Clinical Practices Applied To Patients With Myocardial Infarction Non-obstruction Coronary Arteries (Minoca)

RESUMO | Objetivo: Identificar práticas clínicas com resultados favoráveis aos pacientes com diagnóstico de infarto agudo do miocárdio sem obstrução de artéria coronária. Método: Revisão integrativa da literatura pela base de dados National Library of Medicine e Biblioteca Virtual de Saúde de estudos publicados entre 2018 e 2022. Resultados:87,5% dos estudos encontrados destacaram estratégias farmacológicas e destes, 62,5% citaram o uso da dupla antiagregaçãoplaquetária como mais utilizada, apesar de nenhum estudo evidenciar benefícios. Os inibidores do sistema renina-angiotensina-aldosterona comprovaram benefícios em três estudos. 75% dos artigos apontaram que esse grupo de pacientes recebem menos medicamentos preventivos comparados aos pacientes com infarto por obstrução coronariana. Outros seis estudos, revelaram condução clínica variável desses pacientes. Conclusão: O uso de inibidores do sistema renina-angiotensina-aldosterona deve ser considerado por ser a única medicação com redução da mortalidade evidenciada. São necessários estudos maiores para orientar com mais segurança à condução do infarto do miocárdio sem obstrução de coronária.
Descritores: Infarto do miocárdio sem obstrução de artéria coronária; Terapêuticas; Tratamento; Tomada de decisão clínica

ABSTRACT | Objective: To identify clinical practices with favorable results for patients diagnosed with acute myocardial infarction without coronary artery obstruction. Method: Integrative literature review using the National Library of Medicine and Virtual Health Library databases of studies published between 2018 and 2022. Results: 87.5% of the studies found highlighted pharmacological strategies and of these, 62.5% cited the use of dual antiplatelet therapy as the most used, despite no study showing benefits. Inhibitors of the renin-angiotensin-aldosterone system have shown benefits in three studies. 75% of the articles pointed out that this group of patients receive less preventive medication compared to patients with infarction due to coronary obstruction. Another six studies revealed variable clinical management of these patients. Conclusion: The use of renin-angiotensin-aldosterone system inhibitors should be considered as it is the only medication with proven reduction in mortality. Larger studies are needed to guide with more safety the management of myocardial infarction without coronary obstruction.
Keywords: Myocardial infarction without coronary artery obstruction; Therapeutics; Treatment; clinical decision making

RESUMEN | Objetivo: Identificar prácticas clínicas con resultados favorables para pacientes con diagnóstico de infarto agudo de miocardio sin obstrucción arterial coronaria. Método: revisión integrativa de la literatura utilizando las bases de datos de la Biblioteca Nacional de Medicina y la Biblioteca Virtual en Salud de estudios publicados entre 2018 y 2022. Resultados: el 87,5% de los estudios encontrados destacaron estrategias farmacológicas y de estos, el 62,5% citó el uso de la terapia antiplaquetaria dual como el más utilizados, a pesar de que ningún estudio muestra beneficios. Los inhibidores del sistema renina-angiotensina-aldosterona han mostrado beneficios en tres estudios. El 75% de los artículos señalaron que este grupo de pacientes recibe menos medicación preventiva en comparación con los pacientes con infarto por obstrucción coronaria. Otros seis estudios revelaron un manejo clínico variable de estos pacientes. Conclusión: Se debe considerar el uso de inhibidores del sistema renina-angiotensina-aldosterona, ya que es el único medicamento con reducción comprobada de la mortalidad. Son necesarios estudios más amplios que orienten con mayor seguridad el manejo del infarto de miocardio sin obstrucción coronaria.
Palabras claves: Infarto de miocardio sin obstrucción de la arteria coronaria; Terapéutica; Tratamiento; Toma de decisiones clínicas.

Priscila Hoffmann Soares.
Residente de Enfermagem em Saúde Cardiovascular pelo Hospital das Clínicas da Universidade Federal de Minas Gerais.
ORCID: 0009-0007-3716-5764

Karla Cordeiro Gonçalves.
Doutoranda em Enfermagem pela Universidade Federal de Minas Gerais.
ORCID: 0000-0002-5123-9308

Leandra Delfim do Nascimento.
Mestranda em Terapia Intensiva pelo Centro de Ensino em Saúde Ltda.
ORCID: 0009-0009-1557-7826

Salete Maria de Fatima Silqueira.
outora em Saúde Pública pela Universidade de São Paulo.
0000-0002-4248-7107

Jéferson Valente Vieira.
Mestrando em Enfermagem Assistencial pela Universidade Federal Fluminense.
ORCID: 0009-0008-7813-7935

Maria Fernanda Silveira Scarcella.
Doutoranda em Ciências da Saúde pela Universidade Estadual de Montes Claros.
ORCID: 0000-0002-3319-1646

Recebido em: 28/03/2023
Aprovado em: 17/04/2023

INTRODUCTION

Acute myocardial infarction (AMI) is defined as the death of myocardial cells due to prolonged ischemia. To identify ischemia of the myocardial muscle, the elevation of troponin is evaluated, which is an enzyme that has a higher specificity in relation to the cardiac muscle. [1]

The fourth universal definition of myocardial infarction of 2018 by the European

DOI: https://doi.org/10.36489/nursing.2023v26i300p9616-9624

Society of Cardiology (ESC) defined acute myocardial infarction with non-obstructive coronary arteries (Myocardial Infarction Non Obstructive Coronary Arteries - MINOCA).[2] For its diagnosis, it is necessary that the patient presents the clinical criteria for myocardial infarction, in addition to not finding any obstruction greater than or equal to 50% of the lumen of an epicardial artery observed on coronary angiography. MINOCA is an initial diagnosis that has several etiological possibilities. The main ones can be divided into ischemic and non-ischemic causes. [1,2,3]

With regard to its epidemiological characteristics, divergences from those found in AMI due to atherosclerotic obstruction are observed. A greater involvement was observed in female, non-white and younger people, under 55 years of age. [4]

It is observed that patients with MINOCA represent a great therapeutic challenge, and their management is based on still limited evidence. It was believed that the patients had a benign prognosis, however, studies carried out with patients who had a heart attack without significant coronary obstruction identified an increased risk of death and of new major adverse cardiovascular events (MACE). [2,5-8]

Since there are several possible pathophysiological mechanisms that cause this syndrome, it is not certain that the classic secondary prevention and treatment strategy used for AMI with coronary obstruction is ideal for all patients with MINOCA. [9]

Considering the complexity in etiological identification and the limited consensus regarding diagnostic methods and ideal treatment, the clinical management of these patients is still an unresolved issue. (10) Given these facts, it is necessary for health professionals to keep up to date with regard to therapeutic strategies that have shown better results. This study proposes to investigate such strategies, with the guiding question "what are the differences in clinical practices applied to patients diagnosed with infarction without significant coronary lesions - MINOCA?"

METHOD

An integrative literature review was carried out in which the first step was the elaboration of the guiding question according to the PICO strategy [12], the second consisted of searching or sampling the literature in the databases, the third, the collection of articles, the fourth, critical analysis of the articles included, the fifth, discussion of the results and, finally, the sixth step, which was the presentation of the integrative review. [11]

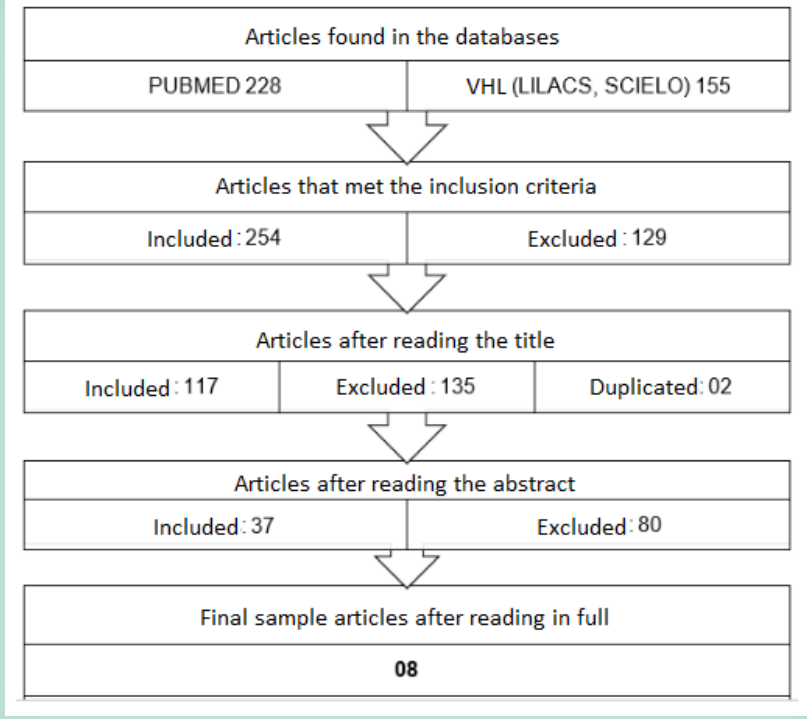
The research was carried out using the National Library of Medicine (Pubmed) database and the Latin American Health Sciences Literature (LILACS) and Scienti-ficElectronic Library Online (SciELO) databases, using the Virtual Health Library metabase (VHL).

The controlled terms (DeCS/MeSH descriptors) and free terms (keywords) selected for the search were "MINOCA", "Myocardial Infarction with non obstructive Coronary Arteries", "Therapeutics", "Treatment" and "Clinical Decision-Making". The search strategy was elaborated using the Boolean operators OR and AND.

The inclusion criteria adopted were: primary studies in English, Spanish and Portuguese, published in the years 2018 to 2022 and available in full. Exclusion criteria were duplicate studies, those that did not meet the main objective of the review, in addition to studies still in progress.

The selected articles and the Qualis/CAPES of the works are shown in Table 1. The Qualis/CAPES (13) it is a scientific production evaluation index used in Brazil, listed from A1 (highest relevance) to C (low relevance). The path of the findings is shown in the flowchart of Figure 01.

Table 01- Sample of articles selected after analysis of the full text, carried out from September to November 2022



Source: Research data, 2022..

DOI: https://doi.org/10.36489/nursing.2023v26i300p9616-9624

RESULTS

The sample of this study consisted of 8 articles as shown in Table 01.

Table 01- Sample of articles selected after analysis of the full text, carried out from September to November 2022. According to the findings, 87.5% (n=7) of the studies addressed pharmacological therapeutic strategies, [14-17,19-21] only one study addressed an adjacent cause diagnostic strategy [18] and there were no studies that addressed non-drug strategies for patients after a diagnosis of MINOCA.

All studies used the same criteria for the diagnosis of MINOCA, as established in the fourth definition of infarction in the ESC. [1] The average rate of patients with MINOCA in the studies was 12.39%, showing great variability depending on the selected population.

Regarding the therapeutic strategy, five studies (62.5%) cited the use of dual antiplatelet therapy (DAPT) as the most used in patients diagnosed with MINOCA, [14-17,20] one of these studies pointed out that MINOCA subgroups more prone to thrombus development receive more DAPT than the others. [16] In contrast, no study points to DAPT as proven beneficial for patients with MINOCA.

On the other hand, the use of inhibitors of the renin-angiotensin-aldosterone system (RAAS) was proven to be beneficial in three studies (37.5%), [15,19,21] one study found evidence that angiotensin--converting enzyme (ACE) inhibitors are the best option compared to angiotensin II receptor blockers (ARB), as they reduce the recurrence of infarction, unless there are contraindications. [19] Furthermore, 62.5% (n=5) of the selected studies mention RAAS inhibitors as a favorable therapeutic strategy for MINOCA. [14-16,19,21]

Despite this, 75% (n=6) of the articles showed that patients with MINOCA received less preventive medication compared to patients with infarction due to

Table 01- Sample of articles selected after analysis of the full text, carried out from September to November 2022

Author/ Year/ Country	Therapeutic strategy used in MINOCA and results	Journals/ Qualis CAPES	Type of study
SAFDAR, B. et al., 2018 U.S.A.	Patients diagnosed with MINOCA tend to receive fewer secondary preventive medications and cardiac rehabilitation.	Journalofthe American Heart Association A1	Observational Prospective
PALIOSSO, P. et al., 2019 Italy	RAAS inhibitors provide medium-term beneficial effects on outcomes in MINOCA patients. In contrast, dual antiplatelet, beta-blocker, and statin therapy had no effects on mortality and major adverse cardiovascular events.	Frontiers in pharmacology B4	Observational Prospective
GAIOR, P. et al.,2020 Poland	Most patients with MINOCA received conventional treatment for AMI. Patients with MINOCA received fewer preventive medications.	JournalofClinical Medicine B4	Observational Prospective
SÁ, F.M. et al., 2020 Portugal	Dual antiplatelet therapy (DAPT) was primarily prescribed to patients in MINOCA subgroups who were more prone to thrombotic events	Revista Portuguesa de Cardiologia B3	Prospective Cohort
REYNOLDS, H.R. et al., 2021 U.S.A.	Multimodal imaging with optical coherence tomography (OCT) and cardiac magnetic resonance imaging (CMR) identified the cause of MINOCA in 84.5% of the women in the study, demonstrating that identification of the cause of MINOCA is feasible and has the potential to guide medical therapy for secondary prevention. .	Circulation AHA A1	Observational Prospective
AHN, J.H. et al. 2021 Korea	ACE was superior to ARBs in reducing the risk of recurrence of infarction in patients with MINOCA, making it the most indicated first-line treatment for this group.	Cardiology Jornal B2	Prospective Randomized
GAO, S. et al., 2021 China	Among patients with MINOCA who received dual antiplatelet therapy, it was found that ticagrelor, compared to clopidogrel, was not associated with a significant difference in the risk of MACE or bleeding events at a median follow-up of 3.5 years.	Frontiers in Cardiovascular Medicine B4	Coorte Prospectivo
SMILOWITZ, N.R. et al., 2021 U.S.A.	High variability in prescription of ACE inhibitors, ARBs and Beta-blockers for patients with MINOCA, in addition to caution regarding the routine use of these agents before elucidating the definitive cause of MINOCA	PlosOne A2	Observational Retrospective

Source: Research data, 2022..

DOI: https://doi.org/10.36489/nursing.2023v26i300p9616-9624

coronary obstruction. [14-17,20,21] Still in this context, six studies stated that there is variability in the clinical management of these patients. [14-20,21]

In addition, it was possible to verify in 37.5% (n=3) of the studies, a high incidence of patients who were discharged from the hospital without elucidating the underlying cause of MINOCA. (14,16,20) It was also exposed by 75% (n=6) of the articles, that patients with MINOCA may have unfavorable clinical outcomes, with major cardiovascular events that include all-cause mortality, cardiac death, stroke and myocardial reinfarction. [14-17,21,22] Finally, 87.5% (n=7) of the studies stated that larger studies are needed so that the management of patients with MINOCA is more homogeneous and effective. [14-17,19-21]

DISCUSSION

In this review, the incidence of MINOCA compared to AMI due to arterial obstruction varied greatly, ranging from 2.94% [15] to 56,48%. [17] Previous studies have already demonstrated divergent incidences. [1,2] It was also observed that, in studies where cardiac catheterization was more frequent and the included population was younger, MINOCA rates were higher. [14,16,18] In the study with the highest incidence, among the participating individuals, the population was composed only of women. [18]

The initial impression in studies involving MINOCA was that subjects had a benign prognosis. [6] It was found that these patients may have major cardiac events in proportions similar to those of patients with AMI due to coronary artery obstruction, and may also develop heart failure, cardiogenic shock, cardiac arrest and even death. [14,15,19]

It was also identified that there is great heterogeneity in the clinical management of these patients. [15-17,21] It has been observed that many cases of MINOCA receive prevention with DAPT less frequently than patients with AMI with coronary obstruction. Patients from subgroups classified as more prone to thrombotic events are the ones who receive the most DAPT in MINOCA, since professionals consider that the anti-platelet aggregation action can be beneficial for this subgroup, but even so, the indication of these agents in patients with MINOCA is not concrete. [17]

> “Therefore, a study revealed that P2Y12 inhibitors showed similar results in patients who used Ticagrelor and Clopidogrel in terms of prognosis and bleeding events, so there is no specific predilection between them in MINOCA initially. [20]”

Still regarding the pharmacological strategy, in the SWEDEHEART REGISTRY study (2019) [2] indicated long-term beneficial effects of treatment with statins and RAAS inhibitors in patients with MINOCA, as well as a trend towards a positive effect of treatment with beta-blockers and a neutral effect of DAPT. [2] In this work, it was identified that RAAS inhibitors were the only drug class that reduced the mortality rate in these patients, [15] being the most indicated ACE inhibitor as it also reduces the risk of recurrent AMI, and should be considered as the first line of treatment. [19]

This work had important limitations. There are few original studies on the therapeutic management of MINOCA, which resulted in a small sample. The studies found were mostly observational and non-randomized, which allows considering the chance of bias in their results. It was not possible to identify clear or standardized evidence regarding therapeutic strategies for MINOCA, which confirms the need to carry out research with larger populations. No studies were found that address other non-drug therapeutic methods and multidisciplinary care for this group of patients.

CONCLUSION

The clinical management of patients diagnosed with MINOCA is still heterogeneous, with a tendency to use standardized strategies for cases of AMI with coronary obstruction, even without scientific evidence. It was observed that compared to patients with AMI due to coronary artery obstruction, individuals with MINOCA may be undertreated and receive less preventive medication. The use of RAAS inhibitors should be considered because it is the only medication with a reduction in mortality shown in studies, mainly ACE inhibitors, due to the reduction in the recurrence of acute myocardial infarction. The absence of studies that address non-pharmacological and multidisciplinary strategies favorable to MINOCA indicates an important gap to be explored. Larger, randomized, multicenter studies are needed to guide MINOCA with more confidence.

DOI: https://doi.org/10.36489/nursing.2023v26i300p9616-9624

References

1 Thygesen K, Alpert JS, Jaffe AS, Chaitman BR, Bax JJ, Morrow DA, et al. Fourth Universal DefinitionofMyocardialInfarction. J Am Coll Cardiol[Internet]. 2018 [cited 2022 Jun 25]; 72(18):2231-2264. Availablefrom: https://pubmed.ncbi.nlm.nih.gov/30153967

2 Lindahl B, Baron T, Albertucci M, Prati F. Myocardialinfarctionwith non-obstructivecoronaryarterydisease. EuroIntervention [internet]. 2021 [cited 2022 Jun 25]; 17:e875-e887. Availablefrom: https://eurointervention.pcronline.com/article/myocardial-infarction-with-non-obstructive-coronary-artery-disease

3 Matta AG, Nader V, Roncalli J. Management ofmyocardialinfarctionwithNonobstructiveCoronaryArteries (MINOCA): a subsetofacutecoronarysyndromepatients. Rev.Cardiovasc. [internet]. 2021 [cited 2022 Jun 25]; 22(3), 625–634; Availablefrom: https://www.imrpress.com/journal/RCM/22/3/10.31083/j.rcm2203073/htm

4 Asamoah K T. MyocardialInfarctionwithNonobstructiveCoronaryArteries: A DiagnosticChallenge. TH Open. [internet]. 2021 [cited 2022 Jun 25]; e195–e199; Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8208841

5 Shamsi F, Hasan KY, Hashmani S, Jamal SF, Ellaham S. ReviewArticle—Clinical Overview ofMyocardialInfarctionWithoutObstructiveCoronaryArteryDisease (MINOCA). J Saudi Heart Assoc. [internet]. 2021 [cited 2022 Jun 25]; 33(1): 9–15. Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8051331

6 Hjort M, Lindahl B, Baron T, Jernberg T, Tornvall P, Eggers KM. Prognosis in relationto high-sensitivitycardiactroponin T levels in patientswithmyocardialinfarctionand non-obstructivecoronaryarteries. Am Heart J. [internet]. 2018 [cited 2022 Jun 25]. 200:60-66; Availablefrom: https://pubmed.ncbi.nlm.nih.gov/29898850/

7 Pelliccia F, Pasceri V, Niccoli G, Gaudio C, Crea F, Camici PG. PredictorsofMortality in MyocardialInfarctionandNonobstructedCoronaryArteries: A SystematicReviewand Meta-Regression. Am J Med. [internet]. 2019 [cited 2022 Jun 25]; 2019.05.048; Availablefrom: https://www.amjmed.com/article/S0002-9343(19)30530-3/fulltext

8 Eggers KM, Hjort M, Baron T, Jernberg T, Nordenskjöld AM, Tornvall P, et al. Morbidityand cause-specificmortality in first-time myocardialinfarctionwithnonobstructivecoronaryarteries. Jo I. M. [internet]. 2018 [cited 2022 Jun 25]; 12857; Availablefrom: https://onlinelibrary.wiley.com/doi/10.1111/joim.12857

9 Abdu FA, Mohammed AQ, Liu L, Xu Y, Che W. MyocardialInfarctionwithNonobstructiveCoronaryArteries (MINOCA): A ReviewoftheCurrent Position. Karger. [internet]. 2020 [cited 2022 Jun 25]; 145:543–552; Availablefrom: https://www.karger.com/Article/Pdf/509100

10 Serpytis R, Majauskiene E, Navickas P, Lizaitis M, Glaveckaite D, Rucinskas K, et al. RandomizedPilotTrialonOptimalTreatmentStrategy, MyocardialChanges, andPrognosisofPatientswithMyocardialInfardtionwithNonobstructiveCoronaryArteries (MINOCA). Am J Med. [internet]. 2021. [cited 2022 Jun 25]; 2021.08.023; Availablefrom: https://www.sciencedirect.com/science/article/abs/pii/S0002934321005866#preview-section-cited-by

11 Souza MT, Silva MD, Carvalho R, Revisão integrativa: o que é e como fazer. Einstein. [internet]. 2010. [cited 2022 Jun 18]. Availablefrom: https://www.scielo.br/j/eins/a/ZQTBkVJZqcWrTT34cXLjtBx/?lang=pt

12 Santos CM, Pimenta CA, Nobre MR. A estratégia PICO para a construção da pergunta de pesquisa e busca de evidências. Rev. Latino-Am. Enfermagem. [Internet]. 2007. [cited 2022 Jun 18]. Availablefrom: https://www.scielo.br/j/rlae/a/CfKNnz8mvSqVjZ37Z77pFsy/?lang=pt

13 Qualis/CAPES. Plataforma Sucupira. Disponível em: https://sucupira.capes.gov.br/sucupira/public/index.xhtml

14 Safdar B, Spatz ES, Dreyer RP, Beltrame JF, Lichtman JH, Spertus JÁ, et al. Presentation, Clinical Profile, andPrognosisof Young PatientsWithMyocardialInfarctionWithNonobstructiveCoronaryArteries (MINOCA): ResultsFromthe VIRGO Study. J Am Heart Assoc. [Internet]. 2018 [cited 2022 Nov 11]; 7(13): e009174; Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6064896

15 Paliosso P, Bergamaschi L, Saturi G, D´Angelo, EC, Magnani I, Toniolo S, et al. SecondaryPrevention Medical TherapyandOutcomes in PatientsWithMyocardialInfarctionWith Non-ObstructiveCoronaryArteryDisease. Front Pharmacol. [Internet] 2020. [cited 2022 Nov 23]; 10: 1606; Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7005107

16 Gasior P, Desperak A, Gierlotka M, Milewski K, Wita K, Kalarus Z, et al. ClinicalCharacteristics, Treatments, andOutcomesofpatientsqithMyocardialInfarctionwith Non-ObstructivecoronaryArteries (MINOCA): Resultsfrom a MulticenterNational Registry. J. Clin Med. [Internet]. 2020 [cited 2022 Nov 23]; 9(9):2779; Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7564426

17 Sá F M, Carvalho RC, Santos L, Ruivo C, Antunes A, Belo A, et al. Dual antiplatelettherapy in myocardialinfarctionwith non-obstructivecoronaryarterydisease – insights from a nationwide registry. J.Rev.P.C. [Internet]. 2020 [cited 2022 Nov 23]. 2020.05.008; Availablefrom: https://www.sciencedirect.com/science/article/pii/S087025512030408X?via%3Dihub

18 Reynolds HR, Maehara A, Kwong RY, Sedlak T, Saw J, Smilowitz NR, et al. CoronaryOpticalCoherenceTomographyandCardiacMagneticResonanceImagingto Determine Underlying Causes ofMyocardialInfarctionWithNonobstructiveCoronaryArteries in Women. Circulation AHA. [Internet]. 2021 [cited 2022 Nov 23]; 143(7): 624–640.Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8627695

19 Ahn JH, Hyun JY, Jeong MH, Kim JH, Hong YJ, Sim DS, et al. Comparativeeffectofangiotensinconvertingenzymeinhibitor versus angiotensin II type I receptor blocker in acutemyocardialinfarctionwith non-obstructivecoronaryarteries; fromtheKoreaAcuteMyocardialInfarction Registry—NationalInstituteof Health. Cardiol J. [Internet]. 2021 [cited 2022 Nov 23]; 28(5): 738–745 Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8428933

20 Gao S, Xu H, Huang S, Yuan J, Yu M. Real-World Use ofClopidogrelandTicagrelor in PatientsWithMyocardialInfarctionWithNonobstructiveCoronaryArteries: PatientCharacteristicsandLong-TermOutcomes. Front Cardiovasc. Med. [Internet]. 2021 [cited 2022 Nov 23]. 8: 807494 Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8724121

21 Smilowitz NR, Dubner R, Hellkamp AS, Widmer RJ, Reynolds HR. Variabilityofdischarge medical therapy for secondarypreventionamongpatientswithmyocardialinfarctionwith non-obstructivecoronaryarteries (MINOCA) in the United States. Journal P One. [Internet]. 2021 [cited 2022 Nov 23]; e0255462 Availablefrom: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8328325

22 Amores N, Salvador P. Utilidaddelultrasonidointracoronarioenel diagnóstico de disecciónconaria espontânea. Arch. Cardiol. Méx. [Internet]. 2019 [cited 2022 Nov 23]. 19000013; Availablefrom: https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1405-99402019000100082

DOI: https://doi.org/10.36489/nursing.2023v26i300p9616-9624