DOI: 10.15253/2175-6783.2014000300016
www.revistarene.ufc.br

Original Article

Chest pain during admission in a reference cardiac emergency unit

Dor torácica na admissão em uma emergência cardiológica de referência

Dolor torácico en la admisión en una urgencia cardiológica de referencia

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This study aimed to verify the presence of chest pain in a reference emergency cardiac unit of Recife, PE, Brazil. This is a cross-sectional, descriptive-exploratory study, with a quantitative approach. Between December 2012 and February 2013, data from 39 patients admitted to the unit with chest pain were collected. For comparison between the averages, the Mann-Whitney test was used and the Pearson correlation was used to verify the association between numerical variables and pain scores and time between symptoms' onset and attendance (delta t). The main presentations were retrosternal chest pain isolated (51.3%) and combined with radiation (33.3%). The average scores reported for pain was 5.15±1.63 and the delta t of the sample was 14.95±8:48h. The delay to arrive at the reference unit harms the diagnosis and the possibility of initiating reperfusion therapy in pre-hospital care should be considered.
Descriptors: Emergency Medical Services; Chest pain; Cardiology; Nursing.

Objetivou-se verificar a apresentação da dor torácica em uma unidade de referência em emergência cardiológica do Recife, PE, Brasil. Trata-se de um estudo de corte transversal, descritivo-exploratório, de abordagem quantitativa. Foram coletados entre dezembro de 2012 e fevereiro de 2013, dados de 39 pacientes admitidos na unidade com dor torácica. Para a comparação entre as médias foi utilizado o teste de Mann-Whitney e a correlação de Pearson foi utilizada para verificar a associação entre variáveis numéricas com os escores de dor e tempo entre início dos sintomas e atendimento (delta t). As principais apresentações foram a dor retroesternal isolada (51,3%) e combinada à irradiações (33,3%). O escore médio referido para dor foi de 5,15±1,63 e o delta t da amostra foi de 14,95±8,48h. A demora até a unidade de referência prejudica o diagnóstico e deve-se considerar a hipótese de a terapia de reperfusão iniciar no atendimento pré-hospitalar.
Descritores: Serviços Médicos de Emergência; Dor no peito; Cardiologia; Enfermagem.

El objetivo fue verificar la presentación del dolor torácico en servicio de urgencia de referencia cardíaca de Recife, PE, Brasil. Estudio de corte transversal, descriptivo, exploratorio, cuantitativo. Fueron recogidos entre diciembre de 2012 y febrero de 2013 los datos de 39 pacientes ingresados en la unidad de dolor torácico. Para comparación entre las medias, fue utilizado test de Mann-Whitney y correlación de Pearson para verificar asociación entre variables numéricas con puntuaciones de dolor y tiempo entre el inicio de los síntomas y atendimiento (delta t). Las principales presentaciones fueron dolor retro esternal solo (51,3%) y combinada con la irradiación (33,3%). La puntuación promedia para dolor retro esternal solo fue de 5,15 ± 1,63 y el delta T de la muestra fue de 14,95 ± 8,48 h. El retraso de la unidad de referencia perjudica el diagnóstico y debe considerarse la posibilidad de iniciar la terapia de reperfusión en la atención prehospitalaria.
Descriptores: Servicios Médicos de Urgencia; Dolor en el pecho; Cardiología; Enfermería.

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Received: Apr. 8th 2014; Accepted: July. 28th 2014.

Introduction

Chest pain is the most common symptomatic expression of cardiac disorder in emergency services. The Coronary Artery Disease progresses to acute myocardial infarction with strong association to pain symptoms[1]. Multicenter studies listed as major risk factors dyslipidemia, hypertension, diabetes, smoking, obesity, physical inactivity and alcohol consumption[2-3].

The association of chest pain to a cardiac event and its gravity has been identified as a factor that favored the early demand for an emergency service[4-6]. Considering the need of rapid intervention for chest pain, nurses must understand its presentation, investigate risk factors and investigate the possibility of non-cardiogenic origin and master protocols to better conduct patients from their arrival at the reference service, since it has already been verified the relationship between the delay in the conduction of an electrocardiogram and in the recognition of acute myocardial infarction as factors that hinder the administration of reperfusion therapy[7-9].

In a recent study about the difficulties of hospital accreditation in a public cardiology institution, the nurses interviewed reported several relevant issues, in particular the need for established, updated protocols, for training and for ease of communication[10]. These factors to be considered take unique proportion in an emergency cardiology unit, as a strategy for reducing in-hospital delay to reperfusion in myocardial infarction.

The chest pain units must know the network to which they are integrated in the regulatory process to facilitate the understanding of patients' presentation. Through this study, one aimed at verifying the presentation of chest pain in a reference unit of cardiac emergency in Recife-PE. Studies like this allow for services a better understanding of the phenomenon and planning of the assistance to be provided, besides bringing reflection about the possibilities of failure in reperfusion therapy within the therapeutic time.

Method

This is a cross-sectional, descriptive-exploratory study, with a quantitative approach, performed in a cardiac emergency service reference in the city of Recife-PE. Data were collected between December 2012 and February 2013, from 39 patients admitted to the emergency service, in the period of up to 24 hours after entering the service. During the collection period, 72 patients with chest pain were attended, out of whom 32 were excluded for being clinically unable or because they were taken to angiography, thrombolysis or intensive care unit.

The instrument of data collection was developed containing socio-demographic and clinical data (origin, years of education, age, sex, labor activity, per capita income, health history, blood pressure on admission, weight, height, body mass index), main complaint, time from onset of the symptoms, way of access to the service and information about the presentation of chest pain: location, radiation, duration. The labor activity was considered in terms of active to those with labor activity and inactive considering those who were unemployed or retired. Patients were classified as to their physical activity when they mentioned its practice, regardless of the frequency or nature of the activity, or sedentariness. Alcohol use was considered in number of times per week, regardless of the dose and smoking in number of cigarettes per day. The minimum wage in the period was R$ 622.00 (approximately US$230).

The pain was recorded as typical retrosternal, retrosternal with radiation, which included any point between the mesogastric region and the jaw and atypical pain, which included non-classical presentations of anginal pain such as stabbing pain, epigastric pain, reports of heartburn/burning etc. For the pain score patients were asked to attribute a grade for their pain on an analog scale from 0 (zero) to 10 (ten) points, representing respectively the smallest and the greatest pain. The variation of time between onset of symptoms and arrival at the service

is expressed by the term delta t. Data were collected through interviews with patients, consultation to their records of assessment and risk classification conducted by a nurse and to their health care records.

The Microsoft Excel 2012 software was used for the preparation of the database, and the analysis was performed using the statistical software Epi-info 7.0 and SPSS 20.0. The results are presented as absolute and relative frequencies, averages, medians, minimum and maximum values. For comparison between the averages the Mann-Whitney test and Pearson's correlation was used to assess the association between numerical variables with pain scores.

This study was based on the resolution of the *Conselho Nacional de Saúde* [National Health Council] in the period of the study – number 196/96 and had the consideration and approval of the research ethics committee of the *Instituto de Medicina Integral de Pernambuco* [Institute of Integral Medicine of Pernambuco] under protocol number 03198212.1.0000.5201.

Results

The sample showed a slight male predominance (51.3%), aged over 60 years old (56.41%, 60.33±11.73 years). Regarding the socio-demographic variables, there were incomes up to three minimum wages (51.3%), without labor activity (64.1%), from the capital and metropolitan region of Recife (84.6%), educational level until 15 years (64.1%) (Table 1).

The chest pain had retrosternal presentation isolated in 51.3% of the cases and radiation combined in more 33.3%. The atypical chest pain, encompassing stabbing pain, right hemithorax, with improvement after the use of painkillers, among others, occurred in only 15.4% of the patients who were diagnosed with non-cardiogenic pain (Table 1).

The majority of the patients were coming from other health units (64.1%), being the first service in 35.9% of the cases. The transportation of these patients occurred in 79.49% by ambulances and other services, with only six cases (15.38%) done by the Mobile Emergency Care Service (table 1).

Table 1 - Distribution of patients attended with chest pain in a reference cardiac emergency unit by sociodemographic and clinical characteristics

Variables	n (%)
Sex	
Male	20 (51.3)
Female	19 (48.7)
Age (in years)	
0-60	22 (56.4)
> 60	17 (43.6)
Labor activity	
Inactive	25 (64.1)
Active	14 (35.9)
Provenance	
Countryside	6 (15.4)
Capital	17 (43.6)
Recife's metropolitan region	16 (41.0)
Income (minimum wage*)	
0-3	20 (51.3)
>3	19 (48.7)
Years of study	
0-4	10 (25.6)
5-10	5 (12.8)
10-15	10 (25.6)
>15	14 (35.9)
Location of pain	
Retrosternal	20 (51.3)
Retrosternal with radiation	13 (33.3)
Atypical	6 (15.4)
Origin	
Home	7 (17.9)
Street	7 (17.9)
Another health unit	25 (64.1)
Form of access to the service	
Own transportation	2 (5.1)
Other ambulance services	31 (79.5)
Mobile Emergency Care Service	6 (15.4)

*Minimum wage = R$ 622.00 / US$ 230.00

Concerning their personal health history, overweight and obesity were found in 35.9% of the patients, being the average of body mass index 24.6±2.6 kg/m^2, diabetes in use of oral hypoglycemic drugs (33.3%) and insulin (20.5%), hypertension

drug treatment in 79.5% of the cases, low frequency or denial of alcohol consumption in 76.9%, smoking in 46.1%. Out of the patients 28.2% had history of cerebrovascular accident and 35.9% had a previous diagnosis of any heart diseases before the onset of chest pain (table 2).

Table 2 - Personal health history of patients with chest pain in a cardiac emergency unit

Variables	n (%)
Weight	
Normal	25 (64.1)
Overweight and obesity	14 (35.9)
Diabetes	
Denies / Does not know	18 (46.1)
Using oral hypoglycemic drugs	13 (33.3)
Using insulin	8 (20.5)
Hypertension	
Denies / Does not know	8 (20.5)
Drug treatment <2 years	4 (10.3)
Drug treatment between 2 - 5 years	10 (25.6)
Drug treatment between 6 - 10 years	8 (20.5)
Drug treatment > 10 years	9 (23.1)
Alcohol consumption (times per week)	
Denies consumption	13 (33.3)
1	17 (43.6)
2 - 3	5 (12.8)
+ 3	4 (10.3)
Smoking (cigarettes/day)	
Denies use	21 (53.8)
Up to 10 cigarettes a day	15 (38.5)
> 10 cigarettes per day	3 (7.7)
Previous heart disease	
Yes	14 (35.9)
No	25 (64.1)
Stroke	
Yes	11 (28.2)
No	28 (71.8)

The average chest pain of the sample was of 5.1±1.6 points, with higher scores among men (6.0±1.6, median 6) compared to women (4.3±0.9, median 4) (p<0.001). (Table 3) Although there is no significant difference between the pain scores in the age group over 60 years old (p=0.16), there was a moderate association between decreased age and increased values of referred pain (p=0.012), corroborating with higher averages among youngsters (Table 4). There was no significant difference among the pain averages concerning the work activity (p=0.42), hypertension (p=0.38), alcohol use (p=0.83), smoking (p=0.26), sedentariness (p=0.11), previous diagnosis of heart disease (p=0.16) or previous stroke (p=0.33). (Table 3) Non-diabetic patients had higher average of self-reported pain (6.3±1.5, median 6.0) compared to diabetic patients (4.2±1.0, median 4.0) (p<0.001) (Table 3).

Table 3 - Assessment of the value of reported chest pain according to socio-demographic and clinical characteristics of the sample

Variables	Average ± SD	Median	Mín-Máx	p*
Sample	5.1±1.6	5	3.0 - 9.0	
Men	6.0±1.7	6	3.0 - 9.0	<0.001
Women	4.3±0.9	4	3.0 - 6.0	
Up to 60 years old	5.5±1.9	6	3.0 - 9.0	0.16
> 60 years old	4.6±0.9	5	3.0 - 6.0	
Active	5.3±1.7	5	3.0 - 9.0	0.42
Inactive	4.9±1.6	4	3.0 - 8.0	
Diabetic	4.2±1.0	4	3.0 - 6.0	<0.001
Nondiabetic	6.3±1.5	6	4.0 - 9.0	
Hypertensive	5.9±2.4	6	3.0 - 9.0	0.38
Nonhypertensive	4.9±1.3	5	3.0 - 8.0	
Alcohol use	5.2±1.6	5	3.0 - 8.0	0.83
Do not use alcohol	5.1±1.7	5	3.0 - 9.0	
Cigarette use	5.4±1.7	5	3.0 - 9.0	0.26
No cigarette use	4.8±1.6	4	3.0 - 8.0	
Sedentary	5.9±2.0	5	3.0 - 9.0	0.11
Non-sedentary	4.8±1.2	5	3.0 - 7.0	
Cardiac disease	5.6±1.5	5	3.0 - 8.0	0.16
No cardiac disease	4.9±1.6	5	3.0 - 9.0	
Previous stroke	5.5±1.6	5	3.0 - 8.0	0.33
No previous stroke	5.0±1.6	5	3.0 - 9.0	
Delta t <12h	5.9±1.8	6	3.0 - 9.0	0.02
Delta t ≥ 12h	4.5±1.1	5	3.0 - 6.0	

* Mann-Whitney Test

There was a higher pain average among patients with up to 12 hours after the onset of symptoms (5.9±1.8, median 6.0) in relation to those who waited for more than 12 hours (4.5±1.14h median 5.0) (p=0.02), verifying a moderate association between the time from the onset of symptoms until the arrival at the emergency unit (delta t) and pain score (r=0.34,

p=0.035). (Tables 3 and 4) The delta t of the sample was of 14.9±8.5h. Blood pressure levels on admission were: systolic blood pressure of 145.1±17,1mmHg and diastolic of 88.4±13,5mmHg, both with weak association (r=0.24) and moderate (r=0.30) with the pain score, but without statistical significance (p=0.135 and 0.065, respectively) (Table 4).

Table 4 - Correlation between the value referred for chest pain in patients attended in a cardiac emergency unit with age, blood pressure, body mass index and interval between the onset of symptoms and attendance

Variables	Average ± SD	*r**	p
Age	60.3 ± 11.7	-0.4	0,012
Systolic blood pressure	145.1 ± 17.1	0.24	0,135
Diastolic blood pressure	88.4 ± 13.5	0.30	0,065
Body mass index	24.6 ± 2.6	0.11	0.49
Delta t	14.9 ± 8.5	0.34	0,035

* Pearson's correlation coefficient

Discussion

Diseases of the heart and of the circulatory system are still the leading cause of deaths in Brazil, accounting for nearly 32% of all deaths[11]. Acute myocardial infarction is still a major cause of morbidity and mortality. The breakthrough that occurred in the treatment of myocardial infarction through reperfusion with fibrinolytic therapy or through primary angioplasty was not enough to prevent it from continuing with high morbidity and mortality.

The sociodemographic profile of the sample was similar to other studies, revealing mainly an average age above 60 years old, a slight predominance of males and the presence of cardiovascular risk factors classically reported in the literature[4,12-14]. Lower income favors diseases and complicates the recognition of the signs and symptoms of acute myocardial infarction[12].

The significant association between the score assigned to the chest pain and delta t found corroborates other studies that also found the fastest search for service of patients with higher pain intensity[6]. A previous study also showed lower averages of pain for diabetic patients compared with non-diabetic ones, and in other international researchers found bigger complications related to the diabetic group[1,15]. Overweight and obesity were present in frequencies above the Brazilian population, and even not having significant association with pain values, they are important modifiable risk factors for the event[4,11,13]. The presence of overweight and obesity in national studies with patients who have acute coronary syndrome in emergency attendance has been found until a frequency of 77%[4].

The percentage of atypical presentations for chest pain found in the sample may hinder the search for emergency services. The symptoms of heart attack can be mistaken for gastrointestinal, muscular and respiratory symptoms, increasing the delay for attendance[9,16]. Chest pain associated with other symptoms such as syncope and dyspnea, are more likely to motivate the search for specialized care[17].

A national study found that 53% sought the service within 12 hours, with worse outcomes for patients who exceeded this time and that only 36.5% of the sample acknowledged that the symptoms were cardiovascular, mistaking them up with food or drug poisoning (8.5%)[12]. Female gender, more comorbidities, longer duration of symptoms, transport by means other than an ambulance were reported in an international study as pre-hospital risk factors for the delay in the administration of thrombolytic therapy[7]. A recent Iranian study found that a delay in the administration of thrombolytic therapy was related to retardation in recognizing the event as a cardiac problem or to recognize the gravity of the symptoms, increasing in up to 2 hours the delta t[7]. Another study sample revealed that the reasons to seek specialized services were in 66% of the cases, no longer putting up with the pain, and 33% who might die; while the non-recognition of the gravity was the

main factor that favored the procrastination[5].

The need for early reperfusion is crucial for good prognosis of myocardial infarction. The average delta t (14.9±8.5) over 12 hours, and the association with worsening of the pain, worsens the prognosis of patients by taking away from patients the possibility of reperfusion. Considering that most of the patients came from other services (64.1%), one should reflect on the use of fibrinolytic agents in fixed and mobile pre-hospital environment. Transport by ambulance (94.9%) was not enough to reduce high delta t, considered as a factor that facilitates access to the service, probably due to the time spent in the attendance on the first unit[18]. A recent Brazilian study in a reference center also presented high delta t in the general sample (9h5min±18h9min), considering averages of other countries and lower values when the transportation was done by ambulances (7h4min±11h3min)[17-19].

It is known that the distance between the residence and the reference attendance unit worsens the prognosis in several cities and the reperfusion therapies end up centralized in references units[20]. Studies verifying the alternative of reperfusion in the pre-hospital environment in the Brazilian health system showed that it improves survival and reduces the cost compared to in-hospital thrombolysis[21]. The development of protocols for hospital emergency units is also crucial in order to reduce waiting time and to favor thrombolysis, considering the limited therapeutic pre-hospital approach[8].

Conclusion

Chest pain has its own characteristic presentation, widespread among health professionals. Then, nurses, who are directly involved with the attention to acute myocardial infarction, should know this clinical condition very well and how to interpret it and to differentiate cardiogenic pain.

In primary prevention, health education can minimize its effects indirectly, by addressing risk factors, control of hypertension and diabetes, or directly, clarifying the population about the early signs and symptoms of acute myocardial infarction. Knowledge about chest pain and what it represents should be widespread for patients to acknowledge it and seek early attendance, avoiding the delay due to self-medication or for not making association with the severity and cause of the cardiogenic episode.

Within the secondary prevention, it is of paramount importance for nurses the knowledge about chest pain, considering that it is responsible for the welcoming and risk classification in emergency services. This understanding gives nurses the option to prioritize chest pain and start the attendance as soon as possible. From the perspective of the reference system of the current organization of health care networks in the cities, there is sufficient evidence of the need for thrombolysis in pre-hospital care. Moreover, in coronary care units, protocols for attendance of chest pain should be well designed and be known by everyone involved, reducing the in-hospital delay to the reperfusion therapy.

This study was limited by the small sample size, as it reflects the early months of attendance to urgency and emergency cardiac cases in the health unit. However, it proved to be of great value in the initial moment of planning and adjustments through which the service has gone, to improve the attendance to chest pain and implement an institutional assistance protocol.

Collaborations

Gomes ET, Queiroga AV, Araujo NR and Bezerra SMMS contributed to the design, analysis, interpretation of data, drafting of the article and final approval of the version to be published. Gomes ET contributed to the data collection, statistical analysis, data interpretation and writing of the article.

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