Incidence of chest pain as a symptom of acute myocardial infarction in an urgent care unit

Incidência da queixa de dor torácica como sintoma de infarto agudo do miocárdio em uma unidade de pronto-atendimento

Andreia Valeria de Souza Miranda[1], Luís Fernando Rampellotti[2]

ABSTRACT

BACKGROUND AND OBJECTIVES: Chest pain is one of the main reasons why individuals seek urgent and emergency services. It is a symptom that may suggest several pathologies, among which the acute coronary syndrome, which makes differential diagnosis difficult. The objective of this study was to identify the incidence of chest pain confirmed as acute myocardial infarction in an urgent care unit in the city of Joinville; and specifically to describe the epidemiological profile of patients with chest pain due to acute myocardial infarction, regarding gender, age, type of acute myocardial infarction and cardiac enzyme alterations; identify how individuals described the symptom; to recognize other factors causing chest pain and to know the incidence of chest pain related to non-cardiac causes.
METHODS: Documentary study, descriptive and quantitative approach.
RESULTS: The incidence of chest pain as a symptom of acute myocardial infarction corresponded to 1% of the sample, affecting males. Several other causes were pointed out stemmed from the international code of diseases to seek care for this complaint.
CONCLUSION: The study evidenced the relevance of this complaint in emergency and urgent care units and the need to recognize the clinical manifestations and acute myocardial infarction screening for differential diagnosis.
Keywords: Angina, Chest pain, Infarction.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor no peito é um dos principais motivos que levam os indivíduos a buscarem serviços de urgência e emergência. Trata-se de um sintoma que pode sugerir diversas doenças, dentre as quais a síndrome coronariana aguda, o que dificulta o diagnóstico diferencial. O objetivo principal deste estudo foi identificar a incidência de dor torácica confirmada como infarto agudo do miocárdio em uma unidade de pronto-atendimento do município de Joinville; e os específicos foram: traçar o perfil epidemiológico dos pacientes com dor torácica por infarto agudo do miocárdio quanto ao sexo, faixa etária, tipo de infarto agudo do miocárdio e alterações de enzimas cardíacas; identificar o modo como os indivíduos descreveram o sintoma; reconhecer outros fatores causadores de dor torácica e conhecer a incidência de dor torácica relacionada a causas não cardíacas.
MÉTODOS: Estudo documental, descritivo e de abordagem quantitativa.
RESULTADOS: A incidência de dor torácica como sintoma de infarto agudo do miocárdio correspondeu a 1% da amostra, acometendo indivíduos do sexo masculino. Diversas outras causas foram apontadas, a partir do código internacional de doenças, para a procura de atendimentos por essa queixa.
CONCLUSÃO: O estudo evidenciou a relevância dessa queixa nas unidades de urgência e emergência e a necessidade do reconhecimento das manifestações clínicas e triagem do infarto agudo do miocárdio para o diagnóstico diferencial.
Descritores: Angina, Dor no peito, Infarto.

Andreia Valeria de Souza Miranda - https://orcid.org/0000-0002-1730-4225;
Luís Fernando Rampellotti - https://orcid.org/0000-0002-0346-8747.

1. Faculdade São Fidélis, Centro Sul Brasileiro de Pesquisa, Extensão e Pós-Graduação, Departamento de Enfermagem, Joinville, SC, Brasil.
2. Faculdade São Fidélis, Centro Sul Brasileiro de Pesquisa, Extensão e Pós-Graduação, Joinville, SC, Brasil.

Correspondence to:
Av. Juscelino Kubitscheck, 627 - Centro
89201-001 Joinville, SC, Brasil.
E-mail: luis.rampellotti@gmail.com

INTRODUCTION

Chest pain is one of the most frequent causes of the search for medical care in urgent and emergency units. However, such a symptom referred to in many different ways is not always related to the manifestation of the acute coronary syndrome (ACS)[1,2].
The relevance and magnitude of the subject have been expressed in world statistics. In the United States, for example, chest pain was the complaint of 5.8 million individuals, out of the 113 million admitted in urgent care units (UCU). According to the world scenario, there are 4 million cases of patients assisted with chest pain complaints per year[3,4].
Cardiovascular diseases (CVD) represent a group of diseases that can cause chest pain symptom, which incidence has

increased in the last decades. In 2011 alone, there were approximately 20 million people affected by CVD worldwide, out of which 12 million died. In Brazil, CVD is the leading cause of mortality, and in 2009 there were 1 million hospitalizations, costing 1.9 billion reais to the Unified Health System (SUS)[3-5].

Regarding the complaint, it may or may not be suggestive of ischemic coronary disease, in which segment angina and acute myocardial infarction (AMI) are included. Therefore, chest discomfort may lead to a cardiological approach or point to other causes. Needless to say that the suspicion of ACS will require a specific clinical approach[1,2].

Regarding the ACS characteristics, it is worth mentioning that angina indicates the involvement of the heart muscle by ischemia. Therefore, there are two main forms of manifestation, unstable and stable angina. While in the first the pain intensity is progressive and does not relieve at rest, the latter presents constant intensity, being perceived under efforts, and relieved by rest. Due to diabetic neuropathy, subjects with *diabetes mellitus* may have an AMI without mentioning pain, and the sweating may be interpreted as hypoglycemia[2]. AMI occurs when the blood supply to the myocardium through the coronary arteries is inefficient to its demands, leading to ischemia and tissue necrosis. In the United States, AMI affects 1 million people per year and is accounts for 466,000 deaths[1,3].

Regarding clinical screening for the diagnosis of AMI, changes in myocardial necrosis markers, especially an increase in troponin combined or not with changes in the electrocardiographic pattern of the ST-segment or pathological Q wave, define the diagnosis and characterize the disease as ACS with or without ST-segment elevation, which occurrence or not, are indicators of the extent of myocardial injury[1].

Together with the ACS as a cause of chest pain, there are others of musculoskeletal, gastrointestinal, psychiatric and pulmonary origin, and they are, in general, benign. On the other hand, there are specific diseases such as acute aortic dissection, pulmonary thromboembolism, hypertensive pneumothorax, cardiac tamponade, and esophageal rupture and perforation, which cause higher mortality than the first[4].

Therefore, given the diversity of diseases and clinical conditions that are manifested by chest pain, the differential diagnosis is difficult and, at the same time, essential to establish the proper approach for the ACS treatment. Consequently, professionals working in urgent care units need to know and recognize the causes, incidence, epidemiological aspects and characteristics of the clinical manifestations of the main causes of chest pain that leads to seeking of medical care[3].

Thus, the overall objective of the study was to identify the incidence of chest pain confirmed as AMI in a UCU. The specifics were to trace the epidemiological profile of patients with AMI-related chest pain regarding gender, age, type of AMI and cardiac enzyme alterations; identify how subjects described the symptom; recognize other factors that cause chest pain, and to know its incidence related to non-cardiac causes.

METHODS

This study was carried based on the graduate thesis of the Nursing course in Urgent Care Unit the School of São Fidélis (CENSUPEG). To develop this study, we used descriptive, documentary research, with a quantitative approach[6]. The research was carried out in an urgent care unit (UCU) in the city of Joinville, SC.

The city of Joinville was founded on March 9, 1851. Today, it has more than 500 thousand inhabitants and one of the highest *per capita* income of Brazil, besides being a big industrial hub.

The city offers urgent and emergency care at two first-aid units (FA) and one UCU, in addition to two public hospital emergency rooms, one pediatric, one obstetric and two privates.

The study was carried at the East UCU, located at Rua Mafalda Laurindo, in the Aventureiro district. The unit is part of the city network of urgent care and is subordinated to the city department of health and maintained with municipal and federal resources. The Aventureiro district is the most populous of the city of Joinville, home to about 40 thousand inhabitants working in the industry, retail and services.

The UCU performs about 500 medical care every 12h, 24h a day, 7 days a week. It provides medical care in internal medicine, general surgery, pediatrics, and dentistry to citizens in a situation of illness or health problem that characterizes urgency and emergency. The Institution adopts the Manchester Classification model.

The study was conducted based on the urgent care records (UCR), filed at the unit and the registry of patient classification in the of *Microsoft Excel Spreadsheet - 2000*, in which all patients, their complaints and the flowchart were inserted.

The medical records of the users who visited the unit from March 1 to 31, 2017, reporting chest pain were selected, and they were classified according to the flowchart number 25 - chest pain. All UCR records from individuals over 18 years of age were selected, with no age limit. The records with incomplete medical care data were excluded.

It was a retrospective study with the purpose of analyzing all UCR records that met the inclusion criteria described. Thus, the initial sample consisted of 310 records.

The data was collected on a spreadsheet (Microsoft Excel 2016), in which the data has been inserted. The variables were: identification (initials), gender (M - male and F - female), age (Arabic numerals) in years, complaint (by numbers representing three major categories of the chest pain complaint [complaint = 1) chest pain, 2) chest pain and left upper limb (LUL) and right upper limb (RUL); 3) chest pain and other symptoms], International Classification of Diseases (ICD - 10), electrocardiogram (A - alteration, S - no alteration, R - performed, NR - not performed) and troponin ([+] altered;] [-] unaltered, R- performed and NR - not performed).

The data were analyzed by simple statistical analysis, arithmetic mean, median, percentage, and mode that gave origin to the tables. The incidence of the chest pain complaint was obtained from the total universe of patients who sought the service during

the study month. The calculations were performed using the Microsoft Excel (2016) software, and the data were organized in descriptive charts[7].

One year was established for the storage of the forms used in data collection, under the responsibility of the researchers. After this period the forms were shredded to make the information unusable. Any form of scientific disclosure was carried out without the identification of participants.

This research followed the legal requirements. This project was submitted to the Development and Structure Program of the Unified Health System - ProgeSUS, - of the City Secretary of Health of Joinville, to request admission to the study site, having been approved (Official Letter 118/2017 / SMS/GAB/GGE/NARAS).

RESULTS

The study analyzed 300 UCR that met the proposed inclusion criteria in March. Ten records were excluded due to ICD-10 non-observance.

Regarding the epidemiological characteristics of patients who sought care for chest pain in a UCU, the majority were women (58.66%). Regarding age, there was an expressive demand from young adults between 18 and 30 years with this complaint, accounting for 83 (27.66%) of the total visits.

The age group between 31 and 50 years and above 51 accounted for 112 (37.33%) and 105 (35%) respectively, with a mean age of 43 years (Table 1).

Concerning the description of the complaint among the three categories in which chest pain was grouped, according to the description of the classifier in the UCR record, complaint 1, chest pain, had a frequency of 139, while complaint 2, chest pain and RUL or LUL had a frequency of 32, and complaint 3, chest pain and other symptoms appeared 129 times. It was observed that only 32 individuals presented typical chest pain, while 129 (43%) patients had, besides chest pain, associated symptoms such as dizziness, palpitation, sweating, nausea, vomiting, among others.

As for the management of the complaint during the clinical care, 135 electrocardiogram tests were requested, and the cause of 165 (55%) chest pain cases was determined without the need of additional diagnostic exams. In addition, cardiac enzyme collection was requested for 74 (24.66%) individuals.

Among the medical assistance, there were three cases of AMI, corresponding to 1% of the sample. Still on the findings, among the AMI, two were diagnosed by the alteration in the electrocardiographic tracing, namely ST-segment elevation and one case by elevated troponin level.

As for the symptoms, none of them had chest pain radiating to the LUL. Two had only chest pain, and one had chest pain associated with other symptoms. Regarding gender, the three cases were male. On the other hand, there was age dispersion in the selected categories. Therefore it was not possible to relate this data to the findings of other authors. Table 2 shows the data on the diagnosis of AMI.

Table 2. Epidemiological profile of patients diagnosed with acute myocardial infarction in March 2017 in the urgent care East unit

Gender	Age (years)	Complaint	Electrocardiogram	Troponin
Male	41	1*	SST	NR
Male	22	1**	SST	NR
Male	65	3**	Normal	Altered

*chest pain; ** chest pain and other symptoms; SST = ST-segment elevation; NR = not performed.
Source: authors (2018).

The study also identified other causes for chest pain complaints, grouped according to ICD-10, described by the organic systems affected by these diseases in the following order of incidence: respiratory/pulmonary, musculoskeletal, nervous and gastrointestinal, shown in table 3.

Table 3. Main causes of chest pain grouped by organic systemic groups according to ICD-10 of patients with chest pain attended in March 2017 in the urgent care East unit

Organic systems	Frequency (n and %)
Respiratory/pulmonary	54 / 18
Musculoskeletal	39 / 13
Nervous	33 / 11
Cardiac	14 / 4.7
Gastrointestinal	10 / 3.3
Cases described as symptoms and not as diagnosis	150 / 50

Source: authors (2018).

The cases described by the ICD-10 corresponding to symptoms and/or did not have the cause defined accounted for half of the sample and may be related to the ICD-10 non-observance of the diagnostic conclusion or the diagnostic vagueness of this complaint at the moment of care.

DISCUSSION

The predominance of female subjects who seek the urgent care units because of chest pain complaint found in the study cor-

Table 1. Epidemiological characterization of patients with complaints of chest pain assisted in the East urgent care unit in March 2017

Gender		Age group (years)			Electrocardiogram			Enzymes		
Male	Female	Average	Mode	Median	R	NR	A	R	NR	A
124	176	43.30	21	43	135	165	2	74	225	1

R = performed; NR = not performed; A = altered.
Source: authors (2018).

roborates the study by Araújo and Marques,[2] in which chest pain was also predominantly female, accounting for 70% of the sample.

Regarding chest pain as an AMI symptom, Mussi, Ferreira and de Menezes[8] pointed out that the AMI treatment in women usually starts later than in men, since they relativize the symptoms from resistance to pain and because professionals, in general, attribute to a psychological factor. In the present study, there were no women affected by AMI, although this was the largest group with this pain complaint.

As for age, the expressive demand for young adults was also observed in the study by Missaglia, Nerins and Silva[3] in which this frequency reached 50%. Similar studies, such as Araújo and Marques[2], Missaglia, Neris and Silva[3] showed frequencies of 40% for individuals aged between 50 and 59 years and 49% for individuals between 41 and 50 years, respectively. These authors also noted that the age above 60 years is the age group with the highest incidence, a fact that in this study is statistically close to the described studies, although the largest number was not in this age group.

Reggi and Stefanini[1] suggest that associated symptoms like dizziness, palpitation, sweating, nausea, vomiting, among others, are more frequent than chest pain radiating to the LUL, a fact pointed out as useful for the differential diagnosis, as well as a sentinel for old or diabetic patients who may have an AMI and not present the typical symptoms.

Similar studies by Missaglia, Neris and Silva[3] and Araújo and Marques[2] have shown that about 10% of chest pain complaints are confirmed as AMI. Thus, in this unit, this mean was lower than in other studies since it indicated an incidence of 1% in the sample. Although 74 individuals (24.7%) have been submitted to cardiac enzyme test, only 3 (1%) were confirmed as AMI, out of which only one individual required laboratory tests to confirm the diagnosis, and all the other 73 patients had this non-related ACS complaint.

A study by Barbosa et al.[4] states that many patients are submitted to the ACS protocol due to diagnosis limitations, some of which could be overcome by more detailed and accurate clinical screening and the patient's history.

The higher incidence of AMI in males, corresponding to the three cases confirmed in this study, corroborate the studies described.

Besides the male predominance, Dessotte, Dantas and Schmidt[9] showed an average age of 55.8 years of patients diagnosed with AMI, the youngest being 25.4 years old and the oldest 79.4 years. This data is very similar to those obtained in this study, an average of 42.6, and ages of 22 years for the youngest and 65 for the oldest. These authors identified that most of the patients with AMI also had risk factors for coronary artery disease, such as hypertension, smoking, obesity, and dyslipidemia, which were not analyzed in this study.

Regarding clinical manifestation, none of the patients diagnosed with AMI reported typical pain. In the study, there were two cases of patients who reported only chest pain and one case (33.3%) of atypical complaint frequency, which is similar to the frequency reported by Reggi and Stefanini[1].

About 50% of the AMI cases showed a change in the ECG tracing with ST-segment elevation. In this study, of the three confirmed cases, two had altered electrocardiograms, that is, 66.7%, similar to the study by Mansur et al.[10]. The same authors[10] stated that there was a 91% specificity of the diagnosis by this method, which may justify why no tissue necrosis markers test, also called cardiac enzymes, was performed in the UCU.

The study showed that the cardiac causes are not the first cause of chest pain, and among the cardiac causes AMI is one of the diseases, but there are others, as also identified in a study by Barbosa et al.[4].

From the perspective of the diversity of etiologies for this complaint, the performance and attention of the healthcare professional as the patient arrives at the emergency service are determinant for the proper clinical approach. The knowledge about the ACS symptoms and the patient's history by the risk classification nurse to identify the predisposing factors determine the prioritization of the care, the approach, and early intervention when necessary[11].

Therefore, although the great majority of the chest pain complaints are not confirmed as AMI, the morbidity and mortality associated with chest pain attributed to cardiac etiologies drive the care in the clinical screening of this symptom.

On the other hand, in the study by Missaglia, Neris and Silva[3], cardiac causes accounted for a significant part of the sample. It is worth mentioning that that study was performed in a reference cardiologic emergency room, which may justify the dissonance with this and other similar studies in which the so-called "unspecified" or "unknown" causes were also more frequent than coronary causes, although there was no agreement for the incidence of various diseases[4,12,13].

CONCLUSION

Chest pain is a frequent complaint in the UCU with prevalence in female subjects.

The complaint of chest pain as an AMI symptom represented a small portion of the sample, below the incidence in similar studies.

There was a significant vagueness of the cause of the chest pain complaint. This may be related to the non-observance of the ICD-10 with the diagnostic conclusion or diagnostic vagueness of this complaint at the time of care.

REFERENCES

1. Reggi S, Stefanini E. Diagnóstico das síndromes coronarianas agudas e modelo sistematizado de atendimento em unidades de dor torácica. Rev Soc Cardiol Estado de São Paulo. 2016;26(2):78-85.

2. Araújo RD, Marques IR. Compreendendo o significado da dor torácica isquêmica de pacientes admitidos na sala de emergência. Rev Bras Enferm. 2007;60(6):676-80. Parte inferior do formulário.

3. Missaglia MT, Neris ES, Silva ML. Uso de protocolo de dor torácica em pronto atendimento de hospital referência em cardiologia. Rev Bras Cardiol. 2013;26(5):374-81.

4. Barbosa AC, Silva AS, Cordeiro AA, Ribeiro BN, Pedra FR, Borges IN, et al. Diagnóstico diferencial da dor torácica: ênfase em causas não coronarianas. Rev Med Minas Gerais. 2010;20(2Suppl 1):S24-9.

5. Huguenin FM, Pinheiro RS, Almeida RM, Infantosi AF. [Characterization of the variation of health care taking into account the costs of hospital admissions for acute

Miranda AV and Rampellotti LF

myocardial infarction a in Brazilian Unified Health System]. Rev Bras Epidemiol. 2016;19(2):229-42. English, Portuguese.

6. Severino AJ. Metodologia do Trabalho Científico. 24ª ed. São Paulo: Cortez Editora; 2016.

7. Batistti ID, Batistti G. Métodos Estatísticos. Ijuí (RS): Coleção Educação a Distância. Série Livro-texto. Editora Unijuí. 2008. 80p. Disponível em: http://bibliodigital.uni-jui.edu.br:8080/xmlui/bitstream/handle/123456789/277/Métodos estatísticos.pdf.

8. Mussi FC, Ferreira SL, de Menezes AA. [Experience of women in face of pain from acute myocardial infarction]. Rev Esc Enferm USP. 2006;40(2):170-8. Portuguese.

9. Dessotte CA, Dantas RA, Schmidt A. [Patients symptoms before a first hospitalization due to acute coronary syndrome]. Rev Esc Enferm USP. 2011;45(5):1097-104. Portuguese.

10. Mansur PH, Cury LK, Destro-Filho JB, Resende ES, Destro JP, de Oliveira LM, et al. [Analysis of electrocardiographic recordings associated with acute myocardial infarction]. Arq Bras Cardiol. 2006;87(2):106-14. Portuguese.

11. Caveião C, Santos RB, Montezeli JH, Visentin A, Brey C, Oliveira VB. Dor torácica: atuação do enfermeiro em um pronto atendimento de um hospital escola. Rev Enferm Cent O Min. 2014;4(1):921-8.

12. Domingues GR, Moraes-Filho JP. Dor torácica não-cardiogênica. Arq Gastroenterol. 2009;46(3):233-40.

13. Gal PL, Teixeira MJ, Bergel RH, Jacobsen WG, Dor torácica. Rev Med. 2001;80(ed. esp. pt.2):341-50. Disponível em: http://www.revistas.usp.br/revistadc/article/view/69990.