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Abilities of nurses in therapeutic use of alteplase in emergency care unit

ABSTRACT | Objective: to evaluate the abilities of nurses in the therapeutic use of Alteplase, as fibrinolytic therapy, in patients diagnosed with acute myocardial infarction. Method: The research was carried out by means of a transversal, quantitative descriptive study, carried out by means of a questionnaire as a collection instrument, containing 10 multiple choice questions elaborated by the author. The sample consisted of 24 nurses. The data collection was carried out in July 2019, with CAAE No. 13159219.7.0000.5493. The data were analyzed and treated through descriptive analysis. Result: The results showed that the research participants have skills for the handling and applicability of fibrinolytic therapy, Alteplase, in patients affected by acute myocardial infarction. Conclusion: The results show that the nurses have skills in the handling, administration and applicability of Alteplase, as well as in the evaluation of the symptoms and contraindications of the drug in patients affected by Acute Myocardial Infarction. However, it was identified a percentage that present difficulties in performing all activities. Therefore, the study will contribute in the elaboration of protocols to the professionals of the health area involved in a direct or indirect way to the care of patients who need this pharmacological intervention as treatment.

Keywords: Nurse; Fibrinolytic therapy; Alteplase; Myocardial infarction.

RESUMEN | Objetivo: evaluar las capacidades de las enfermeras en el uso terapéutico de la Alteplasa, como terapia fibrinolítica, en pacientes diagnosticados con infarto agudo de miocardio. Material y método: La investigación se realizó mediante un estudio descriptivo cuantitativo transversal, realizado mediante un cuestionario como instrumento de recopilación, que contenía 10 preguntas de opción múltiple preparadas por el autor. La muestra constaba de 24 enfermeras. La recopilación de datos se llevó a cabo en julio de 2019, con el CAAE N° 13159219.7.0000.5493. Los datos fueron analizados y tratados mediante un análisis descriptivo. Resultado: Los resultados mostraron que los participantes en la investigación tienen habilidades en el manejo y la aplicabilidad del tratamiento fibrinolítico, Alteplase, en pacientes afectados por un infarto agudo de miocardio. Conclusión: Los resultados muestran que las enfermeras tienen aptitudes para el manejo, la administración y la aplicabilidad del Alteplase, así como para la evaluación de los síntomas y las contraindicaciones del fármaco en los pacientes afectados por un infarto agudo de miocardio. Sin embargo, se identificó un porcentaje que presenta dificultades para realizar todas las actividades. Por lo tanto, el estudio contribuirá a la elaboración de protocolos para los profesionales de la salud que participan directa o indirectamente en la atención de los pacientes que necesitan esta intervención farmacológica como tratamiento.

Palavras claves: Enfermera; Terapia fibrinolítica; Alteplasa; Infarto de miocardio.

RESUMO | Objetivo: avaliar as habilidades dos enfermeiros, no uso terapêutico do Alteplase, como terapia fibrinolítica, em pacientes com diagnóstico de infarto agudo do miocárdio. Método: A pesquisa foi realizada por meio de um estudo descritivo transversal, quantitativo, realizado por meio de questionário como instrumento de coleta, contendo 10 questões de múltipla escolha elaboradas pelo autor. A amostra foi constituída por 24 enfermeiros. A coleta de dados foi realizada em julho de 2019, com CAAE nº 13159219.7.0000.5493. Os dados foram analisados e tratados por meio da análise descritiva. Resultado: Os resultados mostraram que os participantes da pesquisa possuem habilidades para o manuseio e aplicabilidade da terapia fibrinolítica, Alteplase, em pacientes acometidos por infarto agudo do miocárdio. Conclusão: Os resultados obtidos demonstram que os enfermeiros possuem habilidade para o manuseio, administração, aplicabilidade do Alteplase, bem como na avaliação dos sintomas e contraindicações do medicamento em pacientes acometidos por Infarto Agudo do Miocárdio. Entretanto, foi identificado uma porcentagem que apresentam dificuldades na execução de todas as atividades. Portanto, o estudo contribuirá na elaboração de protocolos aos profissionais da área da saúde envolvidos de modo direto ou indireto aos cuidados aos pacientes que necessitam desta intervenção farmacológica como tratamento.

Palavras-chaves: Enfermeiro; Terapia fibrinolítica; Alteplase; Infarto do miocárdio.

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INTRODUCTION

Cardiovascular diseases are the main causes of death in the world. Annually, 17,1 million people are affected by these cardiovascular diseases and their complications, which can lead to death.¹ It is important to note that, the World Health Organization (WHO) assumes that by 2030, the estimate will reach 23 million deaths due to cardiovascular diseases.¹ The high prevalence of these diseases can be explained both by the increase in the age group of the population and by its exposure to risk factors classically known as, inappropriate eating habits, physical inactivity, smoking, alcoholism, increased prevalence of obesity, stress, in addition to socio-economic factors.²

Among cardiovascular diseases, Acute Myocardial Infarction (AMI) represents an important public health problem in the world and in Brazil, with high rates of incidence, prevalence and mortality.² Barbosa and cols (2019), cite that AMI can lead to the death of up to 7,4 million people annually.²

Acute myocardial infarction (AMI) is currently considered an important public health problem in Brazil.³ Most deaths caused by AMI occur in the first hours of disease onset, with 40% -65% of cases in the first hour and approximately 80% in the first 24 hours. Thus, most deaths from AMI occur outside the hospital environment, generally unattended by doctors.⁴

The best recovery and, consequently, a reduction in the mortality rates of patients after AMI is associated with the effectiveness and quality of medical and nursing care. It is essential that prevention is associated with qualified professionals, modern devices for exams, instructions and information due to the patient are fundamental in reducing the number



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of cases.⁵ In this context, the nurse is the primary professional in the composition of the health team and responsible for the administration of drugs previously established in public health programs and in a routine approved by the health institution. Among these drugs, particularly those that are high-risk and priority, participating in health education programs and activities, aimed at improving the health of the individual, the family and the population in general.⁶

For the treatment and reperfusion of the myocardium after AMI, there are several alternatives and according to the results observed, interventional medications guarantee better patient survival, as well as greater tissue preservation.⁷ Fibrinolytic drugs were the first therapy used for reperfusion for patients with AMI. This class of medication activates the endogenous fibrinolytic system and produces rapid reduction or resolution of the thrombus, restoring coronary flow, with Streptokinase being the first fibrinolytic to demonstrate its effectiveness in the treatment of AMI.⁸ The main side effects of streptokinase are low blood pressure, allergic reactions and bleeding. It is important to note that the re-administration of fibrinolytics in patients with failure of the first dose is not recommended, due to the high risk of bleeding and the lower possibility of reperfusion on the second attempt.⁹

The fibrinolytic agent Alteplase, unlike streptokinase, needs a connection with fibrin to be activated and act in the conversion of plasminogen to plasmin, that is, it is an activator of recombinant human tissue plasminogen, a glycoprotein that activates plasminogen directly to plasmin. When administered intravenously, it remains relatively inactive in the circulatory system. Once bound to fibrin, the substance is activated, inducing the conversion of plasminogen

to plasmin, which, in turn, promotes the dissolution of fibrin from the clot, facilitating local circulation.^{10,11}

Fibrinolytic treatment in acute myocardial infarction, in severe acute pulmonary embolism with hemodynamic instability, and in acute ischemic stroke are therapeutic approved by ANVISA for the use of Alteplase.¹² Therefore, it is of utmost importance that health professionals, especially doctors and nurses who will perform the fibrinolytic therapy procedure, always keep up to date on the mechanisms of action of this medication and its contraindications.¹³ Given the above, this study aimed to assess the ability of nurses in the therapeutic use of Alteplase, as interventional fibrinolytic therapy, its indications, contraindications and adverse reactions, as well as the form of care during its administration.

METHOD

It is a descriptive cross-sectional, quantitative research, which was carried out using a questionnaire as a collection instrument. The research instrument used was developed with the following characteristics:

a) Developed by the authors, ba-

sed on the experience of assisting cardiac patients, based on guidelines and protocols.

- b) Three sections were prepared: Section 1 - Sociodemographic data of the participants; Section 2 - About the AMI containing six multiple-choice questions, with the participant being able to choose more than one answer to the same question; Section 3 - On the therapeutic use of Alteplase, composed of 10 multiple choice questions, the participant being able to choose more than one answer to the same question.

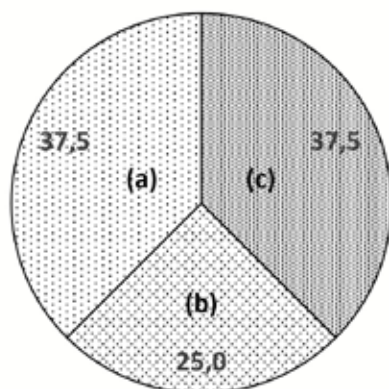
Regarding the questionnaire, it was composed of closed questions, with the answers being available in alternatives, in order to assess the nurses' skills in the use of fibrinolytic therapy, dosage, contraindications, adverse reactions and drug interactions when using Alteplase, in the case of a questionnaire not yet validated. The sample of participants was composed of the teams of nurses from the Urgency and Emergency Unit of the Hospital da Zona Noroeste, the Central Emergency Room and the Emergency Room of the Zona da In-

termediada Zone, in the city of Santos - SP, making a total of 38 nurses among the three units. After the invitation and the established criteria, the sample consisted of 24 professionals who chose to participate in the research. Data collection was carried out in July 2019. Inclusion criteria were considered to be a nurse, a permanent member of the staff of that hospital and who has agreed to participate in the research. The exclusion criteria established were nurses who, during the collection period, were on vacation or on leave and those who did not wish to participate in the research. The impartial analysis of the data collected and the preservation of identity, were identified as follows: a) nurses assigned to the Emergency Room of the Northwest Zone: EZN 1, EZN 2, EZN 3; b) nurses assigned to the Central Emergency Room: EPC 1, EPC 2, EPC3; c) nurses assigned to the Emergency Room in the Mid-Rim Zone: EZOI 1, EZOI 2, EZOI 3. The results were analyzed using the Epi Info™ software (free access) that assists in the analysis of qualitative material, with the coding and text storage tools in specific categories. The data obtained through the software were compiled for Excel® version 1902 of Microsoft Office 365 to be tabulated and subsequently performed a descriptive analysis of the variables. This study was submitted to Plataforma Brasil and to the Ethics and Research Committee of Universidade Anhanguera - Campus Pirituba, with a favorable opinion under CAAE nº 13159219.7.0000.5493, and opinion 3.507.979.

RESULTS

The sample consisted of 24 nursing professionals, 37,5% of whom were allocated to the Zona Noroeste Unit, 25% to the small Hospital and 37,5% to the ZOI Emergency Room Unit.

Figure 1 Distribution of professionals by work unit and the characterization of the participants' socio-demographic variables.



Where: a) nurses from the Zona Noroeste Unit, b) from a Small Hospital and c) from the Emergency Room ZOI.

Table 1: Sociodemographic data of the participants of the Units in the Northwest Zone, Small Hospital and Emergency Room ZOI. Santos - 2020.

| Variável | N | % |
|--|----|-------|
| Gênero | | |
| Masculino | 03 | 12,50 |
| Feminino | 21 | 87,50 |
| Raça | | |
| Branco | 17 | 70,84 |
| Negro | 03 | 12,50 |
| Pardo | 04 | 16,66 |
| Idade | | |
| 31 – 40 anos | 10 | 42,00 |
| 41 – 50 anos | 06 | 25,00 |
| 51 – 69 anos | 08 | 33,00 |
| Tempo de experiência na função | | |
| 6 a 10 anos | 05 | 20,84 |
| 10 a 15 anos | 08 | 33,33 |
| 15 a 20 anos | 02 | 8,33 |
| >20 anos | 09 | 37,50 |
| Grau de Instrução | | |
| Especialização | 20 | 83,34 |
| Mestrado | 02 | 8,33 |
| Doutorado | 0 | 0,00 |
| Tempo de conclusão Especialização | | |
| 1 a 5 anos | 02 | 9,09 |
| 6 a 10 anos | 12 | 54,54 |
| 11 a 15 anos | 03 | 13,64 |
| 16 a 20 anos | 01 | 4,55 |
| >de 21 anos | 04 | 18,18 |

SOURCE: Research data, 2020.

Table 2: Self-perception of nurses about their ability to recognize Acute Myocardial Infarction (AMI), Santos-2020.

| Variável | N | % |
|--|----|-------|
| Caracterização do IAM | | |
| Obstrução total da artéria por trombo | 24 | 100 |
| Obstrução parcial da artéria por trombo | 13 | 54,16 |
| Espasmo arterial | 06 | 25,00 |
| Sintomas do IAM | | |
| Dor precordial irradiada para o braço esquerdo | 14 | 58,34 |
| Dor precordial irradiada para o braço direito | 03 | 12,50 |
| Dor epigástrica | 12 | 50,00 |

Figure 1 shows the distribution of professionals by work unit.

Regarding the nurse's ability to use fibrinolytic therapy, the data are described according to Table 3.

DISCUSSION

The results presented show that the average age of the participants was 45 years old, 70.84% declared themselves white and 87,50% were female. Regarding the time of experience in the function, 37,5% declared to be more than 20 years old. When asked about their abilities to recognize AMI, it was possible to observe that 100% of nursing professionals responded that patients have a total obstruction of a coronary artery by a thrombus, with events such as partial artery obstruction and arterial spasm being observed. The benefits arising from the use of fibrinolytics in patients undergoing AMI treatment in the first hours, demonstrate the relationship between preservation of ventricular function and concomitant to reduced mortality.¹⁴ The study corroborates the data presented by the study by Gusto II B, published in The New England Journal of Medicine where the use of alteplase was used, resulting in a reduction of ten additional deaths per thousand treated patients.¹⁵ In addition, when asked about the symptoms, 58% responded that patients have chest pain radiating to the left arm and 50% indicated that patients may have intense epigastric pain radiating to the dorsal region. About 37% of the participants answered that the patient may not have pain. Regarding the duration of symptoms, 87,50% declare that the pain may have a sudden onset, 83,33% that it may have started a few hours ago, 45,3% a few weeks ago and 50% may be an intermittent pain.

Thus, time is a crucial and determining factor that aims at the nurse

| | | |
|--|----|--------|
| Dor precordial pode irradiar para braço esquerdo, tórax podendo ser confundida com dor epigástrica | 24 | 100,00 |
| Paciente pode relatar ausência de dor | 09 | 37,50 |
| Quanto tempo de dor torácica | | |
| Início súbito | 21 | 87,50 |
| Início há algumas horas | 20 | 83,33 |
| Início há alguns dias | 11 | 45,83 |
| Início há algumas semanas | 08 | 33,33 |
| Dor intermitente | 12 | 50,00 |
| Alterações do Ecocardiograma (ECG) | | |
| Supradesnivelamento de ST em apenas uma derivação | 02 | 8,33 |
| Supradesnivelamento de ST em duas ou mais derivações contíguas | 19 | 79,17 |
| Infradesnivelamento de segmento ST em apenas uma derivação | 01 | 4,17 |
| Infradesnivelamento de segmento ST em duas ou mais derivações contíguas | 01 | 4,17 |
| Complexo QRS alargado ou com detalhes e onda T invertida | 02 | 8,33 |
| Não sabe | 03 | 12,50 |
| Tempo para realização do ECG após a admissão da unidade de assistência | | |
| 10 minutos | 23 | 95,83 |
| 30 minutos | 01 | 4,17 |
| Exames Laboratoriais | | |
| Ureia, Sódio, Potássio, Troponina, Creatinina | 04 | 16,67 |
| CPK, CK-MM, CK-MB, Creatinina, Uréia | 03 | 12,50 |
| Hemograma, CPK, Troponina, Potássio, Sódio | 05 | 20,83 |
| CPK, CK-MB, Troponina, CK-MM | 24 | 100,00 |
| TGO, GGT, CPK, CK-MB | 03 | 12,50 |
| Nãosabe | 01 | 4,17 |

SOURCE: Research data, 2020.

Table 3: Nurses' self-perception about their ability regarding the use of Alteplase, Santos-2020.

| Variável | N | % |
|--|----|-------|
| Pode-se afirmar que a medicação poderá ser diluída em soro fisiológico? | | |
| Sim | 12 | 50,00 |
| Não | 09 | 37,50 |
| Não sabe | 03 | 12,50 |
| O Alteplase pode ser administrado de forma concomitante com outras medicações, no mesmo frasco de infusão e/ou no mesmo acesso venoso de outras drogas? | | |
| Sim | 0 | 0,00 |
| Não | 22 | 91,70 |
| Não sabe | 02 | 8,30 |
| No tratamento do IAM com Supradesnivelamento do segmento ST, na sala de emergência, pode-se utilizar o Alteplase com outras terapias adjuntas? | | |

together with the team to act in order to establish management with speed, efficiency and agility in care, meeting the data presented regarding the recognition of symptoms presented by patients.¹⁶

Another relevant point is the electrocardiogram (ECG), which may show changes, with 80% of the participants reporting that the exam demonstrates ST segment elevation in two or more contiguous leads and 12.50% reported not knowing the changes that the ECG can present. Laboratory tests are usually performed to assist in the diagnosis of the patient with AMI, among them, CPK, CK-MB, Troponin, CK-MM.¹⁷

The diagnostic findings are in line with the literature that supports the diagnosis through the current history of the disease, on the electrocardiogram and on the results of laboratory tests, with the prognosis according to the severity of the coronary artery obstruction of the myocardial injury.¹⁸ After the interview, the results show that 100% of the interviewees reported having knowledge of this conduct.

The time taken to care for a patient with suspected AMI is very important and about 95% of the interviewees demonstrated that care is essential within 10 minutes after its occurrence. The risk of bleeding is very serious and suspicion is an absolute contraindication. About 87% of respondents demonstrated that they are aware of this conduct.

The patient with AMI needs to receive clinical support with thrombolytic therapy or percutaneous angioplasty in order to reduce permanent damage to the myocardial muscle.¹⁹ In addition, the time after the onset of symptoms may also contribute to the success of fibrinolytic therapy. About 16% of participants stated that the time limit of 12 hours after the onset of symptoms is re-

| | | |
|--|----|----------------|
| Sim | 15 | 62,50 |
| Não | 06 | 25,00 |
| Não sabe | 03 | 12,50 |
| Qual o limite máximo de tempo após a ocorrência do IAM o Alteplase poderá ser administrado? | | |
| 06 horas | 19 | 79,16 |
| 08 horas | 1 | 4,16 |
| 12 horas | 04 | 16,68 |
| Sintomas como sonolência, afasia, hemiparesia, convulsão podem ocorrer durante o tratamento | | |
| Sim | 22 | 91,67 |
| Não | 0 | 0,00 |
| Não sabe | 02 | 8,33 |
| Contraindicações absolutas | | |
| Distúrbio hemorrágico significativo | 21 | 87,50 |
| Histórico, evidência ou suspeita de hemorragia intracraniana | 16 | 66,67 |
| Hipertensão grave | 08 | 33,33 |
| Pancreatite aguda | 06 | 25,00 |
| Neoplasia com alto risco de sangramento | 16 | 66,67 |
| Hipersensibilidade ao medicamento | 13 | 54,17 |
| Não sabe | 01 | 4,17 |
| Conhecimento das advertências e precauções | | TOTAL % |
| O látex da embalagem do medicamento pode causar alergia | 07 | 29,17 |
| Múltiplas punções podem interferir no risco de hemorragia | 17 | 0,83 |
| Paciente submetido ao RCP recente | 09 | 37,50 |
| Possibilidade de arritmia e hipotensão grave | 18 | 75,00 |
| Uso do Alteplase pode causar AVC hemorrágico | 08 | 33,33 |
| Não sabe | 03 | 12,50 |

Na escolha da reperfusão cardíaca como estratégia de tratamento, poderá ocorrer a possibilidade de arritmias, podendo evoluir a PCR, podendo utilizar antiarrítmicos convencionais, neste caso cabe ao enfermeiro monitorizar

commended for therapy. According to Sallum and Paranhos, (2010), nurses occupy a prominent place in the care of patients with acute coronary syndromes, with knowledge of this disease, classification and clinical and therapeutic changes in addition to specific care in cardiac care being paramount.²⁰

Regarding the warnings and precautions, 70.8% of the participants reported not knowing that the latex of the packaging can cause an allergic response of the patient, 75% said they knew the possibility of arrhythmia and hypotension and 33% reported that they are aware that Alteplase can cause hemorrhagic stroke. Regarding the preparation of the medication to be administered, 37.50% of the participants said they knew the correct way and the vehicle to be used (specific diluent). Approximately 91% of the participants reported having knowledge that drowsiness, hemiparesis, seizures and aphasia are symptoms that patients may experience during treatment. According to Knobel (2002) the nurse in the face of knowledge and rational approach is able to determine contributions to the adequate and early treatment minimizing complications.²¹

The results obtained in the research are in line with the literature demonstrating that nurses have skills for handling and applicability of the medication, having as a guiding principle the development of care protocols for the most effective nursing care for the patient.

CONCLUSION

Among the results obtained, we can highlight the need for knowledge of the time for administration, the form of administration and the contraindications for the use of this medication. Knowledge of these factors

| | | |
|--------------------------------------|----|-------|
| Alterações hemodinâmicas | 23 | 95,84 |
| Progressão da Insuficiência Cardíaca | 09 | 37,50 |
| Hipotensão | 15 | 62,50 |
| Dor torácica | 0 | 0,00 |
| Não sabe | 0 | 0,00 |

Quanto ao tempo de infusão do Alteplase para o tratamento do IAM, qual o regime de administração deve ser seguido?

| | | |
|--|----|-------|
| 15mg em bolus IV, seguido de 50mg por 30 minutos, seguida de 35mg por 60 minutos, até a dosagem máxima de 100mg em 90 minutos. | 19 | 79,16 |
| Administração de 10mg em bolus IV, seguido de 50mg por 60 minutos, seguida de 10mg por 30 minutos, até a dosagem máxima de 100mg em até 3 horas. | 02 | 8,33 |
| Não sabe | 03 | 12,50 |

SOURCE: Research data, 2020.

is essential, as it is the key element in the treatment of patients with acu-

te AMI and subacute, being based on the prevention of complications,

reduction of hospital stay, mortality and hospital cost.

There is a need for assistance standards that seek the quality, effectiveness and efficiency of the team's work. Continuing health education must be present in all actions, at all levels of care to promote health and prevent diseases, implementing ideas and practices that are part of the daily life of the population and that meets their needs. The study carried out had important limitations with regard to the sample size, which when presented in a small number, allowing to consider the results found only for the population in question. 🐦

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