Article

Characteristic differences of chest pain in male and female patients with acute coronary syndrome: A pilot study

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Abstract

Background: The typical sign or main symptom in acute coronary syndrome (ACS) patients is chest pain, which is an initial benchmark or early sign for diagnosis. Certain factors, such as gender differences, the presence of diabetes mellitus or other clinical conditions, may make the patient not realize they have ACS. Therefore, this study aims to identify the characteristics of chest pain symptoms in male and female patients with ACS.

Design and Methods: This is a non-experimental quantitative study, namely analytical observation using a cross-sectional approach within 4 months (January-April 2019). Furthermore, the samples were 53 ACS patients (28 male and 25 female).

Results: The chest pain characteristics that have a significant relationship with gender differences in ACS patients are shown based on the aspects of location, pain duration and quality. Male patients are more likely to feel pain at the left or middle chest, the duration is between <20 to >20 min with moderate pain quality, which tends to become severe, while females are more likely to feel pain at the chest which radiates to the neck and chin, the duration is usually >20 min, with mild to moderate pain quality.

Conclusions: The result showed a significant difference in chest pain characteristics in male and female patients with ACS. Regarding location, duration and quality of chest pain, male ACS patients mostly have more typical symptoms, while females' symptoms are atypical.

Introduction

Cardiovascular disease is the major cause of disability and death in both males and females in the world. In fact, this condition is the leading cause of death from all non-communicable diseases, and is responsible for 17.5 million deaths in the world or 46% of all non-communicable disease deaths. Also, it is estimated that 7.4 millions of these deaths are caused by ischemic heart disease.[1] Based on research data from the Jakarta Acute Coronary Syndrome (JACS) Registry, there were a total of 1223, 1915, and 1925 patients with ACS in 2007, 2010 and 2013, respectively, which were classified as acute coronary syndrome NSTEMI (non-ST elevation myocardial infarction).[2] This figure shows that ACS increases every year, and based on the ACS Registry at a general hospital in Malang, East Java, Indonesia, it was found that at least 1-2 people are hospitalized daily for ACS. Acute coronary syndrome requires immediate diagnosis and management to prevent more severe complications.[3,4] The typical sign or main symptom that appears in the patients is chest pain, therefore this presentation can be used as an initial benchmark to detect ACS. Early identification and accurate symptoms interpretation are difficult for non-professionals, especially when the symptoms deviate from what the patient believes to be normal, or the symptoms are similar to other non-cardiac conditions.[5-7] Also, chest pain characteristics can be ambiguous, especially in certain special conditions such as gender differences, diabetes mellitus or other diseases, hence the patient might not realize they have ACS. Therefore, it is important for high-risk individuals or patients to know the signs and symptoms of ACS, since it has been frequently associated with late treatment or prehospital delay.[8-10]

There are many variations in chest pain symptoms between male and female with regards to the aspects of location, nature, and additional symptoms.[11-13] Meanwhile, females primarily experience more atypical symptoms.[14] The difference in symptom manifestations reported in males and females with ACS in previous study,[15] is known to be due to the process of chest pain transmission mechanisms which is mediated by sympathetic and vagal nerves activation. There are still no studies that focus on examining the characteristic difference of chest pain symptoms in male and female patients with ACS in Indonesia. Therefore, this study aims to describe the characteristics difference of chest pain in male and female patients with ACS.

Design and Methods

This is a non-experimental quantitative study, namely analytic observation using a cross sectional approach conducted at general

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Significance for public health

There are various characteristics of chest pain differences between male and female patients with Acute Coronary Syndrome. The findings of this study showed that it is important to provide optimal nursing care and also educate patients and families about the signs, or symptoms that often occur, especially atypical symptoms. This will reduce the tendency to delay in seeking treatment, which will affect prehospital delay time.

hospital in Malang for 4 months (January-April 2019). Furthermore, the respondents were selected using purposive sampling technique. The inclusion criteria were: i) medical diagnosis of STEMI and NSTEMI; ii) free of chest pain (angina) for 24 hours for those with myocardial infarction; iii) hemodynamically stable; iv) not diagnosed with acute decompensated heart failure (ADHF); v) does not have malignant arrhythmias; vi) not in acute lung oedema (ALO) state; vii) not on ventilator; viii) willing to become respondents. Meanwhile, the exclusion criteria were: i) patients with various complications; ii) ACS patients with diabetes mellitus. Based on the inclusion and exclusion criteria, the sample size of 53 patients was obtained. This study used the chi-square statistical test to analyze the demographic characteristics and differences in chest pain in male and female patients with ACS. Also, the questionnaire was obtained from modified flowchart (SCORE Chart). In addition, ethical research was approved by the ethics committee of dr. Saiful Anwar hospital, Malang.

Results and Discussions

Patient baseline characteristics being observed include age, menopause, marital status, education, occupation, type of payment, BMI, clinical history and medical diagnosis. Table 1 shows the distribution analysis result of baseline characteristics of ACS patients. The number of respondents were 53 patients (28 male and 25 female). Based on Table 1, it can be seen that in the patient's demographic data, only points of marital status, occupation, clinical history of smoking, history of hypertension and medical diagnosis have a significant relationship with gender differences (p<0.05) (Table 1). Table 2 shows the differences in chest pain characteristics that can be seen in male and female patients with ACS. The results showed that out of the 6 aspects covered as chest pain characteristics, only 3 aspects that had a significant relationship (p<0.05), namely location, duration and pain quality. In addition, Table 3 showed that out of the 5 accompanying symptoms that occur in ACS patients, only 2 are significantly related to gender differences (p<0.05), which is abdominal pain and diaphoresis (Table 3). There are 6 chest pain characteristics aspects in this study which consist of location, cause, duration, character/nature, quality and history. However, this study showed that location, duration and quality had significant correlations with gender differences (p<0.05). Based on the pain location, it was found that males with ACS tend to experience pain in the left or middle chest compared to female patients, while females felt more pain in the chest area radiating to the neck and chin. This data is directly proportional to previous studies,[16-18] that demonstrated pain in the middle part of chest is more experienced by males with a p<0.01 and female patients experience pain in form of radiations to the

Table 1. Baseline characteristics.

Respondent characteristics	ACS patients who suffer chest pain		p
	Male (n=28)	Female (n=25)	
Age	55.82±(12.772)	62.92±(9.363)	0.509
Menopause	-	20 (80%)	-
Marital status			0.044
Married	44 (83%)	26 (92.9%)	18 (72%)	
Widow	9 (17%)	2 (7.1%)	7 (28%)	
Educational background			0.585
Non completed elementary school	2 (3.8%)	1 (3.6%)	1 (4%)	
Elementary school	10 (18.9%)	5 (17.9%)	5 (20%)	
Junior high school	16 (30.2%)	6 (21.4%)	10 (40%)	
Senior high school	20 (37.7%)	13 (46.4%)	7 (28%)	
University	5 (9.4%)	3 (10.7%)	2 (8%)	
Occupation			0.005
Civil servant	3 (5.7%)	3 (10.7%)	0 (0%)	
Private servant	14 (26.4%)	10 (35.7%)	4 (16%)	
Entrepreneur	9 (17%)	7 (25%)	2 (8%)	
Unemployed	27 (50.9%)	8 (28.6%)	19 (76%)	
Payment type			0.415
General	11 (20.8%)	7 (25%)	4 (16%)	
JKN	38 (71.7%)	18 (64.3%)	20 (80%)	
Employment insurance	4 (7.5%)	3 (10.7%)	1 (4%)	
Personal insurance	-	-	-	
Body mass index			0.823
Normal	41 (77.4%)	22 (78.6%)	19 (76%)	
Overweight	12 (22.6%)	6 (21.4%)	6 (24%)	
Clinical history			
Smoker	23 (43.4%)	23 (82.1%)	0 (0%)	0.000
Dyslipidemia	42 (79.2%)	22 (78.6%)	20 (80%)	0.898
Hypertension	33 (62.3%)	14 (50%)	19 (76%)	0.051
Family history of cardiovascular event	9 (17%)	3 (10.7%)	6 (24%)	0.198
Medical diagnosis			0.013
STEMI	40 (75.5%)	25 (89.3%)	15 (60%)	
NSTEMI	13 (24.5%)	3 (10.7%)	10 (40%)	

neck, chin, and shoulder area with a p<0.01. The difference in symptomatic manifestation in males and females with ACS is due to the process of chest pain transmission mechanism mediated by sympathetic and vagal nerves activation. In fact, afferent fibers arising from the sympathetic nerves are concentrated along the left anterior coronary artery, while parasympathetic afferents dominate along the right coronary artery and circumflex. Therefore, the problematic part of the artery in ACS can affect the dominance of sympathetic nerves on vagal nerve activation. The activation of the parasympathetic nervous system is associated with manifestations in the form of symptoms such as nausea and vomiting and can characterize pain in patients with a right dominant system, where the tendency of the right dominant coronary system occurs in females.[15,19-21]

The pain felt by male patients was more varied at <20 min to> 20 min, while all female patients experienced pain for >20 min.

These, results are supported by previous studies that in male and female patients, there is a significant difference in terms of duration.[22] The data showed that 2-30 mins duration is more dominant in male patients with a significance p=0.04, while in females, it is more dominant at >30 min with a significance p=0.007. These results are also supported by the statement that when myocardial heart has ischemia or infarction, oxygen can supply for at least ±20 min, therefore patients with myocardial infarction who experience chest pain duration >20 min are considered predictive of ACS diagnosis. Meanwhile, chest pain with a duration of <5 min can be stated as less likely to have a diagnosis such as ACS, and has a better prognosis than prolonged pain duration.[23]

The results showed that the pain quality scale in males is heavier (moderate - severe pain scale) than in females (mild - moderate pain scale). Pain quality in males is heavier than in females as indicated by the data that the average pain quality in males is on a scale

Table 2. Chest pain characteristics.

Chest pain location	ACS patients who suffer chest pain		p
	Male (n=28)	Female (n=25)	
Left or middle chest	27 (96.4%)	16 (64%)	0.003
Chest, through to back	16 (57.1%)	18 (72%)	0.260
Chest, radiating to left hand	2 (7.1%)	2 (8%)	0.906
Chest, radiating to neck	1 (3.6%)	12 (48%)	0.000
Chest, radiating to chin	0 (0%)	4 (16%)	0.028
Epigastric	4 (14.3%)	5 (20%)	0.580
Chest pain trigger			0.219
Occurred in regular activities, diminished after resting	5 (17.9%)	4 (16%)	
Occurred in regular activities, not reduced with resting or ISDN	16 (57.1%)	8 (32%)	
Occurred in light activities	1 (3.6%)	2 (8%)	
Occurred when resting	6 (21.4%)	11 (44%)	
Chest pain duration			0.014
>20 minutes	22 (78.6%)	25 (100%)	
<20 minutes	6 (21.4%)	0 (0%)	
Chest pain sensation			0.106
Like getting ripped off or sudden	-	-	
Burnt or stabbed	18 (64.3%)	9 (36%)	
Crushed or suppressed	8 (28.6%)	14 (56%)	
Worsen with food/position/ inhale	2 (7.1%)	2 (8%)	
Chest pain history			0.273
Never	21 (75%)	18 (72%)	
Ever, but with lower pain than before	1 (36%)	0 (0%)	
Ever, same as usual	2 (7.1%)	0 (0%)	
Ever, more severe than before	4 (14.3%)	7 (28%)	
Chest pain level			0.038
Low pain	3 (10.7%)	6 (24%)	
Moderate pain	13 (46.4%)	16 (64%)	
Severe pain	12 (42.9%)	3 (12%)	

ISDN, rest isosorbide dinitrate.

Table 3. Characteristics of atypically symptoms.

Respondent characteristics		ACS patients who suffer chest pain		p
		Male (n=28)	Female (n=25)	
Nausea	29 (54.7%)	14 (50%)	15 (60%)	0.465
Vomit	17 (32.1%)	7 (25%)	10 (40%)	0.243
Dyspnea	34 (64.2%)	15 (53.6%)	19 (76%)	0.089
Abdominal pain	7 (13.2%)	0 (0%)	7 (28%)	0.003
Diaphoresis	37 (69.8%)	25 (89.3%)	12 (48%)	0.001

of 4-8, while it is 4-6 for females.[22] The difference in perceived quality is due to variations in typical pain. Also, females with ACS are more likely to complain of atypical symptoms such as tightness, nausea and pain in the radiating area of the neck and chin, therefore the impression of pain is lower than the typical pain felt in males.[24-26] Another significant difference is the accompanying symptoms, where males with ACS experienced more diaphoresis as a comorbid symptom, while females experienced more abdominal pain. Therefore, the results are relevant to previous studies that in males, the most significant comorbid symptom for gender differences is diaphoresis, and in females, the most significant symptom was abdominal pain, with a $p < 0.05$.[16,22]

Conclusions

This study showed a significant difference in the characteristics of chest pain symptoms in male and female patients with ACS. Meanwhile, in the aspect of location, duration and quality of chest pain, males have more typical symptoms, while females' symptoms are atypical.

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