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Research Article

ELECTROCARDIOGRAM CHANGES IN ELDERLY PATIENTS HAD CHEST PAIN ATTENDING ELDERLY CLINIC IN BAGHDAD

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ABSTRACT

A cross-sectional descriptive study of elderly patients carried on in Baghdad. Direct interview was performed with all patients together with electrocardiographic examination.

Pain in 32.7% of patients was constricting in nature, pricking pain in 28.7% of elderly. The pain was severe in 7% of patients and was mild in 43.6% of patients. Specific ischemic changes in electrocardiogram and type of pain was found significant (P-value 0.018) and severity of pain (P-value 0.043) but not significant with location of pain and its radiation (p-value 0.608, 0.248 respectively).

Electrocardiogram not necessarily shows relevant findings in all patients. A comprehensive geriatric assessment with high clinical suspicion is required to improve patient care.

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INTRODUCTION

A remarkable phenomenon of increase in number of old age is expected to nearly triple, is being driven by declines in fertility and improvements in longevity⁽¹⁾.

Aging is an inevitable part of life and brings along two inconvenient events: physiologic decline and disease state⁽¹⁾. The importance of cardiovascular disease as a leading cause of death in adults becomes increasingly clear as the population ages⁽²⁾.

Chest pain is one of the most common life-threatening complaints in the geriatric population. Elderly patients are more likely to present with atypical symptoms and nonspecific physical findings, so they are more liable for misdiagnosis and worse prognosis^(3, 4).

Obtaining a detailed history is a crucial step in the formulation of an appropriate differential diagnosis in patients who have chest pain. Priority must be given to potentially serious disorders. All elderly patients require an electrocardiogram (ECG) as soon as possible⁽³⁾.

It is expected that the prevalence of chronic diseases are even higher among the elderly people⁽⁵⁾. These patients are often

ignored because they have multiple medical comorbidities and are difficult to manage⁽⁶⁾.

It is essential to obtain the characteristics of pain including its location, duration, radiation, and quality as well as any accompanying symptom. The history and the physical examination remain the front line of evaluation^(7, 8).

In evaluating acute chest pain, the immediate goal is to determine the accurate diagnosis and to initiate the appropriate life-saving therapies as quickly as possible.

Most of elderly presenting with acute chest pain are of benign origin⁽⁹⁾. Thus, distinguishing it from serious causes of chest pain is imperative, and diagnostic and prognostic questions are important in making this determination⁽¹⁰⁾.

This study designed to explore the mode of presentation of elderly patients had chest pain and the relationship between electrocardiographic findings and chest pain perception by elderly patients.

METHODOLOGY

A cross-sectional descriptive study carried on in Al-Yarmouk teaching hospital in Baghdad. Elderly patient (60 years and

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older) who attend the elderly clinic in the hospital. The period of study started at first February till the end of April 2018.

Geriatric patients complaining of chest pain suspected to be of ischemic type were recruited to participate in the study after explanation of the research work on voluntary base and obtaining an oral consent.

A questionnaire was prepared for the purpose of the study depending on previous similar studies and researchers' view. It was revised by a committee of expert. The instrument covers the sociodemographic variables in addition to details about the chest pain description, site, radiations, factors precipitating and factors alleviating the pain, and duration. The instrument was filled in by direct interview to overcome some expected difficulties like illiteracy of some patient, unable to understand some questions, and to save time.

ECG record done for all the patients and were examined by an internist, findings were reported. St-T-wave changes and QRS-changes were considered as markers of ischemic changes.

A pilot study: performed in the same clinic along three work days. Re-reviewing the questions, finding the time needed to fill the questionnaire, training of the researchers all these were gained from the pilot study. The patients participated in the pilot study were not included in the research work.

Statistical issue: using the SPSS V20 software program the data was grouped, analyzed, and tabulated. To explore the significant relationship between categorical variables Chi-square test was used. P value ≤ 0.05 were considered statistically significant

Ethical issue: The researchers obtained verbal consent of all participants and they were informed that their identity will not revealed and that the work was done only for research purpose.

RESULTS

This study covers 101 elderly patients; Mean age was 66.4±5.1 years; range was (60-82). Males forming 56.4% and females (43.6%), majority were married 80.2% the remaining 19.8% were widowed. Those who had high education constitute 16.8% of total sample, one third of the sample 34.7% were not able to read and write. Majority of the study group 94.1% not working and the remaining 5.9% working. About half of the sample 53.5% were none smokers the other half were either current or past smokers all these were expressed in table (1).

Table 1 Essential characteristics of respondents

Socio-demographic variables (N=101)			
		n	%
Age groups	60-69	74	73.3
	70-82	27	26.7
	Male	57	56.4
Gender	Female	44	43.6
	Not read not write	35	34.7
Education status	Primary	26	25.7
	Secondary	23	22.8
	Higher	17	16.8
Marital status	Married	81	80.2
	Widow	20	19.8
Smoking status	None-smoker	54	53.5
	Past smoker	34	33.7
	Smoker	13	12.9

Table 2 revealed the highest rate 32.7% of pain was constricting in nature followed by pricking nature of pain 28.7%. The pain was severe in 7% of patients and was mild in 43.6%. More than half of the patients 57.4% perceive the pain at the mid-central area of the chest; pain radiates to the left shoulder in 34.7% of patients.

Table 2 Chest pain description (N=101)

	Chest pain	N	%
Type	constricting	33	32.7
	pricking	29	28.7
	heaviness	20	19.8
	burning	10	9.9
	throbbing	9	8.9
Severity	mild	44	43.6
	moderate	50	49.5
	sever	7	6.9
Place	mid-central chest	58	57.4
	to the left	39	38.6
	to the right	3	3.0
	upper chest	1	1.0
	left shoulder	35	34.7
Radiation	no radiation	20	19.8
	back	19	18.8
	right shoulder	17	16.8
	base of neck	10	9.9

In our sample 39.6% of elderly patients presented with chest pain without any associated symptoms. While 61% of patients had associating symptoms at presentation time, among them dyspnea is the most prevalent one 33.7% these findings were shown in table (3).

Table 3 Chest pain associating symptoms in elderly patients

Associated symptoms	n	%
None	40	39.6
Dyspnea	34	33.7
Palpitation	10	9.9
Dyspnea on exertion	8	7.9
GIT symptoms	5	5.0
Cough	2	2.0
Sweating	2	2.0
Total	101	100

In table 4 we noticed that only 49.5% of the ECG done for the elderly patients showed specific ischemic changes, while 24.8% had none-specific ECG changes and the remaining 25.7% of elderly patients had normal ECG record.

Table 4 Electrocardiography findings in study group

	ECG	N	%
Abnormal record	Normal record	26	25.7
	None-ischemic changes	25	24.8
	Ischemic changes	50	49.5
	ST- changes	28(57.1)	
	T-inversion	14(28.6)	
	QRS-changes	2(4.1)	
	ST- depression & T- inversion total	6(12.2)	50(100)
Total		101	100

To explore the relationship between presence of ECG changes and different variables table 5 was constructed which revealed presence of significant relationship with type of symptoms associated with chest pain (p-value 0.007). But it was not significant with chronic diseases, BMI, and smoking status (p-value 0.318, 0.249, 0.109 respectively).

Table 5 Distribution of electrocardiography changes according to different variables

Variables	ECG			Chi-square test P-value	
	Specific ischemic changes n(%)	Non-specific changes n(%)	Total n(%)		
Associate d symptoms	dyspnea	20(58.8)	14(41.2)	34(100)	15.850 0.007
	dyspnea on exertion	2(25)	6(75)	8(100)	
	palpitation	1(10)	9(90)	10(100)	
	sweating	1(25)	3(65)	4(100)	
	GIT symptom	1(20)	4(80)	5(100)	
Chronic diseases	none	26(65)	14(35)	40(100)	3.523 0.318
	one disease	23(51.1)	22(48.9)	45(100)	
	two diseases	20(51.3)	19(48.7)	39(100)	
	more than two diseases	1(16.7)	5(83.3)	6(100)	
BMI group	none	7(63.6)	4(36.4)	11(100)	2.782 0.249
	normal	8(38.1)	13(61.9)	21(100)	
	overweight	19(61.3)	12(38.7)	31(100)	
Smoking	obese	24(48.9)	25(51.1)	49(100)	2.782 0.249
	none-smoker	24(44.4)	30(55.6)	54(100)	
	past smoker	17(50.0)	17(50.0)	34(100)	
	current smoker	10(76.9)	3(23.1)	13(100)	

Table 6 showed the relationship between presence of ischemic changes in electrocardiography and characteristics of chest pain in the elderly patients under study. The relationship was found to be significant with type of pain (P-value 0.018) and severity of pain (P-value 0.043) but not significant with location of pain and its radiation (p- value 0.608, 0.248 respectively).

Table 6 Distribution of electrocardiography changes according to chest pain characteristics

Chest pain characteristics	ECG			Chi-square test P-value	
	Specific ischemic changes n(%)	Non-specific changes n(%)	Total n(%)		
Type	constricting	12(36.4)	21(63.6)	33(100)	11.858 0.018
	pricking	15(51.7)	14(48.3)	29(100)	
	heaviness	15(75.0)	5(25.0)	20(100)	
	burning	7(70.0)	3(30.0)	10(100)	
	throbbing	2(22.2)	7(77.8)	9(100)	
Severity	mild	28(61.0)	16(39.0)	44(100)	6.286 0.043
	moderate	19(41.5)	31(58.5)	50(100)	
	sever	4(57.1)	3(42.9)	7(100)	
Location	mid-central	27(46.6)	31(53.4)	58(100)	1.830 0.608
	to the left	21(53.8)	18(46.2)	39(100)	
	to the right	3(75.0)	1(25.0)	4(100)	
	base of neck	3(30.0)	7(70.0)	10(100)	
Radiation	left shoulder	19(54.3)	16(45.7)	35(100)	5.404 0.248
	right shoulder	12(70.6)	5(29.4)	17(100)	
	back	8(42.1)	11(57.9)	19(100)	
	No radiation	9(45.0)	11(55.0)	20(100)	

DISCUSSION

Age: The current study was carried in elderly clinic in a general hospital; patients of 60 years or older were seen in this clinic. Conventionally, "elderly" has been defined as a chronological age of 65 years old or older^(11, 12, 13). Leonardi *et al* in 2018 mean by 'elderly' individuals 75 years of age or older⁽¹⁴⁾. Across the population ageing process is not similar

because of the differences in genetics, lifestyle, and overall health⁽¹⁵⁾.

Gender: In this study male represented at a rate slightly higher than female. Granot *et al* found gender differences, more women than men were suffering from chest pain⁽¹⁶⁾. Both female sex and increasing age have been reported to be risk factors for atypical presentation⁽¹⁷⁾. Because the study women were post-menopausal, we do not expect physiological components such as the sex hormones play role in gender differences.

Marital state: Marriage has long been known to offer health benefits relative to people who are not married⁽¹⁸⁾. Being married has been associated with a lower risk of ischemic heart disease mortality in men, but not in women. Marriage may protect against developing disease by encouraging a healthier lifestyle or by providing social support or financial security⁽¹⁹⁾. In contrast, evidence for increased risk of adverse cardiovascular outcomes in unmarried populations remains conflicting⁽¹⁷⁾.

Chest pain: More than quarter of patients in this study has constricting type of chest pain. The elderly appear to have a somewhat reduced pain perception⁽⁴⁾, and if they have the pain then high rate of them would have atypical presentation leading to a worse prognosis⁽²⁰⁾. Non-traumatic chest pain is a common presenting complaint among patients seeking medical care. The main tools used to determine the likelihood of cause are the chest pain history, ECG and blood markers such as troponins⁽⁸⁾. **Locality:** More than half of the patients in the current study perceive the pain at mid-central area of the chest. Although it is important, the location of pain should not be used by itself to exclude potential life-threatening diagnoses⁽³⁾.

Symptoms: In our study 5% of patients have gastrointestinal symptoms. Oguzturk *et al* in 2011 documented that ischemic heart diseases can presented as epigastric pain, the cardiac etiology is often missed in patients presenting with a chief complaint of abdominal pain⁽²¹⁾.

Dyspnea: In this study dyspnea and dyspnea on exertion constituted the majority of associated symptoms with chest pain. In some cases dyspnea precedes chest pain whereas in others the chest pain precedes the dyspnea. Dyspnea also carries important prognostic information in ischemic heart disease⁽²²⁾. Overlapping clinical presentations and comorbid diseases can make the diagnostic evaluation of dyspnea a clinical challenge, as dyspnea covers a wide variety of subjective experiences⁽²³⁾.

ECG: is efficient as a rapid and convenient bedside test for the detection of ischemia at rest or under stress test in the diagnosis of acute coronary syndrome⁽⁴⁾. In this study only 49.5% percent of the patients showed ECG changes that are relevant to ischemic heart disease, mainly in form of ST segment changes (57.1%). Hung *et al* in 2010 stated that elderly patients with ischemia are less likely to have typical ECG findings than younger patients. Comparison with previous ECGs is thus necessary⁽⁴⁾.

Relationship: This study showed that there was a significant relationship between ECG ischemic changes and associating

symptoms. Also it was significant with type of pain and severity of chest pain.

Birnbaum concluded from his study in 2014 that ECG interpretation provides indirect information about the presence, extent, and severity of myocardial ischemia. At times, the changes are typical and clear, in other instances, changes are atypical and not clear and might be recognized only when ECG recording is repeated after changes in the severity of symptoms. ECG interpretation is an essential part of the initial evaluation of patients with symptoms suspected to be related to myocardial ischemia⁽²⁴⁾. The coexistence of several diseases may cause the clinical picture to be uncharacteristic⁽²⁵⁾.

CONCLUSION AND RECOMMENDATIONS

Chest pain is one of the most frequent complaints in the elderly population. Several diseases often coexist, so atypical presentation is common. ECG not necessarily shows relevant findings in all patients. A comprehensive geriatric assessment with high clinical suspicion is required to improve patient care.

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