ROLE OF CHROMOGRANIN A IN THE ASSESSMENT OF SYMPATHETIC ACTIVITY IN ACUTE MYOCARDIAL INFARCTION

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ABSTRACT

Background and objectives Measurement of chromogranin A in plasma has been used for the diagnosis and prognosis of many endocrine and neuroendocrine tumors that are associated with increased catecholamines secretion. Little is known, however, about the magnitude of increased sympathetic activity after acute myocardial infarction. Investigating the value of plasma chromogranin A as a quantitative measurement for this purpose probably will be of clinical significance. The objective was to evaluate the sympathetic nervous system activity in patients with acute myocardial infarction by measuring plasma chromogrnin A.

Methods This study involved 45 patients with acute myocardial infarction and 30 apparently healthy subjects as controls. Serum troponin I and CK-MB were measured by VIDAS machine and kinetic method respectively, chromogranin A was measured by ELISA technique.

Results Plasma chromogranin A in myocardial infarction patients (307.4 ng/ml) was significantly higher ($p < 0.001$) than that in controls (182.6 ng/ml). The value of plasma chromogranin A level (≥ 252.1 ng/ml) had an accuracy of 77.3 %, sensitivity of 64.4 % and 96.7 % specificity for establishing increased sympathetic system activity in patients with acute myocardial infarction. Patients with acute inferior wall myocardial infarction showed no appreciable difference in plasma chromogranin A level (308.1 ng/ml) from patients with other sites of myocardial wall infarction (306.8 ng/ml). Sympathetic activity was significantly lower in myocardial infarction patients who received morphine compared to those with negative history of morphine administration (236 vs 325.2 ng/ml, respectively, $p = 0.01$). However, plasma chromogranin A level was not influenced by gender, history of diabetes mellitus and smoking history.

Conclusions Measurement of plasma chromogranin A level is valuable for evaluating sympathetic activity after acute myocardial infarction. The magnitude of increased sympathetic system activity is not different in patients with acute inferior wall myocardial infarction and patients with other sites of myocardial wall infarction. In addition, morphine administration modulates sympathetic system activity after acute myocardial infarction.

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Key words: Chromogranin A, Sympathetic activity, Acute myocardial infarction

Acute myocardial infarction (MI) is a medical condition characterized by damage and potential death (necrosis) of cardiac myocytes caused by prolonged interruption of the blood supply to a part of the heart and it is the leading cause of death both for men and women.[1,2]

Decreased cardiac output in acute MI

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lead to activation of several neurohormonal systems such as renin-angiotensin-aldosterone system, release of anti-diuretic hormone, secretion of atrial natriuretic peptides and activation of sympathetic nervous system.[2,3]

Neurons and cells of the neuroendocrine system contain vesicles which store and release a variety of peptide hormones, biogenic amines and neurotransmitters. Chromogranins and secretogranins are a unique group of acidic, soluble secretory proteins found in vesicles of neurons and neuroendocrine cells. There are three types of chromogranins; the first one is chromogranin A (Cg A), a 49 kDa which consists of 439 amino acids residues, first isolated from chromaffin cells of the adrenal medulla. The second type is chromogranin B (Cg B) that consists of 657 amino acids, and initially characterized in a rat pheochromocytoma cell line. The third chromogranin is secretogranin II (chromogranin C), which is isolated from the anterior pituitary gland.[4]

In granulated vesicles of sympathetic postganglionic neurons and adrenal medullary cells, norepinephrine and epinephrine are bound to adenosine tri-phosphate and associated with chromogranin A.[5]

Chromogranin A increase has been proposed as a diagnostic marker of several neuroendocrine tumors such as pheochromocytoma,[6] parathyroid adenoma,[7] carcinoid tumors,[8] pancreatic islet-cell and aortic body tumours.[9] In addition to that, measurement of chromogranin A has yielded new insights into the pathogenesis of essential hypertension.[4]

Circulating levels of chromogranin A appear to be a better index of sympathetic activity.[5] It has been reported that serum concentration of chromogranin A increases after cardiac arrest, strenuous exercise and hypoglycaemia.[10]

As far as we are aware, data concerning the measurement of chromogranins, particularly chromogranin A in apparently healthy subjects and in diseased conditions, are not available in our locality. Little information, however, are available concerning the role of chromogranin A in the assessment of sympathetic system activity in cardiovascular disorders.

The current study aims to contribute whether and to what extent the measurement of plasma chromogranin A level can be used for the assessment of sympathetic activity in patients with AMI.

METHODS

Subjects included in this study were classified into two groups: patients with acute MI (n = 45, comprised 39 males and 6 females, their average age = 57.62 years) and a group of apparently healthy subjects (n = 30, among them 25 were males and 5 females, their average age = 46.63 years). General information and history were reported, then measurement of vital signs, echocardiography parameters (ejection fraction and fractional shortening), then venous blood samples were obtained for measurement of plasma concentration of chromogranin A, serum concentrations of cardiac biomarkers (troponin I and CK-MB) and high sensitivity C-reactive protein.

In MI group, blood samples were obtained within 24 hours of the onset of symptoms and centrifuged at 3000 g for 30 min. at 4 ^{o}C. The serum and plasma were obtained and frozen at -28 ^{o}C until the time of analysis.

Control subjects were asked to fast overnight (10 – 12 hours). Next day at 9 a.m. the questionnaire was completed and sampling started. One subject was investigated each day. All apparently normal volunteers were kept in a calm place at (20-25 ^{o}C) and in lying position for 30 minutes before withdrawing blood

samples. Blood samples were taken in the same way as performed for patient group.

Plasma chromogranin A levels were measured by ELISA using Epitope Diagnostics, Inc. (EDI™) kit, serum cardiac troponin I measured by VIDAS using BioMerieux® SA, France kit. Serum CK-MB measured by CK-MB isoenzyme immunoinhibition method using BIOLABO SA, France kit and hs-CRP measured by ELISA using Monobind Inc., USA kit.

RESULTS

There was a highly significant increase (P < 0.001) of mean plasma chromogranin A level in MI cases (307.4±19.43 ng/ml) compared to the control group (182.6±9.59 ng/ml) (Figure 1).

There were statistically significant increases in the serum levels of CK-MB (101 vs 13.7 UI/L, p< 0.001), troponin I (3.9 vs 0.01 µg/L, p < 0.001) and high sensitivity C-reactive protein (7.3 vs 2.8 µg/ml, p < 0.002) in the MI group compared to the controls as shown in table 1.

Using receiver operating characteristics (ROC) curve, table 2 and figure 2 illustrate that serum troponin I was of highest validity in differentiating MI from healthy subjects with an area under the curve (AUC) of 0.933, followed by CK-MB (AUC = 0.905) and plasma chromogranin A (AUC = 0.817) respectively, hs-CRP was of the lowest validity (AUC = 0.713) among the selected parameters for differentiating MI cases from controls.

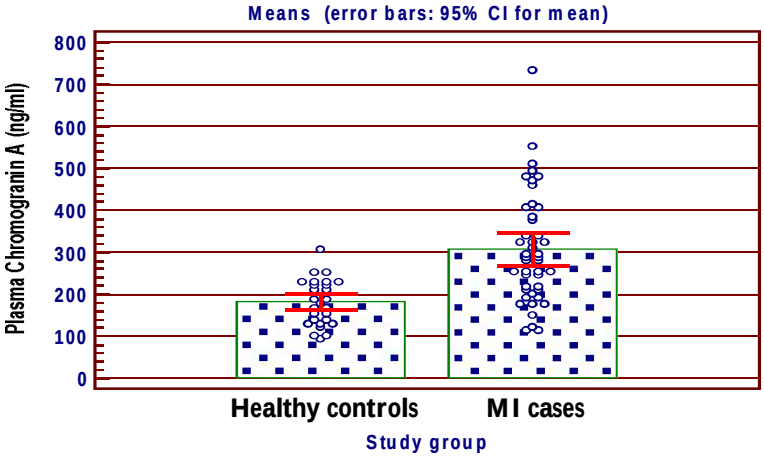

Figure 1. Comparison of the mean plasma Chromogranin A between MI cases and healthy controls

Table 1. Measurements of serum cardiac biomarkers and high sensitivity C-Reactive Protein in the studied groups

Parameters	Healthy controls N = 30	MI N = 45	P value
Serum CK-MB (UI/L)			
Mean ± SE	13.7 ± 0.62	101 ± 12.22	<0.001*
Serum Troponin-I (ug/L)			
Median	0.01	3.9	<0.001**
Interquartile range	(0.01 - 0.01)	(0.5 - 14.95)	
High sensitivity C-Reactive Protein (ug/ml)			
Median	2.8	7.3	0.002**
Interquartile range	(1.6 - 5.1)	(2.9 - 13.6)	

** Independent samples t-test was used*
*** Mann-Whitney U-test was used*

Table 2. ROC area for plasma chromogranin A and selected cardiac biomarkers when used in differentiating MI cases from healthy controls

Parameters	ROC area	P
Plasma Chromogranin A (ng/ml)	0.817	<0.001
Serum Troponin-I (ug/L)	0.933	<0.001
Serum CK-MB (UI/L)	0.905	<0.001
High sensitivity C-Reactive Protein (ug/ml)	0.713	0.002

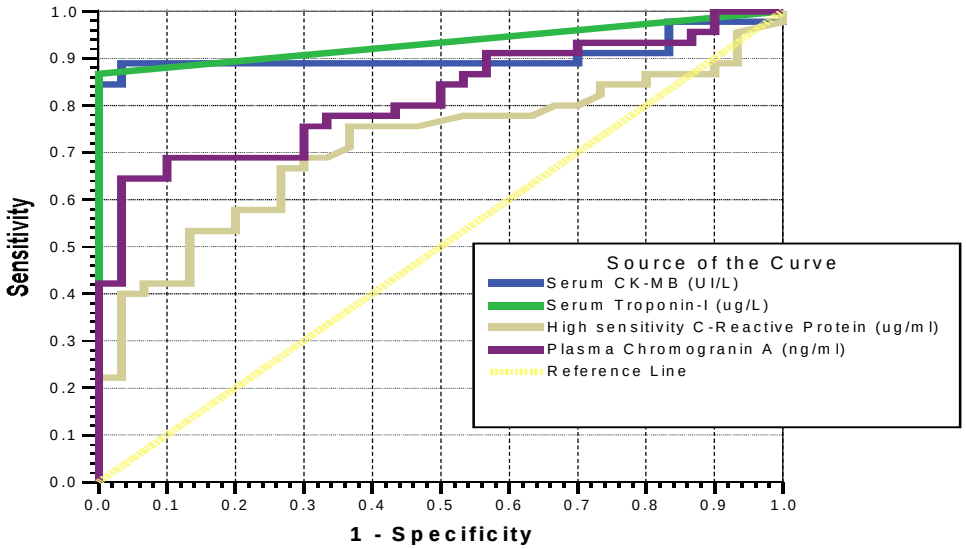

Figure 2. ROC curve showing the trade-off between sensitivity (true positive) and 1-specificity (false positive) for plasma chromogranin A and selected cardiac biomarkers when used in differentiating acute MI patients from healthy controls

Plasma chromogranin A cut-off value associated with highest sensitivity is positive if ≥ 107.7 ng/ml, which is associated with detection rate (100 %) for diagnosis and increased sympathetic activity in acute MI cases when used for screening purposes. A subject, who is negative for the test at this cut-off value, is considered negative for acute MI and increased sympathetic system activity with 100 % certainty level.

The optimum (typical cut-off value) is (252.1 ng/ml) which yields a sensitivity of (64.4 %), accuracy (77.3%) and (96.7 %) specificity. Testing positive at this cut-off value will establish the diagnosis and increased sympathetic system activation in MI with 95.1 % confidence. In the same context, testing negative will exclude MI and sympathetic overactivity in MI with (96.1 %) confidence. The cut-off value of the highest specificity is 307.5 fmol/ml. At this cut-off value, the diagnosis and increased sympathetic system activation in MI is established with 100 % confidence (Table 3).

Plasma chromogranin A reached to its highest level after 13 hours from onset of symptoms (345.7 ng/ml), but it was statistically not different from other subgroups (when blood sampling done within 12 hours of the onset of symptoms) (p = 0.29) (Figure 3).

Thrombolytic therapy induced appreciable but statistically not significant decrease of plasma chromogranin A level compared to those with negative history of thrombolytic therapy (276 vs 340.2 ng/ml, p = 0.1). However, patients with positive history of thrombolytic therapy showed significantly higher levels of serum troponin I (Table 4).

Table 3. Validity parameters of plasma chromogranin A, selected cardiac biomarkers and high sensitivity C-reactive protein when used to differentiate MI from controls

Parameters	Sensitivity	Specificity	Accuracy	PPV at pretest probability		*NPV at pretest probability =10%*
				50%	90%	
Positive if greater than or equal to cut-off value						
Plasma chromogranin A (ng/ml)						
107.7 (highest sensitivity)	**100.0**	**10.0**	**64.0**	**52.6**	**90.9**	***100.0***
252.1 (Optimum)	**64.4**	**96.7**	**77.3**	**95.1**	**99.4**	***96.1***
307.5 (highest specificity)	**42.2**	**100.0**	**65.3**	**100.0**	**100.0**	***94.0***
Serum Troponin I (µg/L)						
0.01 (Opimum, highest sensitivity and highest specificity)	**86.7**	**100.0**	**92.0**	**100.0**	**100.0**	***98.5***
Serum CK-MB (UI/L)						
10.0 (highest sensitivity)	**97.8**	**16.7**	**65.4**	**54.0**	**91.4**	***98.6***
18.9 (Optimum cut-off)	**88.9**	**96.7**	**92.0**	**96.4**	**99.6**	***98.7***
23.3 (Highest specificity)	**84.4**	**100.0**	**90.6**	**100.0**	**100.0**	***98.3***
High sensitivity C-Reaction Protien (µg/ml)						
0.5 (highest sensitivity)	**95.6**	**6.7**	**60.0**	**50.6**	**90.2**	***93.2***
2.95 (Optimum)	**75.6**	**63.3**	**70.7**	**67.3**	**94.9**	***95.9***
14.90 (highest specificity)	***22.2***	***100.0***	***53.3***	***100.0***	***100.0***	***92.0***

PPV is positive predictive value
NPV is negative predictive value

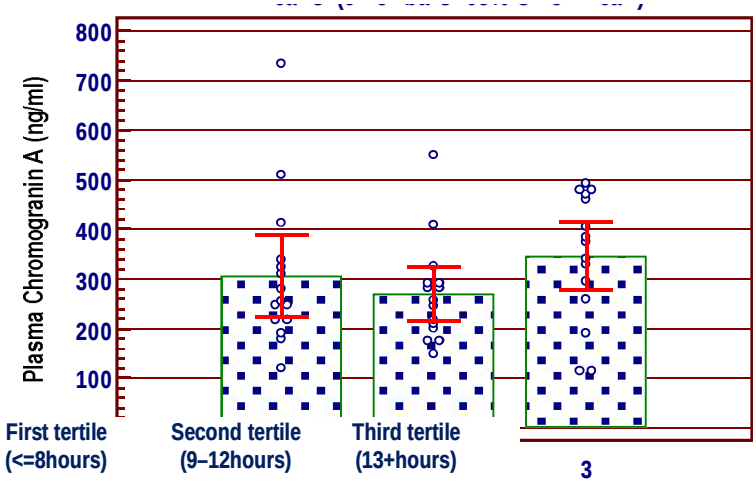

Figure 3. Showing the mean plasma Chromogranin A by ordered categories of time interval between onset of symptoms and blood sampling in patients with acute myocardial infarction

Table 4. Comparison of the plasma chromogranin A and selected serum cardiac biomarkers in MI patients with positive and negative history of thrombolytic therapy

Parameters	Received Thrombolytic therapy (Actilyse)		P
	Negative N = 22	Positive N = 23	
Plasma Chromogranin A (ng/ml)			
Mean ± SE	340.2 ± 31.03	276 ± 22.5	0.1*[NS]
Serum CK-MB (UI/L)			
Mean ± SE	78.4 ± 14.39	122.6 ± 18.76	0.07*[NS]
Serum Troponin-I (ug/L)			
Median	1.39	9.58	0.029**
Interquartile range	(0.16 - 6.77)	(1.11 - 86.9)	
High sensitivity C-Reactive Protein (ug/ml)			
Median	5.2	10.7	0.06**[NS]
Interquartile range	(1.9 - 8.6)	(3.2 - 20.1)	

* *Independent samples t-test was used*
** *mann-Whitney U-test was used*

No statistically significant differences in plasma chromogranin A levels (Table 5) and other selected cardiac biomarkers were noticed among patients with inferior wall MI and other sites of myocardial wall infarction.

Measurement of echocardiography parameters and vital signs showed no significant or appreciable differences between patients with inferior wall and other sites of MI (Data are not shown).

As shown in table 6, the mean plasma chromogranin A level was significantly ($p = 0.01$) lower among patients with acute MI who received morphine (325.2 ng/ml) on admission, compared to those who did not receive morphine (236 ng/ml). Meanwhile, other independent variables (patient's history of CVD, family history of CVD, history of diabetes mellitus and gender) did not influence an appreciable and significant difference in plasma chromogranin A levels.

Table 5. Comparison of plasma chromogranin A, selected serum cardiac biomarkers and high sensitivity C-reactive protein among patients with inferior wall MI and other sites of myocardial wall infarction

Parameters	Site of MI		P
	Inferior wall N = 25	Other sites N = 20	
Plasma Chromogranin A (ng/ml)			
Mean ± SE	306.8 ± 23.55	308.1 ± 33.03	0.98*[NS]
Serum CK-MB (UI/L)			
Mean ± SE	94.5 ± 16.47	109.1 ± 18.54	0.56*[NS]
Serum Troponin-I (ug/L)			
Median	2.95	3.95	0.6**[NS]
Interquartile range	(0.5 - 10.8)	(0.47 - 25.95)	
High sensitivity C-Reactive Protein (ug/ml)			
Median	10.4	4.8	0.21**[NS]
Interquartile range	(3.2 - 14.9)	(2.9 - 12.1)	

* *Independent samples t-test was used*
** *Mann-Whitney U-test was used*

Table 6. The mean plasma Chromogranin-A by selected independent variables among cases with MI

Independent variables	Plasma Chromogranin A (ng/ml)		P (t-test)
	Mean ± SE	N	
Patient's history of CVD			**0.35[NS]**
Negative	283.1 ± 26.4	13	
Positive	317.2 ± 25.1	32	
Family history of CVD			**0.68[NS]**
Negative	300.4 ± 24.4	26	
Positive	361.9 ± 32.3	19	
History of diabetes mellitus			**0.34[NS]**
Negative	295.5 ± 21.37	34	
Positive	344.1 ± 44.27	11	
Received morphine			**0.01**
Negative	325.2 ± 22.63	36	
Positive	236 ± 24.99	9	
Sex			**0.95 [NS]**
Female	303.5 ± 66.1	6	
Male	308 ± 20.39	39	

According to the smoking history, each study group was divided into three subgroups; non smoker, current smoker and X-smoker. In the control group, no significant difference were noticed in the levels of plasma chromogranin A and cardiac biomarkers between the subgroups (Data are not shown).

Meanwhile, in the MI group significantly higher levels of CK-MB and troponin I were observed in the current smokers compared to non smokers and X-smokers (133.1 vs 72.7 and 64.7 UI/L, p = 0.032) and (10.8 vs 1.12 and 0.17, p = 0.001) respectively (Table 7), but, plasma chromogranin A and serum hs-CRP levels were not significantly affected by smoking history.

Table 7. Measurement of plasma chromogranin A, serum cardiac biomarkers and high sensitivity C-reactive protein in MI cases according to smoking history

MI cases	Smoking history			P value
	Non smoker N = 16	Current smoker N = 22	X-smoker N = 7	
Plasma Chromogranin A (ng/ml)				
Mean ± SE	353.7 ± 40.61	272 ± 20.88	312.6 ± 45.86	0.16*[NS]
Serum CK-MB (UI/L)				
Mean ± SE	72.7 ± 16.05	133.1 ± 18.32	64.7 ± 28.52	0.032*
Serum Troponin-I (ug/L)				
Median	1.12	10.8	0.17	0.001**
Interquartile range	(0.03 - 7.3)	(2.63 - 82.25)	(0.01 - 2.64)	
High sensitivity C-Reactive Protein (ug/ml)				
Median	6.6	8.2	3.1	0.29**[NS]
Interquartile range	(2 - 21.2)	(4.1 - 11.1)	(1.7 - 7.8)	

** One-way ANOVA test was used*

***KruskaII-WaIIis test was used*

DISCUSSION

Significant increases in serum troponin I and CK-MB were observed in patients with acute myocardial infarction compared to the controls. These markers are specific for myocardial cell damage[11] and support our clinical diagnosis of acute myocardial infarction.

Patients with acute myocardial infarction had an increased plasma chromogranin A level about 1.7 fold in comparison to normal controls. Although limited data are available in this field, our findings are consistent with those of other studies[12, 13] and indicate that sympathetic system activity is greater in patients with acute myocardial infarction than the normal subjects.

The present study showed that an optimum (typical) cut-off value of more than or equal to 252.1 ng/ml had an accuracy of 77.3 %, sensitivity of 64.4 % and 96.7 % specificity for establishing increased sympathetic activity in acute myocardial infarction.

Moreover, recent information demonstrated that chromogranin A is detected in human myocardial secretory granules containing atrial natriuretic peptide, and myocardial production of chromogranin A in humans is enhanced in patients with dilated and hypertrophic cardiomyopathy,[12] suggesting that chromogranin A may be released from the myocardium in conditions characterized by increased pressure or volume overload.

Therefore, determination of plasma chromogranin A is clinically significant and might be of value in the diagnosis of acute myocardial infarction (in addition to the assessment of sympathetic system activity) which can be used as an additional new biochemical marker for the diagnosis of acute myocardial infarction. However, this does not rule out the possibility that other organs, including adrenal glands, might be the contributing sources to increased levels of chromogranin A.[13]

This study showed that sympathetic hyperactivity is not affected by the time span after acute myocardial infarction, indicating that the magnitude and the duration of this activation are probably linked to the extent of myocardial injury and the degree of ventricular dysfunction. Our results are in agreement with an experimental study carried out by Jardine et al.[14] who reported a sustained increase in sympathetic system activity following experimental myocardial infarction.

Patients with positive history of thrombolytic therapy had plasma chromogranin A level about 19 % lower than in patients with negative history of thrombolytic therapy. Although this difference was statistically not significant, this effect of thrombolytic therapy on sympathetic system activity might partly contribute to the hemodynamic stability of patients with acute myocardial infarction following reperfusion therapy.

Patients with positive history of reperfusion therapy showed higher serum levels of cardiac biomarkers compared to those with negative history of such therapy. This might indicate that restoration of blood flow to an ischemic area (or necrotic area) of myocardial wall cause washing of large quantities of these cardiac biomarkers into the circulation. In addition, troponin I is more abundant in the myocardium than CK-MB,[15,16] which might contribute to the more obvious elevation of troponin I following thrombolytic therapy.

Our study showed no influence of site of infarction on levels of plasma chromogranin A. Indicating that the degree of sympathetic system activation is more or less similar and not dependent on the site of infarction.

We found that morphine administration significantly decreases sympathetic system activity after acute MI. Our results are consistent with those reported by Takashi et al.[17] and Kienbaum et al.[18] On the other hand, this finding is not consistent with results observed by

Mildh et al.[19] and Carter et al.[20] who demonstrated an increased sympathetic activity and mean arterial pressure after morphine administration.

The mechanism through which morphine decrease the sympathetic activity could be the binding of morphine to opioid receptors of sympathetic centers in the brain stem and spinal cord.[21]

It has been found that co-release of chromogranin A and catecholamine is increased in smokers.[22] However, we found in the present work that smoking does not influence chromogranin A levels neither in the control subjects nor in patients with acute myocardial infarction. This might be attributed to desensitization and downgrading of nicotinic receptors at autonomic ganglia due to chronic excessive exposure to nicotine, because majority of smokers in this study (71.4%) were moderate and heavy smokers.

Current smokers in the myocardial infarction group showed significantly higher serum levels of cardiac biomarkers. This indicates that current smokers are liable to a more extensive damage of myocardial wall during such attacks than non smokers or X-smokers. This could be attributed to higher plasma fibrinogen level in the current smokers.[23] Plasma fibrinogen levels show a dose dependent increase in smokers, and abstention from smoking reduces both synthesis and plasma fibrinogen level.[24] high plasma fibrinogen levels promote atherogenesis, thrombogenesis and increased blood viscosity with consequent extensive occlusion of coronary arteries.[25]

In agreement with previous studies, [3,26,27] we found that hs-CRP is significantly increased in acute myocardial infarction. High values of hs-CRP suggest that the patient may be at increased risk of cardiac events[28]; therefore, patients with acute myocardial infarction should be kept under strict medical observation within the first few days.

Patients with positive history of thrombolytic therapy showed significantly higher levels of hs-CRP than those with negative history. This indicates that restoration of blood flow to a damaged tissue will consequently activate the inflammatory process.

We conclude that these data indicate that AMI is associated with increased sympathetic nervous system activity and measurement of plasma chromogranin A levels can be used readily to assess the extent of this activity.The magnitude of increased sympathetic system activity is not different in patients with acute inferior wall MI and patients with other sites of myocardial wall infarction. Morphine administration modulates sympathetic system activity after AMI. Increased sympathetic system activity after AMI is not restricted to a certain period of time, and is attributed to the degree of hemodynamic stability following such attacks. Sympathetic system activity is not increased in heavy smokers which is most likely due to down-regulation and desensitization of nicotinic receptors at autonomic ganglia following long-term exposure to nicotine. As well as high sensitivity C-reactive protein level peaks after 12 hours of the onset of AMI, during which the patient is at increased risk of complications and careful observation is needed until hs-CRP begins to decrease.

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پوخته

رولێ کروموکرانین ئەی د هەلسەنگاندنا چالاکیا سیستەمێ سمپاتتیك دا پشتی ئەنفارکشنا دلی یا دژوار

پێشەکی و ئارمانج: دیارکرنا ریژا Chromogranin A دناڤ پلازمایێ دا یا هاتییە بکارئینان بۆ دەسنیشانکرن و پێشبینکرنا پەنجەشێرێن دەمارەخانا و رژێنێن گرتی ئەوێن گرێدای برژاندنا catecholamine ڤە دناڤ خویناڤێدا. کێم پێزانین بێت هەین لسەر چەندایەتیا زێدەبونا چالاکیا سیستەمێ سمپاتتیك پشتی پەیدابونا ئەنفارکشنا دلی، دیڤچۆنا بهایێ Chromogranin A دناڤ پلازمایێدا وەك پیڤەرەکێ چەندایەتی بۆ ڤێ مەرەمێ رەنگە گرنگیەکا کلینیکی هەبیت. ئارمانجا ڤەکولینێ هەلسەنگاندنا چالاکیا سیستەمێ سمپاتتیك پشتی ئەنفارکشنا دلی یا دژوار بریکەکا چەندایەتی بپیڤانا ئاستێ Chromogranin A دناڤ پلازمایێ دا.

ریکێن ڤەکولینێ: ئەڤ ڤەکولینە ژ دوو گروپا پێك دهات: 45 نەخوشێن ئەنفارکشنا دلی یا دژوار و 30 مرۆڤێن سروشتی. فورما پێزانینا بۆ هەردوو گروپا هاتە پڕکرن. ریژا Chromogranin A دناڤ پلازمایێدا و پێکهاتێن بایو کیمیاوی بێن مرنا ماسۆلکا دلی هاتنە دیارکرن. د گروپێ ئەنفارکشنێ دا نمونێن خوینێ هاتنە وەرگرتن دماوێ 24 دەمژمێرادا ژ دەسپێکا پەیدابونا نیشانێن نەخوشیێ.

ئەنجام: هوسا دیاربو زێدەبونا مەعنەوی د ریژا Chromogranin A دناڤ پلازمایێ دا لدەف نەخوشێن ئەنفارکشنێ (Vs 307.4 ng/ml 252.1 (182.6 ng/ml, P < 0.001 دناڤ هەردوو گروپاندا. ریژا ئاستێ Chromogranin A دناڤ پلازمایێ دا پتر ژ شیایە زێدەبونا چالاکیا سیستەمێ سمپاتتیك دیاربکەت بریژا 77.3٪ بهویراتی، 64.4٪ هەستداری و 96.7٪ تایبەتمەندی لدەف نەخوشێن ئەنفارکشنێ. هیچ جیاوازی دناڤبەرا ئەنفارکشنا دلی ژ جورێ inferior و ئەنفارکشنا جهێن دی ژ دیوارێ دلی دیارنەبوویە (Vs 308.1 ng/ml 306.8) لدیفئێکدا، دگەلدا هیچ جیاوازی یا مەعنەوی د چالاکیێن زیندەکیدا دیارنەبوویە دناڤبەرا ڤان هەردوو گروپاندا. کێمبوونەکا مەعنەوی د چالاکیا سیستەمێ سمپاتتیکدا (بنوینەراتیا ئاستێ Chromogranin A دناڤ پلازمایێ دا) دیارکریە لدەف نەخوشێن ئەنفارکشنا دلی ئەوێن مورفین وەرگرتین بەرەوردکرن دگەل وان نەخوشان ئەوێن مورفین نەوەرگرتین (236 Vs 325.2 ng/ml, P = 0.01) لدیفئێکدا. هەرچەندە رەگەز، نەخوشیا شەکرێ و جگارە کێشانێ هیچ کارتێکرن نەبوویە لسەر ئاستێ Chromogranin A دناڤ پلازمایێ دا.

دەرئەنجام: ئەڤ داتایە زێدەبوونا چالاکیا سیستەمێ سمپاتتیك پشتی ئەنفارکشنا دلی دیاردکەن، و پشکنینا ئاستێ Chromogranin A دناڤ پلازمایێ دا رەنگە بێتە بکارئینان بۆ هەلسەنگاندنا ڤێ چالاکیێ. چەندایەتیا زێدەبوونا چالاکیا سیستەمێ سمپاتتیك دناڤبەرا ئەنفارکشنا دلی ژ جورێ inferior و ئەنفارکشنا جهێن دی ژ دیوارێ دلی وەکی ئێکە. وەرگرتنا مورفینی، بەرسڤدانەڤەیا سیستەمێ سمپاتتیك دگوهوریت پشتی ئەنفارکشنا دلی یا دژوار.

الخلاصة

دور الكروموكرانين أي في تقدير نشاط الجهاز العصبي الودي في احتشاء العضلة القلبية الحاد

خلفية واهداف البحث: إستعمل قياس ال chromogranin Aفي البلازما في تشخيص العديد من أورام الغدد الصم و الغدد الافرازية (neuroendocrine) التي تفرز ال catecholamine في المصل. رغم وجود قلة معرفة حول مقدار نشاط الجهاز الودي المتزايد بعد احتشاء العضلة القلبية الحادّ، من المحتمل ان يكون التحرّي لقيمة chromogranin A في البلازما (كمقياس كمّي لهذا الغرض) ذا أهمية سريرية. الهدف من الدراسة تقييم نشاط الجهاز العصبي الودي بعد احتشاء العضلة القلبية الحادّ بطريقة كمّية خلال قياس مستوى chromogranin A في البلازما.

طرق البحث: الاشخاص المشمولين في هذه الدراسة قسموا الى مجموعتين: خمس و اربعون مريضا من المصابين باحتشاء العضلة القلبية الحاد و ثلاثون شخصا طبيعيا. تم ملأ استمارة الاستبيان لكلا المجموعتين، ثم تم قياس تراكيز ال troponin I بجهاز VIDAS و CK–MB بطريقة Kinetic و تركيز ال chromogranin A في البلازما بطريقة ELISA. تم اخذ نماذج من مجموعة المصابين باحتشاء العضلة القلبية خلال 24 ساعة من بدء علامات المرض.

النتائج: لوحظ زيادة معنوية في معدل مستوى ال chromogranin A عند المرضى المصابين باحتشاء العضلة القلبية مقارنة مع الاشخاص الطبيعيين (307.4 P<0.001) (182.6 ng/ml Vs بالتتابع. قيمة مستوى chromogranin Aفي البلازما اكبر او يساوي 252.1 ng/ml له دقة 77.3% ، حساسية 64.4% و خصوصية 96.7% لاثبات زيادة نشاط الجهاز العصبي الودي عند المرضى المصابين باحتشاء العضلة القلبية الحاد. المرضى المصابين باحتشاء العضلة القلبية نوع inferior لم يتبين عندهم اي اختلاف مقدر في مستوى ال chromogranin A في البلازما مقارنة مع احتشاء العضلة في المواقع الاخرى من جدار القلب (306.8 (308.1 ng/ml Vs بالتتابع. في مرضى احتشاء العضلة القلبية، تبين وجود انخفاض معنوي في نشاط الجهاز العصبي الودي (متمثلا بمستوى ال chromogranin A في البلازما) بعد استلامهم المورفين مقارنة مع المرضى الذين لم يعالجوا بالمورفين (236 Vs 325.2 ng/ml, P = 0.01) بالتتابع، بينما لم يتأثر مستوى ال chromogranin A في البلازما بالجنس و داء السكّري و التدخين.

الاستنتاجات: يمكن استخدام قياس مستويات ال chromogranin A في البلازما لتقييم درجة الزيادة في نشاط الجهاز العصبي الودي بعد احتشاء العضلة القلبية الحاد. احتشاء العضلة القلبية نوع inferior و الاحتشاء في المواقع الاخرى من جدار القلب لهما نفس درجة الزيادة في نشاط الجهاز العصبي الودي. و اخيرا المورفين يغير استجابة الجهاز الودي بعد احتشاء العضلة القلبية الحاد.