealed the positive benefits of nurse-led early triage for NSTEMI-ACS patients. In acute coronary obstruction, electrocardiography is used to

determine the location and extent of myocardial involvement. In this way, we can increase the chances of survival and decrease complications with early coronary perfusion⁽³⁻⁵⁾. Nurses have an important role to initiate life-saving guidelines for myocardial infarction, which include obtaining electrocardiograms within 10 min of emergency department arrival. Identification of patients suspected of ACS begins by the triage nursing. Through a diligent triage examination, the nurse gathers necessary information to correct diagnosis and adequate therapeutic process⁽⁶⁾. One of the challenges in patients with ACS without ST-segment elevation is the greater incidence of atypical symptoms and misdiagnosis, and delay in intensive treatment will increase the mortality rate in this group⁽⁶⁾. Approximately one-third of ACS patients do not report chest pain⁽⁷⁾. Sheifer reported that the chest pain in STEMI is usually severe. In addition, patients with ACS (with or without ST elevation) may report other symptoms such as dyspnea, diaphoresis, nausea/ vomiting, palpitations, and gastrointestinal complaints⁽⁸⁾. Thuresson reported that only half of the patients with ST segment elevation had chest pain/ discomfort, nausea, and diaphoresis⁽⁹⁾. Although in patients with typical symptoms, the most diagnoses are unstable angina or NSTEMI, the presence of atypical symptoms does not rule out these diagnoses. Therefore, clinicians should not solely rely on the patient's descriptions of the symptoms when there is high suspicion of unstable angina or NSTEMI⁽¹⁰⁾. Mant (2004) emphasized on the importance of ST-segment in the diagnosis of ACS⁽¹¹⁾. Sometimes ST-segment changes are so subtle that they should be interpreted according to the clinical situation or in some cases it is so obvious that treatment is necessary even in the absence of symptoms^(7, 13).

Methods

This descriptive analytic study was conducted on 446 patients with ACS who were admitted

to the emergency care units of 8 hospitals in Tehran. A researcher-made checklist consisting of 11 symptoms (typical= 5 symptoms, atypical=6 symptoms) was used to identify the typical and atypical symptoms of ACS. Typical symptoms were chest symptoms, diaphoresis, dyspnea, pain in the arms, jaw, or neck, and atypical symptoms included fatigue, palpitation, nausea/ vomiting, and pain between the shoulders. This checklist was developed based on the literature⁽¹⁴⁻¹⁶⁾, cardiologists' comments, and researchers' professional experience in cardiac care. For determining content validity, 10 nursing instructors and a cardiologist identified relevance, simplicity, and clarity of each of the typical and atypical symptoms in the checklist. The chi-squared test and logistic regression analyses were done using SPSS (version 16).

Results

The mean age of the patients was 67.13 ± 8.79 (range= 22- 90 years), 256 patients (58.4%) were male, 238 patients (41.29%) had a diagnosis of ACS with ST elevation, and 208 patients (58.71%) had ACS without ST-segment elevation. The most reported typical symptoms included dyspnea (46.1%), and palpitation (75.97%) was the most atypical symptom reported. Neck or jaw pain was the least typical symptom (17.47%), and indigestion was the lowest atypical symptom (4.3%), respectively. Also, 384 patients (86.01%) reported at least one atypical symptom. Atypical symptoms were observed in 47% of the patients with ST-segment elevation and in 39% of the patients without ST-segment elevation. The mean typical symptoms reported by the patients was 2.80 ± 1.24 (median = 3 symptoms) and the mean number of atypical symptoms was 2.36 ± 1.27 (median = 2 symptoms), respectively. In the patients with ST-segment elevation, palpitation (37.14%) was the most and indigestion (2.86%) was the least atypical symptoms, respectively. In the patients

without ST elevation, the most and least atypical symptoms were palpitation (38.51%) and indigestion (0.57%), respectively.

Dyspnea was the most typical symptom in the patients with or without ST segment (26.47% vs. 28.84%, respectively) (Table I and II).

Table I. Typical symptoms related to ST elevation or non-ST elevation

	Typical symptoms					
	Chest symptoms*	Arm pain	Diaphoresis [†]	Jaw/Neck pain	Dyspnea	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
ST elevation	62 (26.50)	39 (16.39)	60 (25.21)	14 (5.88)	63 (26.47)	238 (100)
Non- ST elevation	47 (22.60)	48 (23.08)	31 (14.90)	22 (10.58)	60 (28.84)	208 (100)

* $P < 0.001$

Table II. Atypical symptoms related to ST elevation or non-ST elevation

	Atypical symptoms						
	Fatigue	Palpitation [†]	Nausea/ Vomiting [†]	pain between shoulders	Right side symptoms	Indigestion	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
ST elevation	57 (27.14)	78 (37.14)	47 (22.38)	15 (7.14)	7 (3.34)	6 (2.86)	210 (100)
Non- ST elevation	48 (27.58)	67 (38.51)	18 (10.35)	19 (10.92)	21 (12.07)	1 (0.57)	174 (100)

* $P < 0.001$

As regards the relationship between symptoms and ST-segment change, 62 ACS patients (26.05%) with ST-segment elevation reported chest symptoms (pain under the sternum or in the left side, feeling of pressure, heaviness, and tightness or crushing). Chest symptoms were reported in 47 patients (22.60%) with ST-segment elevation. Among the typical symptoms, chest symptoms ($P=0.037$) and diaphoresis ($P=0.006$) showed a significant difference between the patients with and without ST-segment elevation (Table I). Also, among the atypical

symptoms, nausea/ vomiting ($P=0.043$) and palpitations ($P < 0.001$) showed a significant difference between the patients with and without ST-segment elevation (Table 2). According to the logistic regression test, the odd ratios of the chest symptoms ($OR=1.56$, $CI=1.025-2.374$, $P=0.038$), diaphoresis ($OR=1.72$, $CI=1.163-2.255$, $P=0.007$), and nausea / vomiting ($OR=1.45$, $CI=0.973-2.189$, $P=0.068$) were higher in ACS with ST elevation and palpitation was more frequent in the non-ST-elevation group (Table III).

Table III. Odd ratios of ACS symptoms based on ST or non-ST elevation

P	(CI 95%) OR	ACS symptoms	Typical symptoms
0.038*	2.374-1.025 (1.56)	Chest symptoms	
0.996	1.470-0.682(1.00)	Arm pain	
0.007*	1.72(1.163-2.255)	Diaphoresis	
0.275	2.077-0.812(1.29)	Jaw/Neck pain	
0.436	1.262-0.583 (0.86)	Dyspnea	
0.446	1.376-0.576 (0.85)	Fatigue	
<0.001*	0.700 - 0.297 (0.45)	Palpitation	Atypical symptoms
0.043*	1.45(0.973-2.189)	Nausea/Vomiting	
0.655	1.371-0.605 (0.91)	Pain between shoulders	
0.938	1.553-0.621 (0.98)	Right side symptoms	
0.881	1.564-0.594 (0.96)	Indigestion	

Discussion

This study revealed that there is a relationship between ACS typical and atypical symptoms

with ST-segment changes. Chest symptoms, diaphoresis, and nausea or vomiting were the most reported symptoms in patients with ST-segment elevation. Consistent with the

findings of this research in the Thoresson study, severe crushing chest pain, nausea, and cold sweats were the most reported symptoms in patients with ST-segment elevation ⁽¹¹⁾. According to the results of this study, chest symptom was observed in 26% of the patients with ST-segment elevation. In this regard, Osborne stated that approximately 30% of patients do not report chest pain with ST-segment elevation and this is one of the most important issues in the triage of patients suspected of myocardial infarction without the symptoms of the disease ⁽²²⁾. On the other hand, patients with ST-segment changes with no chest pain are at an increased risk of ventricular ectopia and sudden cardiac death. Thus, nurses should be proactive in recognizing ST-segment changes in these patients ⁽²³⁾. In this study, the most common symptom in the ACS patients with ST elevation was dyspnea (26.47%). However, in the Wu study, this rate was higher than 60% ⁽²⁴⁾. In this study, palpitation was the most atypical symptoms in the patients with and without ST-segment elevation, and similarly the chance of palpitation in the patients with ST-segment elevation was 45% less than that of the patients without ST elevation. However, in this study, the frequency of symptoms was analyzed with respect to age ⁽²⁵⁾. In the Glickman study, palpitation was not considered important enough for triage; however, in patients over 80 years of age, abdominal pain and nausea and vomiting were presented as the key criteria for obtaining ECGs as soon as possible ⁽²⁵⁾. In the present study in the ACS patients with or without ST-segment elevation, no significant differences were seen in chest symptoms, palpitation, and nausea or vomiting. However, a chest symptom was not reported as the most common symptoms in the ACS patients. In this regard, Gupta reported that nurses with awareness of the atypical presentations of patients with acute myocardial infarction may provide further focus for research into the

presentations of ACS other than chest pain ⁽²⁶⁾. Based on the findings, most patients showed at least one of the atypical symptoms, and the percentage of the atypical symptoms in the patients with ST-segment elevation was slightly more than that of the patients without ST-segment elevation. Also, Pinto showed more atypical symptoms in patients with ST-segment elevation ⁽²⁷⁾. This suggests that atypical symptoms in patients with ST-segment elevation should be taken into further consideration. According to the findings, chest symptoms, nausea or vomiting, and diaphoresis were seen more in the patients with ST-segment elevation. In such situations, with more confidence we can triage patients as a high-risk group so that treatment measures can be taken as soon as possible. However, the typical symptoms were lower in the patients with ACS without ST-segment elevation. The importance of this finding is in a more precise evaluation of patients with the cardiac complaints and without ST-segment elevation. Tierney stated that as nurses interfere in the thrombolytic therapy, they play a sensitive role in rapid treatment with risk assessment, applying knowledge and evidence-based activities in patients without ST elevation ⁽¹⁶⁾. Coady also suggested that nurses can reduce the mortality rate of patients without ST-segment elevation with effective nursing intervention, monitoring, risk classification, and discharge instructions ⁽²⁸⁾. Nikus described the electrocardiographic changes in ACS as a dynamic nature that is not simply interpretation-based on ST changes, but emphasizes on the clinical findings, symptoms, and identification of high-risk patients ⁽²⁹⁾. Kamali in a prospective study on 1151 patients with chest pain presenting to the emergency room found a strong clinical suspicion based on the typical symptoms, ischemic electrocardiographic changes, and increased serum troponin T. He underlined the importance of symptoms as an appropriate primary subjective criterion for

the diagnosis of ACS and not for a definite diagnosis⁽³⁰⁾.

Conclusion

Risk stratification in patients with ACS is a complex process. With regard to the findings of this research and previous studies, we conclude that in high-risk patients without typical symptoms, even in the presence of changes in the ST segment, an important nursing intervention in triage includes preparing ECG strips and preparing serial cardiac biomarkers samplings to help physicians with an earlier ACS diagnosis. This is particularly important in medical centers with limited diagnostic facilities. The results of this study could be important in understanding the relationship between ST-segment changes and the report of ACS symptoms. Using the findings of this study, emergency department physicians and nurses can triage patients suspected of ACS more accurately.

Recommendations

We would recommend that future studies focus on other ischemia parameters such as T-wave inversions or nonspecific ECG changes and further describe the symptoms.

Acknowledgments

This article is extracted from a research project with the code 522/8 / P. M., sponsored by Shahed University. The authors thank all of all colleagues and patients who helped us with this research.

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