INTEGRATIVE REVIEW ARTICLE

SIGNS, SYMPTOMS AND COMPLICATIONS OF ACUTE MYOCARDIAL INFARCTION

SINAIS, SÍNTOMAS E COMPLICACIONES DEL INFARTO AGUDO DEL MIOCÁRDIO

Abstracts are written in plain text as per the requirements.
INTRODUCTION

In Brazil, cardiovascular diseases have been the main cause of death since the 1960s, representing a relevant percentage of all hospitalizations in the country.¹ Acute myocardial infarction (AMI) was the leading cause of death throughout the country, accounting for 8.76 million of all deaths by 2015.² According to the Department of Information Technology of the National Health System (DATASUS), in 2016, 107,409 hospitalizations and 12,215 deaths were recorded for AMI.³ The third universal definition of AMI, in terms of pathological features, is the death of cardiomyocytes due to prolonged ischemia.⁴ The most common symptom of AMI is thoracic discomfort, which is manifested in 75% to 80% of patients, patients, in the form of “burning, indigestion, weight, tightness, oppression, suffocation, pain or pressure”, that can last for about 30 minutes and can be constant and disappear, or be relieved with eructation.⁵ According to the American Heart Association, among the main causes of cardiovascular disease are poor living habits and health behavior, especially for AMI and Stroke, which include: smoking / tobacco use, obesity, sedentary lifestyle, high fat and sodium diets, family history and genetics of heart disease, high levels of cholesterol and other blood lipids, systemic arterial hypertension, diabetes mellitus and metabolic syndrome.⁶

Given the relevance of the theme and the character of increasing morbidity and mortality in Brazil, this integrative review of the literature will contribute to the knowledge related to the early identification of the disease (both among health professionals, and in the population in general), subsidizing clinical Nursing practice.

OBJECTIVE

- To analyze the scientific productions regarding the frequency of signs, symptoms and complications of acute myocardial infarction.

METHOD

Integrative review made from six stages: identification of the theme and selection of the guiding questions of the research; establishment of criteria for inclusion and exclusion of studies; definition of the phenomena related to acute myocardial infarction to be extracted from the results of the original articles; evaluation of selected articles in the integrative review; interpretation of results; presentation of the knowledge evidenced by the integrative review.⁷

The integrative literature review can be defined as a broad review method that includes experimental and non-experimental research, aiming at the best understanding about a phenomenon and allowing the summary of the state of knowledge about a specific subject, indicating, from that scientific gaps that need to be met with the execution of new research.⁷ ⁸

The purpose of this review was to identify the terms related to the signs, symptoms and complications of AMI being guided by the following guiding questions: What are the antecedent signs and symptoms of AMI? What are the signs and symptoms related to AMI complications?

A search was performed between August 2015 and December 2015 in the Latin American and Caribbean Literature on Health Sciences (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) and Cumulative Index to Nursing & Allied Health Literature (CINAHL) with the descriptors: “Nursing care”, “Nursing diagnosis”, “classification” and “acute myocardial infarction”, two to two in Portuguese, English and Spanish. The temporal cut used was the selection of scientific articles extracted from these databases between 2010 and 2014. The criteria for inclusion of the articles were: original articles, presenting, in their results, signs, symptoms or complications of AMI and have abstracts available in the databases. Exclusion criteria were: papers presented at congresses, dissertations, monographs, theses, letters to the editor, reflection studies, articles on other topics or on AMI, but that did not bring signs, symptoms or complications and articles without a summary available.

We found 1187 articles divided into the following databases: 51 articles in LILACS, 951 in MEDLINE and 185 in CINAHL. Of this total, 68 were excluded because they were without the abstract available. Thus, 1119 articles were selected for reading the abstracts. Of these, 33 were excluded because they were repeated, leaving 1086 articles remaining. Then, another 966 articles were also excluded because they did not meet the inclusion and exclusion criteria. Finally, 122 articles were included in this integrative review (ten with qualitative design and 112 with quantitative) (Figure 1).
The researches were carried out, independently, by two researchers (the main author of the study and its counselor). The selection of the studies was made from the analysis of the titles, abstracts and full texts of the publications. It is worth mentioning that, in situations of divergence, they were resolved through consensus. The articles included in the review that were not initially available in the databases were obtained in the full text format on the Coordination of Improvement of Higher Education Personnel Portal (CAPES).

The organization of the data was made from the elaboration of a structured instrument containing the database; the name of the magazine; the type of study; the study sample; the country in which it was carried out; and the level of evidence. The process of analysis of the 122 articles selected was based on the exploratory and critical reading of the titles, abstracts and results of the research, in which the AMI-related phenomena (signs, symptoms and complications) were searched.

Regarding the evidence of the studies, they were classified, considering the hierarchy of evidence for intervention studies, in: Level I - systematic review or meta-analysis; Level II - controlled and randomized studies; Level III - controlled studies without randomization; Level IV - case-control or cohort studies; Level V - systematic review of qualitative or descriptive studies; Level VI - qualitative or descriptive studies and Level VII - opinions or consensuses.

When considering the analysis of the original articles and excluding the integrative or systematic reviews of the literature, as well as articles of expert opinions, as mentioned in the inclusion and exclusion criteria, only articles with levels of evidence II, III, IV I heard.

RESULTS AND DISCUSSION

Most articles were found in the MEDLINE database, with 104 articles (85.24%), followed by CINAHL and LILACS, with nine articles and eight articles, respectively (7.37%, 6.55%). Of this total of 122 articles selected, only 13 were conducted in Brazil, 26 studies were conducted in the United States and the rest in several European, Asian and South American countries, as shown in figure 2.
<table>
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Cardiovasc Imaging
Passinho RS, Sipolatti WGR, Fiorese M et al.

Signs, symptoms and complications of...
Concerning the level of evidence of the selected articles, only nine presented level II (controlled and randomized studies), in which an experiment was performed with individuals previously randomized to a treatment group or a control group.5

Levels of evidence IV (observational case-control or cohort studies) and VI (qualitative or descriptive studies) prevailed, being found in, respectively, 41 and 72 studies.

Despite the large number of articles selected in the databases on AMI, only 21 were published in Nursing journals.

After reading the articles, the signs and symptoms and similar complications in the clinical manifestations were grouped and, as regards the frequency of appearance in the articles, the most found were (Figure 3).
Chest pain was the most frequent symptom in the articles of this review (75 times). It was also termed chest pain, precordial pain or precordialgia. Described as tight, oppressive, with irradiation to the upper limbs, mandible, dorsum or epigastrium, being accompanied or not by dyspnoea (24 times), cold sweating (seven times), nausea (six times) and vomiting (four times). Such pain is of ischemic origin and is characterized by the sign of Levine (the patient places his hand flat on the center of the precordium). The common discomfort in pain is retrosternal and diffuse. Although it is impossible to characterize the myocardial wall affected by tissue ischemia solely by the location of the pain and its irradiation, there has already been an association between epigastric pain and infarction in the myocardial inferior wall.

Patients presenting with atypical chest discomfort that are similar to the causes of musculoskeletal, postural or pleuritic origin are usually the elderly, diabetics, and women. Diabetics may exhibit the following atypical signs and symptoms: generalized weakness, syncope, dizziness or altered level of consciousness. Some women who have acute coronary syndrome describe a vague chest discomfort that may go away. In addition, they frequently manifest dyspnoea, weakness, unusual fatigue, cold sweating, dizziness, nausea and vomiting, and are twice as likely to die and reinfar in the first few weeks after AMI compared to men. However, not all individuals will present chest pain, such as, some diabetics (due to sensory and autonomic neuropathy), some women and the elderly.

In-hospital mortality due to cardiovascular diseases is higher among patients with known type II diabetes mellitus and with worse glycemic control. Heart failure is one of the most frequent complications after AMI, evidenced 52 times in this review. In relation to the onset of heart

<table>
<thead>
<tr>
<th>Signs, symptoms and complications of AMI</th>
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<tr>
<td>Pain / discomfort chest / rest / effort / restrosternal / type tightness or pressure / stitching / burning / laceration / weight</td>
<td>75</td>
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<tr>
<td>Congestive heart failure (CHF) / Chronic heart failure / Signs and symptoms associated with complicated HF: Pulmonary eardrums; Presence of third heart heart; (moderate or severe heart failure, pulmonary rales, presence of third heart, tachycardia, acute lung edema, and cardiogenic shock), and pulmonary edema / pulmonary congestion / systolic ventricular dysfunction / acute pulmonary edema / / Reinfarction / Left ventricular remodeling / Myocardial revascularization / Decreased cardiac output / Decreased ventricular ejection fraction / Cardiomegaly / Mechanical complications / Septal defects / Cardiogenic shock / hemodynamic instability</td>
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<tr>
<td>Dyspnoea / hyperventilation / Respiratory insufficiency</td>
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<tr>
<td>Arrhythmia / Conduction Disorders (others) / Atrioventricular block / bradycardhythmia / Tachyarrhythmia / Supraventricular tachycardia / Ventricular tachycardia / Atrial fibrillation / Ventricular fibrillation / Palpitation</td>
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<tr>
<td>Irradiation of myocardial ischemic pain: Headache / Abdominal / epigastric pain / Arm discomfort / Hand numbness / Jaw pain / maxillary discomfort / teeth / Back pain / Neck pain</td>
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<tr>
<td>Fatigue</td>
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<tr>
<td>Anxiety / Affliction / Negative affectivity / Adapting to the new reality / Hopelessness / Despair / Feeling of physical or mental pressure / Feelings of shame and guilt / Sadness</td>
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<tr>
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<tr>
<td>Nausea</td>
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<td>Lethargy</td>
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<td>Disturbed sensory perception</td>
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<tr>
<td>Ineffective tissue perfusion</td>
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<td>Heat sensation</td>
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failure and the functional severity of AMI, it is worth mentioning the elaboration of the clinical classification of Thomas Killip III and John T. Kimball, which was first published in 1967 with the purpose of describing the results of the treatment of 250 patients with AMI admitted to a coronary unit at a university hospital in the United States. It was presented based on clinical evidence of heart failure and cardiogenic shock. Thus, functional severity was related to the morbidity and mortality of AMI being classified as: Killip I - no signs of cardiac decompensation; Killip II - with pulmonary crackles, presence of third heart and elevated jugular venous pressure; Killip III - with acute pulmonary edema; and Killip IV - with cardiogenic shock or hypotension and peripheral vasoconstriction.\(^{134-135}\)

Dyspnea was found in 24 articles of this review and means “shortness of breath.” It is a subjective sensation of respiratory discomfort, consisting of qualitatively distinct sensations and varying in intensity. It can be perceived in different ways, such as tightness in the chest, suffocation, shortness of breath or inability to fill the air lung. It is classified as mild, moderate, moderately intense or intense and is considered an anginal equivalent with regard to the manifestations of myocardial ischemia.\(^{136-138}\)

One of the causes of dyspnea in AMI is left ventricular dysfunction, which may be evidenced due to the presence of pulmonary crepitations (or rales), more common in dependent lobes (right and left lung bases). Pulmonary crepitation is caused by sudden reinflation of groups of alveoli and increased fluid in small airways. Sound is like “cellophane crushing” and are more heard during the end of inspiration.\(^{139-140}\)

Arrhythmic manifestations (including tachycardia and bradycardia) are also anginal equivalents of myocardial ischemia and were evidenced 20 times in this review. Bradycardia may occur due to decreased heart rate during ischemia (resulting from hyperactivity of the parasympathetic nervous system) or its drug treatment. It may occur during the management of myocardial ischemia pain with opioid medications or during the prevention of arrhythmias with the use of beta-blockers. Sinus bradycardia may occur in lower-wall AMI, vagal reflexes or even ischemia of the sinus node. It occurs in the form of symptoms of low cardiac output such as syncope or pre-syncope, dizziness, empty headache, weakness, fatigue, decreased level of consciousness, shortness of breath and chest discomfort or pain, in addition to sweating, congestion pulmonary, orthostatic and arterial hypotension, evident heart failure or pulmonary edema, and ventricular tachycardia or frequent premature ventricular complexes related to bradycardia. Tachycardia usually accompanies chest pain and is caused by hyperactivity of the sympathetic nervous system (as well as sweating and hypertension).\(^{132, 139, 141}\)

Signs and symptoms arising from the irradiation of myocardial ischemic pain were found 18 times in this review. Chest discomfort in AMI can radiate to the neck, jaw, teeth, arms, shoulders and in the epigastric region. This reflects the common origin of sensory neurons supplying the heart and these areas from the posterior horn of the spinal cord.\(^{140}\)

In a study carried out with a population of 255 elderly Frenchmen diagnosed with AMI and aged 75 years or older, it was identified that the digestive symptoms, as an atypical presentation of the disease, were present in 9.8% of the sample.\(^{142}\)

Esophageal pain, caused by acid reflux in the stomach, spasm, obstruction, or injury in general is difficult to differentiate from the ischemic chest pain of acute coronary syndrome because the heart shares efferent vagal innervations with the esophagus. In addition, esophageal or abdominal pain may also be related to lower-wall AMI during right ventricular infarction, which is an anginal equivalent of myocardial ischemia.\(^{140, 141}\)

Radiating pain in the jaw / teeth / jaw, observed in people affected by AMI, occurs due to the visceral nociceptive cardiac distribution through the convergence with the trigeminal nerve afferents in the cephalic segment, stimulating the second order trigeminal neurons that also carry sensorial information from the teeth . Therefore, heart pain can be interpreted as tooth or face pain. Characterized as strong to strong and palpation of masticatory muscles does not alter pain (differential diagnosis for pain due to temporomandibular dysfunction).\(^{143}\)

Nausea (six times in the review) and vomiting (four times in the review), are manifested as atypical signs and symptoms of myocardial ischemia, and occur due to reflex stimulation of the center of vomiting due to pain or due to vasovagal reflexes initiated in the infarcted myocardial area.\(^{139}\)

AMI is a condition that interferes in the musculoskeletal system and its associated pathways and compromises an individual's ability to mobilize properly, especially as a result of the signs, symptoms and complications associated with this disease.\(^{143}\)
Fatigue (12 times in review) is conceptualized as a negative emotion. They are feelings of decreased strength and endurance, exhaustion, mental or physical fatigue; lassitude with diminished aptitude for physical or mental work.\(^{116}\)

Weakness (four times in review) is an attribute of fatigue and is conceptualized as synonymous with asthenia (weakness, organic weakness).\(^{145}\) Weakness, weakness, tremor, and activity intolerance are non-specific symptoms of AMI and evidence the reduction in the pumping capacity of the patient.\(^{140}\)

A secondary analysis study of 1270 women with AMI in the United States showed that 48.6% of those in the group classified as having “mild” symptoms presented extreme fatigue and one unusual fatigue.\(^{129}\)

In a phenomenological study in Sweden, with respect to the experience of 17 adults under 55 years of age who had AMI, it was evident that, after survival, there was an intense physical and mental fatigue related to the difficulty of performing the activities they did previously. In addition, the study showed that, in the face of an AMI, regardless of the age at which it occurs, there is a serious danger related to the patient's daily life, leaving him in an uncertain and vulnerable daily situation.\(^{101}\)

In addition to clinical repercussions, AMI has significant changes in quality of life after the occurrence of the acute event. The impairment of the quality of life of these patients is mainly due to limitations in the performance of daily activities. A study conducted in 2012 evaluated the incidence of loss of independence and the decline in physical function after one year of hospitalization in 2002 in patients who underwent AMI in the United States to identify patients vulnerable to declining health status after illness. 43% of the patients studied experienced a decline in their health status; 12.8% lost their independence; 15.2% had physical function decline; and 15% presented a decline in the latter two, concomitantly.\(^{146}\)

In a population-based cohort study, conducted in 2014 with participants who had functional and cognitive limitations after hospitalization for stroke (n = 432) and AMI (n = 450), it was evidenced that most hospital admissions for these diseases were associated with significant increases in patients' functional disability at the time of the event and in the subsequent decade. Functional disability assessed included activities of daily living - ADL (walking, dressing, bathing, eating and going from bed to the bathroom) and instrumental activities of daily living - AIVD (preparing a hot meal, doing shopping at the grocery store, making phone calls, ingesting drugs, and managing one’s own money).

The signs, symptoms and complications of AMI found in this integrative review are important for the early identification of the disease, and will thus contribute to reduce the risks of morbidity and mortality in the adult population. Other signs and symptoms and complications were also found in this study, but, less frequently.

As a limitation of the research, it is possible to point out the non-inclusion of articles written in languages other than Portuguese, Spanish and English.

CONCLUSION

The analysis of the frequency of signs, symptoms and complications of AMI showed that the early recognition of these phenomena in the person affected by the disease, especially chest pain and its ischemic equivalents, will improve the prognosis of the individual with this morbidity.

The results found in this integrative review will contribute to the anticipation of the complications of AMI, both during admission, and in the clinical or mechanical treatment of the disease, providing, nurses, with scientific subsidies to provide quality care based on the integrality and reduction of the sequelae of the disease. morbidity and mortality, through an evidence-based practice.

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