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INDEX

RESPONSIBLE AND RELEVANT DISCLOSURE

It is with great satisfaction and joy that we deliver another issue of the Scientific Journal CEREM Goiás to our distinguished readership. With a lot of seriousness and work, every day our vehicle has been consolidating itself as one of the most reputable and renowned medical-scientific publications in Goiás and Brazil. Thanks to everyone who has believed in our project, answered our call and sent their scientific works for evaluation and publication, we are offering our share of contribution to the responsible and academically relevant dissemination of the scientific production of resident physicians and medical residency services from our region.

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Best regards.

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ORIGINAL ARTICLE

RETROSPECTIVE ANALYSIS ON THE USE OF ACETYLSALICYLIC ACID IN THE PREVENTION OF PREECLAMPSIA IN A MUNICIPALITY OF GOIÁS

ADRYANE DA COSTA VIEIRA[1], CAROLINE QUEIROZ SILVA[1], ANDRÉ MAROCCOLO DE SOUSA[2], JUAREZ ANTÔNIO DE SOUSA[2], ADELINO CRISTÓVÃO NETO[3], CAMILA LOPES DE OLIVEIRA[1]

ABSTRACT

Objective: This study aims to analyze and quantify the use of ASA in pregnant women with a high risk of pre-eclampsia in a city of Goiás, a Brazilian state, between 2019 and 2020. Methodology: The study analyzed 400 prenatal records of the Health System of one city of Goiás and identified clinical criteria pre-defined by the International Federation of Gynecology and Obstetrics, which allowed to identify the indications and propaedeutics of the medication. Results: 147 pregnant women had an indication for use of prophylactic ASA and 92% of them did not receive the medication. Within the 8% medicated, there was no adequate prescription. In addition, among pregnant women with an indication, 85% started prenatal care on time for the introduction of the medication and, in the vast majority, it was not started. Conclusion: The dissemination of knowledge and the rate of prescription of acetylsalicylic acid are extremely low in the city of Goiás. Thus, the opportunity to prevent serious illness with a medication recommended by regulatory agencies is lost.

KEYWORDS: PRE-ECLAMPSIA. PRENATAL. ASPIRIN. PREVALENCE. INFORMATION DISSEMINATION

INTRODUCTION

Preeclampsia (PE) is currently defined as hypertension (blood pressure ≥140x90 mmHg, on at least two occasions, measured four hours apart, in previously normotensive pregnant women), which normally occurs after 20 weeks of gestation, and is accompanied by one or more of these conditions: proteinuria (>300 mg/24 hours); evidence of other maternal organ dysfunction (acute kidney injury, liver involvement with or without right upper quadrant, epigastric abdominal pain, neurologic or hematologic complications); uteroplacental dysfunction (fetal growth restriction, abnormal umbilical artery Doppler waveform analysis, or stillbirth), with resolution up to 12 weeks postpartum.[1]

The etiology of preeclampsia is not fully understood. However, many sources consider that an inadequate or deficient invasion of the trophoblast in the maternal spiral arteries occurs in early pregnancy. This invasion normally begins at the 8th week and is completed between the 16th and 22nd weeks of gestation.[2] This process triggers an imbalance between angiogenic and antiangiogenic factors.1 Thus, with abnormal placentation, there is a deficit in the intravascular production of prostacyclins (vasodilators) and excessive platelet production of thromboxane A2 (vasoconstrictor and platelet aggregation stimulant).[2]

Preeclampsia occurs in about 2 to 5% of pregnant women and is a major cause of maternal and fetal morbidity and mortality. This pathology annually causes the death of 76,000 women and 500,000 newborns worldwide.1

Risk factors have already been studied by numerous authors. However, when adopting the standards established by the International Federation of Gynecology and Obstetrics (FIGO), we find the following:

Fatores de Alto Risco	Fatores de Médio Risco
História prévia de PE;	Nuliparas;
Doença renal;	Idade >35 anos;
Doença autoimune (Lúpus Eritematoso Sistêmico e Síndrome Antifosfolipídeo);	IMC >30 kg/m²;
	História familiar de PE;
Diabetes Mellitus 1 e 2;	Intervalo interpartal longo (>23 meses) e
Hipertensão Crônica.	curto (<12 meses);
	Reprodução assistida;
	Etnia afro-caribenha ou sul-asiática.

Chart 1 – Risk factors for preeclampsia.
Source: Own authorship based on FIGO manual [1]

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These risk factors coincide, for the most part, with those defined by the World Health Organization (WHO), the National Institute Clinical Excellence (NICE) and the American College of Obstetricians and Gynecologists (ACOG) and directly interfere with the prophylactic conduct with Acetylsalicylic acid (ASA).[3,1,4,5]

The risk factors (Chart 1), as determined by NICE and ACOG and endorsed by FIGO, are subdivided into medium and high risk, with pregnant women at high risk of developing PE having two medium risk factors or one high risk. With the objective of achieving a more effective screening and with fewer false-positive cases, FIGO proposes that the assessment with biomarkers, Mean Arterial Pressure (MAP) and uterine artery pulsatility index be added to the analysis of risk factors. However, the use of high risk factors, in places with low infrastructure and impossibility of performing other methods, may be sufficient to indicate prophylactic treatment. MAP must be measured using an appropriate technique and must be entered into specific calculators, together with the risk factors already mentioned in the table above.6 Biochemical markers: PLG-F (Placenta Growth Factor) and PAPP-A (Plasma Protein Associated with Pregnancy) and biophysical: measurement of uterine artery pulsatility, significantly increase the accuracy of screening, but because they are instruments of difficult access and high cost, they are rarely used.[1]

According to Antunes[2], the use of ASA in low doses has been suggested by several scholars and researches in the prevention of PE due to its ability to selectively inhibit the cyclooxygenase pathway in platelets, sparing the vascular endothelium.[7,8,9,10,11,1,12,5,3,4,13] Thus, ASA inhibits thromboxane synthesis without affecting the production of prostacyclins, protecting against vasoconstriction and abnormal placental clotting, that is, without altering uteroplacental blood flow.2

The ideal dose of ASA and its timely introduction are still being discussed by various literatures, as mentioned above. However, FIGO is the main reference, as it is an international body and has a recent guideline. The 2019 guideline recommends that patients weighing less than 40 kg should take 100 mg at night, while patients weighing more than 40 kg should take 150 mg. [1] It is recommended to start treatment before the 16th to 20th week of pregnancy, since it is in this fetal period that the development of the uterine spiral arteries ends and the placental invasion ends, places where ASA will act to prevent on foot. [12] The medication can be continued until 36 weeks of gestation or until delivery. [1]

ASA has been considered very effective in the prophylactic treatment of PE.[11,14,15] According to Gavillet[16], the prophylactic administration of ASA generates a 62% reduction in the risk of preeclampsia. Hoffman[17] observed in a randomized, double-blind study a reduction in the risk of preterm birth (less than 34 weeks), perinatal mortality, women who gave birth before 34 weeks with hypertensive disorders and fetal loss (infant death after 16 weeks of pregnancy and before seven days postpartum). Hoffman[17] also emphasizes that the medication is well tolerated and inexpensive, which favors the expansion of this propaedeutic.

According to FIGO, preeclampsia is responsible annually for about 10% of maternal deaths and 9 to 20% of perinatal deaths worldwide.[1] In addition, it is one of the four causes of maternal mortality and morbidity in countries with high, medium and low income. In Brazil, hypertensive events are among the three main causes of maternal mortality, along with sepsis and hemorrhage.[18]

In view of this perspective, this study aimed to analyze adherence to the use of prophylactic ASA in pregnant women at high risk of PE in a municipality in the State of Goiás, who underwent prenatal care between August 2019 and December 2020, since , despite the high level of scientific evidence, this approach is not frequently observed in daily medical practice. In addition, it was possible to observe the adequacy of the workup and dosage in line with current guidelines.

With the data obtained, this work will provide subsidies for the development of health policies aimed at the education and updating of health professionals and will bring benefits to future pregnant women, who, if they are at high risk of PE, will have greater chances of receiving prophylactic medication.

METHODOLOGY

Retrospective observational study, carried out after approval by the Ethics and Research Committee (CEP), under opinion 4,529,556, through the review and analysis of 400 prenatal medical records from the public health network of a municipality in State of Goiás, which took place between August 2019 and December 2020. Data collection was authorized by the Municipal Health Department and the search was carried out between January and April 2021, through the municipality's Electronic Medical Records System, through reading, reviewing and identifying terms, data, signs and symptoms that included the pregnant woman in the high risk group for PE. After this analysis, the data were cataloged in Microsoft Excel tables and segmented into three comparative groups: patients who used the medication with adequate propaedeutics (dose recommended by FIGO and timely introduction), patients who used the medication with inadequate propaedeutics, and patients who did not use the medication. The tables obtained were converted into graphs to facilitate the understanding of the readers.

The population consisted of pregnant women who are considered by FIGO to be at high risk of preeclampsia, and who would have an indication for preventive treatment with ASA. Among them, those with one high risk factor or two or more medium risk factors, mentioned above, were counted. FIGO, in 2019, with the aim of increasing the reliability of the screening, recommended that these criteria be added to at least one of the following: MAP measurement, biochemical markers or Doppler ultrasound with measurement of the uterine artery pulsatility index.1 However, for this study, due

to its retrospective nature, limited access to information and the high cost of more accurate tools (specific markers and Doppler ultrasound) to the Unified Health System (SUS), screening was performed only with maternal risk factors . Despite being less accurate, isolated risk factors were used before the 2019 FIGO guideline.[3,5] Healthy pregnant women, or those who underwent prenatal care before August 2019 and after December 2020, or even inconsistent and incomplete medical records were excluded.

When analyzing the possible risks, patients could have been subject to stigmatization, disclosure of information, invasion of privacy and risk of disclosure of confidential data. However, despite the severity of the risks, they were minimized by limiting access to medical records for the duration of the research. Confidentiality and privacy were ensured, since the patient's name was replaced by a numerical code, in order to protect individuals from exposure and stigmatization, ensuring that the information is not used to the physical, emotional and economic harm of people and/or the community. It is worth mentioning that there was no episode of violation of privacy.

It is also declared that there are no conflicts of interest between the researchers and the institution to be researched.

The research followed Resolution No. 466/2012 of the National Health Council (CNS), which regulates research involving human beings. There was no filing of data and/or medical records.

RESULTS

The sample of the present study consisted of 395 pregnant women who underwent prenatal care between August 2019 and December 2020 in a municipality in the State of Goiás, with 5 pregnant women excluded from the population (400 pregnant women) for having performed a prenatal period in another location.

The age of the pregnant women ranged from 14 to 44 years, with a prevalence in the range of 21 to 25 years (Figure 1).

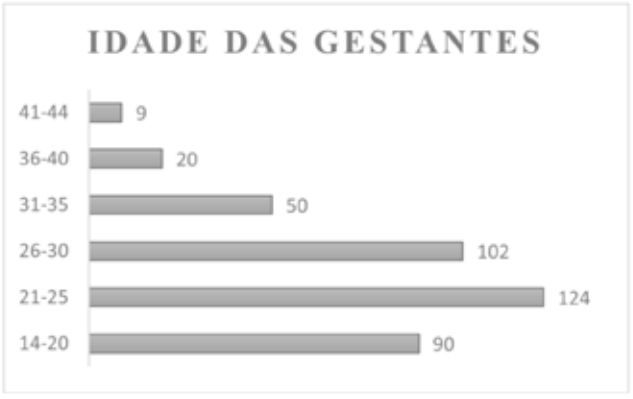

FIGURE 1 - Segmentation by age of pregnant women
Caption: Pregnant women segmented by age. Source: Own authorship.

Regarding the use of ASA, it was identified that 147 pregnant women (37.3%) had indication for prophylactic use (Figure 2). Of these, 92% did not use the medication and only 12 women (8%) used it, with [6] using the 100 mg dose, which is inadequate for the weight of these pregnant women (75 to 123 kg) and the other [6] did not have dosing information in the medical record. In addition, one of them made previous and constant use of medication for the treatment of Systemic Lupus Erythematosus.

Regarding the time of use and date of initiation of prophylaxis, all pregnant women who used ASA started the medication before the 16th week of pregnancy. However, there is only information about drug withdrawal in three medical records, in which the first kept the use of the medication until the eighth month of pregnancy, the second kept it until the 35th week and the third stopped using it on its own without a specified date. Thus, 8% of the pregnant women used the medication with inadequate propaedeutics and 0% used the medication properly (Figure 2). It was also concluded that of the 147 pregnant women who had an indication for the use of ASA, 15% started prenatal care late and there was no time to start the medication, since the Gestational Age (GA) at the first consultation exceeded 20 weeks. However, 85% of pregnant women started prenatal care in a timely manner and even so, ASA was not prescribed for them (Figure 2).

Figure 2.A: Light pink: the use of ASA is not indicated; Gray: indicated the use of ASA; Figure 2.B: Light pink: pregnant women who did not use the medication; Gray: pregnant women who used the medication with inadequate propaedeutics; Light gray (no representation in the graph - 0%): pregnant women who used the medication with adequate propaedeutics; Figure 2.C: Light pink: not enough time to start using the medication; Gray: time to start using the medication. Source: Own authorship.

Regarding high risk factors, the most common was Diabetes Mellitus [1] (DM1)/ Diabetes Mellitus [2] (DM2)/ Gestational Diabetes Mellitus (GDM) (Figure 3-A). As for the medium risk factors, nulliparity, BMI>30kg/m2 and intrapartum interval>23 months stood out (Figure 3-B). In addition, it is important to note that the patient's ethnicity was not reported in the medical records and in some of them (11.13%) the pregnant woman's intrapartum interval was also not mentioned.

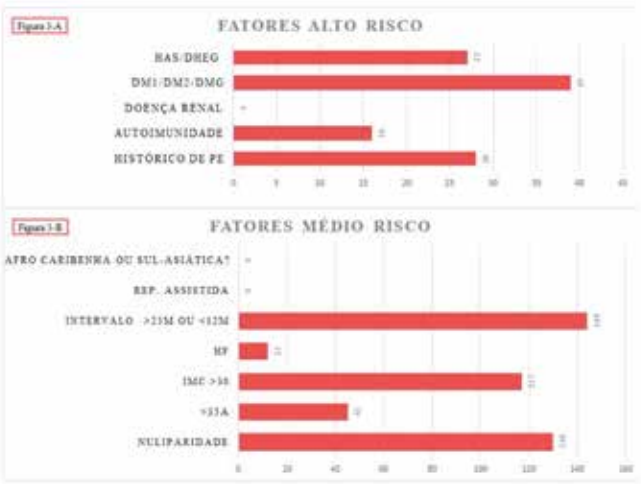

FIGURE 3 - Frequency of high and medium risk factors
Caption: Frequency of risk factors found in pregnant women surveyed. Source: Own authorship.

There were 18 reports of PE (4.5%), of which 17 (94.4%) had an indication for prophylactic ASA and the pregnant women did not receive the medication. There were also [8] cases of hypertensive/SHDP peaks, of which 7 (87.5%) were indicated for the use of ASA and only 28.6% had access to medication. Data related to pregnancy outcomes are shown in Figure 4-A and demonstrate that most pregnancies ended with cesarean delivery without complications (55%). However, among the high-risk pregnant women, there were 24 cases (16%) of hypertensive events or PE, of which only [2] used prophylactic ASA, however, with inadequate propaedeutics (Figure 4-B).

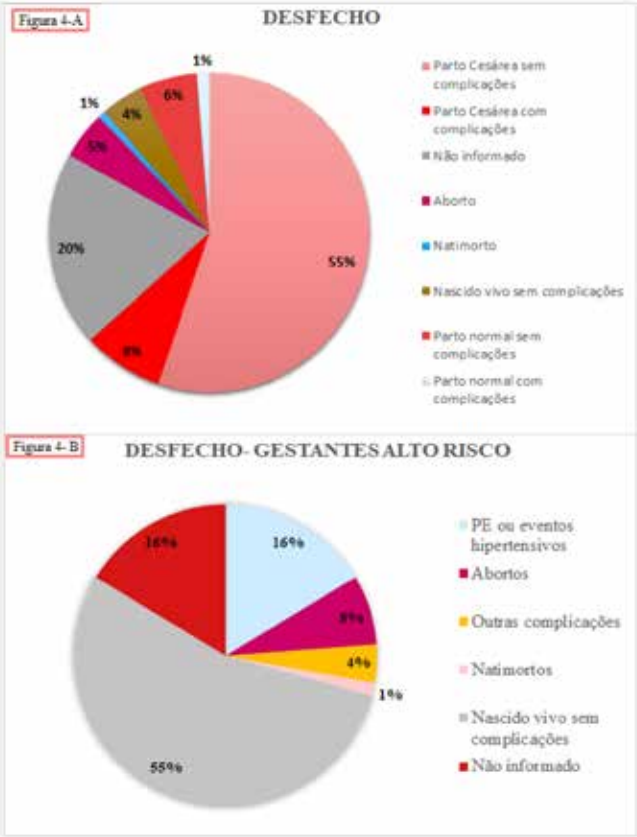

FIGURE 4 - Outcomes of pregnancies
Caption: Figure 4-A: Light pink: cesarean delivery without complications; Red: cesarean delivery with complications; Gray: unreported outcome; Purple: miscarriages; Blue: stillbirths; Olive green: live births without complications (not differentiated between normal and cesarean delivery); Coral: normal delivery without complications; Light blue: normal delivery with complications. Figure 4-B: Gray: live birth without complications (not differentiated between normal and cesarean delivery); Red: unreported outcome; Baby blue: preeclampsia or hypertensive events; Purple: miscarriages; Yellow: other complications not related to PE; Light pink: stillbirths. Source: Own authorship.

DISCUSSION

It was identified in this study that about one third of the pregnant women were indicated for the use of low-dose ASA in the prophylaxis of preeclampsia. The fact that the minority used the medication and among these, none with the appropriate dosage, makes the situation more worrying. This makes us question the updating of doctors who work in prenatal care in the public network of a municipality in the State of Goiás. Although the FIGO guideline is from 2019 and has presented updates mainly regarding the indication of the use and dosage of ASA, the use of this medication has been established and recommended since 2013 by the WHO, that is, 6 years before the focus of this study. Thus, it was expected that a more significant portion of the pregnant women would have received the medication, even if in underdosage.

A study conducted in 2017 retrospectively evaluated

pregnant women who gave birth at Thomas Jefferson University Hospital before and after the publication of the 2016 ACOG guideline, which determined the use of ASA 80 mg for PE prophylaxis, and it was noticed that the percentage of use increased from 7% to 70%.19 This proportion was not found in the present study, since, even after numerous guidelines, the number of indications in the studied municipality is not similar to what was found by Banala, in the United States of America (USA).

It is impossible, with the present study, to state the reasons for not performing prophylactic treatment. However, we raise the possibility of medical negligence, medical choice or non-adherence to prophylaxis on behalf of the patient. In this case, this last reason tends to be discarded, since the prescription or any information about the patient's refusal is not included in the medical records. Even so, this possibility should be considered in the future, since, in a 2020 multicenter study, with the objective of identifying the adherence of pregnant women at high risk of PE to prophylactic treatment with ASA, it was identified that 79% of pregnant women were instructed to undergo treatment with low-dose ASA and only 21.5% actually used it. Of the women who used it, the vast majority used the medication according to the protocol. Among the women who did not use the medication, the majority stated that they believed they were not included in the profile of prophylactic indication. The second reason for not using the medication was the lack of recommendation by the professional who accompanied the prenatal care.[10] Thus, it is essential to promote in Brazil, a broader discussion about the benefits of this prophylaxis with all medical professionals. In addition, full and effective communication between pregnant women and health professionals should be encouraged, in order to ensure the use of medication and achieve an adequate prophylactic level.

Regarding diagnostic screening, it is known that the accuracy becomes greater as the specificity and technology used in the tests increases – biomarkers and Doppler ultrasound.[20] However, in a deficient socioeconomic context, where these resources are not widely available, as in SUS - Brazil, it is known that it is better to opt for screening based on risk factors and start therapy based on these criteria. In addition, in this study, there was a perception of the effectiveness of the analysis of risk factors, since within the medical records analyzed, practically all the patients who progressed to outcomes related to hypertensive problems had an indication of the prophylactic use of ASA, and only 2 women who had this outcome did not meet the criteria for the use of prophylactic medication. Thus, even if there are no tools available to investigate the risk of PE according to FIGO's gold standard indications, a careful analysis of the risk factors and possible indication of ASA is worth, since the benefit is gigantic, in addition to the medication being safe, as long as it is in a low dose (150 mg), with medical indication and monitoring. Furthermore, it is a cheap and widely accessible medication.[21]

The basic health unit (UBS) is the gateway for pregnant women to the prenatal service. Thus, it is necessary to focus and disseminate knowledge about this prophylaxis to physicians responsible for primary care. Since, in most cases, they will be responsible for monitoring the pregnant woman during the gestational interval of 16-22 weeks, in which there will be an indication to institute the medication.[22] It should also be noted that the indicated dose, 150 mg, can be administered with one and a half tablets of infant ASA (100 mg/tablet). ASA protect, coated tablet, cannot be broken.[23]

Despite the positive results, it is necessary that new studies be carried out in the area and with periodic intervals, aiming to increase the prescription of medication and, consequently, reduce the incidence of preeclampsia, maternal and fetal deaths. However, even with significant results, the retrospective work limited the research and the search for data, since, as researchers, we depend on the information questioned and collected at the time of prenatal care and recorded in medical records. Thus, it would be interesting for a new study to be carried out in a prospective format.

CONCLUSION

From this study, it was possible to prove the hypothesis generated based on the observation of daily medical practice that, despite ASA being extremely effective in the prophylactic treatment of preeclampsia, it was not offered to patients who underwent prenatal care in a municipality of the State of Goiás, in the period 2019-2020.

Thus, the need to update general practitioners, family doctors and obstetrician-gynecologists is clear, so that the medication is offered to pregnant women whenever there is an indication. With such an attitude, given the effectiveness of the medication, we will reduce the chances of hypertensive events and possible maternal and fetal deaths. Continuous updating is extremely important in medicine, as well as affecting the doctor and the patient himself. A study carried out in Hong Kong identified that more than 90% of physicians understand the need for continuous updating[24], associated with this, Robertson and Long[25], highlighted the consequences of error or negligence for the physician himself, which can generate demotivation, feelings of guilt, shame or depression. Therefore, this work can be used as a subsidy for the dissemination of knowledge and awareness of physicians.

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ARTIGO ORIGINAL

PALLIATIVE CARE AT HOME PROVIDED BY THE PRIMARY HEALTH CARE TEAM

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ABSTRACT

Introduction: Introduction: Palliative care aims to alleviate human suffering with the adoption of a correct assessment and treatment of pain and other problems, whether physical, psychosocial and spiritual, based on early identification. Due to the substantial increase in the number of elderly people and the prevalence of non-communicable chronic degenerative diseases, this care has been increasingly necessary, also developed by Primary Health Care (PHC). It is known that both palliative care and PHC have teamwork as the basis of care. Objective: To synthesize the results of studies on the importance of palliative care at home provided by the Primary Health Care team. Methodology: Integrative literature review. The search for studies was performed on LILACS, SCIELO and Medline platforms. Studies in English and Portuguese, with a publication date of the last six years, were included. Results: Regarding the characterization of the analyzed articles, two (28.5%) were published in 2016, two (28.5%) were published in 2019, 1 in 2021 (14.5%) and two (28.5%) were published in 2022. Among the studies, none were published in specific journals for palliative care. Final Considerations: We know that countless patients die before receiving palliative care and of these many, before finitude, suffer from the disease without the minimum quality of life and suffering in the face of the situation. Thus, it is necessary to think and reflect on the PC, which should be available as close as possible to the patient, that is, in Primary Health Care.

KEYWORDS: NON-COMMUNICABLE CHRONIC DISEASES; PALLIATIVE CARE; PRIMARY HEALTH CARE

INTRODUCTION

Palliative care (PC) aims to minimize human suffering through adequate assessment and treatment of pain and other problems, whether physical, psychosocial and/or spiritual, based on early identification. Due to the substantial increase in the number of elderly people and the prevalence of non-communicable chronic degenerative diseases, such care has been increasingly necessary [1].

Cancer patients, as they experience pain and suffering on a daily basis, as well as people, elderly or not, who have chronic non-communicable diseases (CNCDs), represent a growing concern. In view of this, the World Health Organization (WHO), in 2002, defined Palliative Care as an approach that aims to improve the quality of life of patients and their families, in the face of diseases that threaten the continuity of life. This PC implies the gathering of skills by a multiprofessional team to help patients and their families to adapt to a new standard of living imposed by the disease. Due to its importance, on October 7th, the World Day of Palliative Care is celebrated [2].

According to data from the World Health Organization, each year about 40 million people need PC (WHO, 2015). Among these, almost 39% are people with cardiovascular diseases, 34% with cancer, 10% with lung diseases, 6% with HIV/AIDS and 5% with diabetes, both in an advanced stage (WHO, 2015). In this sense, Primary Health Care (PHC) guided by the principles of care coordination; of the bond and continuity; of completeness; of accountability; of humanization; equity and social participation has the potential to become one of the levels of health care with conditions to facilitate the population's access to Palliative Care [1].

The principles of palliative care, according to WHO information are:

Provide relief for pain, asthenia, inappetence, dyspnea, among others; reaffirming life and death as natural processes; integrate psychological, social and spiritual aspects into the clinical aspect of patient care; not hasten or postpone death; provide a support system to help the family cope with the patient's illness in their own environment; offer a support system to help patients live as actively as possible until their death; use an interdisciplinary approach to assess the clinical and psychosocial needs of patients and their families, including grief counseling and support [4].

It is known that this care is part of the scope of action of Primary Health Care (PHC) and also, both palliative care and PHC have teamwork as the basis of care by definition. Therefore, exploring this theme allows talking about symptomatic control in palliative care patients, exclusive or not [5].

In view of the population aging scenario, in addition to inadequate population feeding practices, sedentary life-

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style, among other factors that corroborate the emergence of CNCDs, it is believed that a model of care that includes palliative care is essential.

It is understood that, for a long time, health professionals had well-established attitudes in a mechanistic conception of life, which is why it is currently possible to observe the numerous difficulties in recognizing the complex and multidimensional reality of health care. Regardless of the symptom, we must understand these patients in an integral way, approaching the physical, social, psychological and spiritual spheres.

Based on the above, articles that address evidence-based practice were analyzed, as they improve clinical effectiveness and support health professionals in their conduct based on scientific evidence, clinical experience and client preferences [6].

The general objective is to synthesize results of studies on the importance of palliative care at home provided by the Primary Health Care team.

The motivation for the theme is due to the fact that, in chronic diseases, actions and palliative care should be initiated at the time of diagnosis and developed together throughout the treatment of the disease, given that this practice brings as its main benefit a better quality of life for the patient.

LITERATURE REVISION

Palliative care and ethical aspects

Palliative Care (PC) implies an improvement in the quality of life of patients and their families due to a disease that may compromise their quality of life, or even lead to death. Such care promotes the prevention and relief of suffering through early identification, rigorous assessment and treatment of pain [1].

In this type of care, orthothanasia is promoted and dysthanasia is avoided. In 2009, the Federal Council of Medicine (CFM) wrote for the first time the term palliative care in the Code of Medical Ethics, maintaining the wording in the current version of the Code, published in 2018 [7].

Regarding health care, in 2018, Brazil had 177 Palliative Care services, expanding to 190 in 2019. Although this increase of almost 8% represents advances, it is not enough for Brazil to be among the nations with the best level of coverage of this type of care [8].

Frossard [9] reports that palliative care denotes the reality of public health in Brazil, lacking intensive care units and expecting greater investments. For the author, it is urgent to draft laws that are actually implemented in fact. The researcher brings to light the reflection on the social assistance policy implemented at the different levels of social protection, based on the availability of social services that should incorporate demands for palliative care with reception of the difficulties of people who are dependent on this care.

ALONG THE SAME LINES, HERE IS WHAT SANTOS, FERREIRA AND GUIRRO (2020) POINT OUT:

Unlike countries where Palliative Care is more developed, Brazil did not have, until November 2018, any policy that specifically structured or guided the development of the area and even today there are differences when comparing the state and federal levels [8].

The demand for PC is a current public health problem, especially due to the progressive aging of the world population, whose consequence is revealed by the substantial growth in the number of elderly people. This context, according to Queiroz [10], highlights the importance of this care, as well as the reorganization of health services in order to ensure their supply.

This care consists of the assistance provided by a multiprofessional health team, in addition to volunteers, to individuals diagnosed with a life-threatening chronic disease, with the aim of improving the quality of life of these subjects and reducing hospitalizations and unnecessary care [5]. In this way, PCs go through the interdisciplinarity of care, in an integral way, for people with advanced diseases in the terminal phase and their families and/or caregivers [11].

In the Brazilian national territory, Primary Care is developed with capillarity and, in a decentralized way, occurs in the place closest to people's lives. There are several related governmental strategies, among them, Basic Health Units, Community Health Agents, Family Health Team and Family Health Support Nucleus, having at an intermediate level the Mobile Emergency Care Service, Emergency Care Units and Medium and High Complexity care provided in hospitals. Secondary care is composed of specialized services at an outpatient and hospital level, with a technological density between primary and secondary care. The third level of care, called tertiary or high-complexity care, is composed of highly specialized therapies and procedures, also organizing procedures that require high technology and high cost, such as oncology, cardiology, transplants, among others [12,13].

According to the World Health Organization, PC can be performed at different levels of health care, especially within the PHC, bringing benefits to the health system in the reduction of hospitalizations, and can be offered by health professionals and volunteers [3].

It is known that this type of care for patients with non-communicable chronic diseases can benefit them. PC is present at all levels of care, and can be adopted as an approach by qualified health professionals [14].

Ethical dilemmas and insecurities from the legal point of view of professionals, in the face of palliative care, commonly arise. Therefore, one of the pillars of medical ethics is decision making. Having the ability to make the right decision, informing patients and their families and/or caregivers that they need to understand the risks and benefits of each therapeutic option, is essential so that they can make decisions according to their life history and values. However, studies show that many patients have inadequate views on their prognosis [15].

Faced with the finitude of life, the terminal patient is granted respect for autonomy; beneficence; non-maleficence; and justice. He has the right to be treated properly until his death. Even if there is no prospect of life, he has the right to feel hope

and express, as he wants, feelings and emotions in the face of death. Another important ethical factor to consider refers to the right of this patient to participate in decisions about care, treatments and receiving medical and nursing care, even if the healing goals assume the sense of comfort goals. He must not yet die alone; be relieved of pain and discomfort and, finally, have your questions (asked or suggested) answered honestly [16].

The issues related to the process of finitude faced by the patient are not always clearly explained to the health professionals involved in this care. Therefore, the qualified listening of this professional, with a view to providing more substantial information, will provide greater support for patient care. Also looking at this caregiver, respecting their limits, is essential [17].

Palliative care at home provided by the Primary Health Care team

From the Declaration of Alma-ata, in 1978, a new form of organization of the health system was carried out. Primary Health Care (PHC) constitutes a primary health care model based on scientific evidence, methods and practices within the reach of individuals, families and communities.

According to the Ministry of Health, there is a configuration that does not match the care models recommended in public policies. This inconsistency is marked by the provision of services and the population's health needs. Therefore, for this discrepancy to be overcome, it is necessary to rescue the Health Care Networks, since they aim at the systemic integration of health actions and services with the increase of the system's performance in terms of access, equity, clinical and sanitary[18].

As the PHC is the gateway to the health system and because it is decentralized, it should value the proximity of services to the population, whose actions are organized through the multidisciplinary team. The Family Health Strategy (FHS) is the form of action used in the Brazilian scenario [1].

On the other hand, Home Care (HC) aims to reorganize the work process of teams that provide home care in PHC, in outpatient clinics, in urgent and emergency and hospital services, with the goal of reducing the permanence of hospitalized users. [19].

AD was adopted by Brazilian public policies as an alternative to hospitalization. In the Unified Health System (SUS), this care format was established by Law No. 10,424, of April 15, 2002, which defines this type of assistance and by Ordinance No. 2,529, of October 19, 2006, which defines the forms of action, the formation of the care team, financial resources and accreditation conditions. More recently, the forms of AD were redefined by Ordinance No. 963, of May 27, 2013, which establishes the Home Care Service (SAD) in the SUS, defining the formation of the Multiprofessional Home Care Team (Emad) and including PC and death care in its prerogatives [20].

Souza et al. [1] and Floriani and Schramm[21], refer that PC care in PHC should not be understood as home care of the home care type. Therefore, their work must be organized to assist patients suffering from advanced chronic diseases, with high dependence, in traditional interventionist ways. In relation to PC specifically in PHC, it refers to a specific type of service that can be organized and offered at all levels of reference, without interruption.

In the Brazilian context, since the beginnings of the Community Health Agents Program (PACS) and the Family Health Program (PSF), with wide national distribution, they already provided for visits by a team of health professionals at home, so that, despite not having originally developed for palliative care actions, they were gradually structured to incorporate such a model, assuming important attributions in this care modality [21].

Souza et al. [1] already reported the reality of patients and family members who need home care with the use of palliative care by PHC professionals. These situations they experienced generated ethical challenges, especially with regard to communication between the team, family and patient and the lack of emotional and institutional support for caregivers, due to the wear and tear resulting from the overload of care that can be clearly perceived by the team.

The integration of PC to existing health services, especially those that include home care, without requiring specialized knowledge, greatly facilitates access to this type of care for a greater number of users [22] .

The fact that the patient can be at home, maintaining their privacy and being able to perform daily tasks, maintaining leisure habits, are some of the numerous benefits of palliative care. You have a more varied diet at home and more flexible hours. These factors promote and/or strengthen the subject's autonomy. Another benefit is the reduction of long and costly hospital stays for the health system. Such care basically requires good communication, treatment of symptoms – such as pain and others – at the end of life, generally low cost, and great coordination of the care process [3].

In addition, visits and attention from the health team that is intended for the patient and family are essential for a better quality of life for the client and there is no need to use more complex resources to control physical symptoms brings to the reflection the meaning of palliative care that is materialized through the relief of suffering, early identification, correct assessment and treatment of pain, greater autonomy of the patient in meeting their needs.

Another factor to be pointed out as an aid tool used by professionals who work at home is qualified listening and guidance to family members and caregivers about unexpected situations with the patient. This listening can help to reduce anguish, moreover, these people need to be prepared, as much as possible, for some events, such as clinical complications [17].

There is no ready-made recipe about PC for patients and their families and/or caregivers. However, the approach is of great importance as, in this phase of life, of great vulnerability, with the proximity of the finitude of life, people almost always cling to their beliefs and values as an inner resource to relieve their anguish. Therefore, understanding death as a natural

process of life, although not an easy task, may be the only way to relieve the suffering of definitive disconnection from life as we know it [19].

Highlights as fundamental the adequate relief of symptoms, which can restore the confidence of the patient and their families, making them safer and more comfortable to enjoy care, according to their needs, in the comfort of their homes, living every moment that is rightfully theirs[4].

METHODOLOGY

The integrative review was adopted as a method for grouping the data collected on the proposed theme. It is a broad methodological approach that allows the inclusion of experimental and non-experimental studies, data from the theoretical and empirical literature on what is to be analyzed [23].

Unlike the systematic review that constitutes experimental studies of recovery of critical analysis of the literature, the integrative review appears with the objective of reviewing and combining studies with different methodologies, integrating the results [24].

Like other review methods, integrative review is linked to Evidence-Based Practice (EBP). Data were sought in order to answer the guiding question: What is the importance of palliative care at home provided by the Primary Health Care team, consisting of a doctor, nurse, community health agent and nursing technician, based on the characteristics of each municipality, as established by the guidelines of the National Primary Care Policy (PNAB) and the essential attributes of PHC?

For data analysis, a search for articles from the last six years was carried out, seeking the most up-to-date publications on the subject, being searched in a database in the Latin American and Caribbean Literature on Health Sciences (LILACS), Scientific Electronic Library Online (SCIELO) and MEDLINE. The search was carried out in November 2021, with an update in January 2022 in the same databases. The following descriptors were used: non-communicable chronic diseases; palliative care and primary health care. For the operationalization of the study, the descriptors were crossed in the referred database associated with the Boolean operator and.

As inclusion criteria in the results, articles published between 2016 and 2022 were used, with full text, described in Portuguese and English, free of charge. Articles that were not in accordance with the objectives proposed in this study were excluded.

The process of identification, selection and inclusion of primary publications took place in the following steps: step 1 - identification of studies through descriptors and application of filters, totaling 568 articles; 2 - reading the titles and abstracts of the articles, applying the inclusion and exclusion criteria, being selected 34 articles. After reading these in full, 7 articles were chosen that met the objective of this study. It should be noted that the ethical aspects and the Copyright Law were met.

RESULTS AND DISCUSSION

Regarding the characterization of the analyzed articles, two (28.5%) were published in 2016, two (28.5%) were published in 2019, one (14.5%) in 2021 and two (28.5%) were published in 2022. Among the studies, none were published in a specific journal for palliative care, 2 were published in public health journals, 1 in a cancerology journal, 2 in nursing journals, 1 in a PHC journal and 1 in a psychology journal. In this study, in order to facilitate the visualization of the results found, a synoptic table was built containing the author, journal, article title, method and conclusion.

AUTORIA	PERIÓDICO	TÍTULO	MÉTODO	CONCLUSÃO
Marcucci *et al.* (2016)	Cadernos de Saúde Coletiva	Identificação de pacientes com indicação de Cuidados Paliativos na Estratégia Saúde da Família: estudo exploratório	Estudo exploratório transversal, realizado a partir da seleção de uma UBS do município que possuía uma equipe da ESF.	Os CP ainda não estão incluídos nas diretrizes de atuação da ESF, apesar de DCNT's estarem presentes no cotidiano dos profissionais inseridos na atenção primária e demandarem cuidados frequentes por parte das equipes e de seus cuidadores.
Pessalacia, Zobeli e Ribeiro (2016)	Revista de Enfermagem do Centro Oeste Mineiro	Equidade no acesso aos cuidados paliativos na atenção primária à saúde: uma reflexão teórica	Estudo de reflexão teórica	Identificou-se como determinantes e condicionantes: financiamento em saúde, responsabilidade dos profissionais; quantitativo de profissionais necessário; estrutura dos serviços; acesso a medicamentos; organização dos serviços para a tomada de decisão justa mediante recursos limitados; políticas voltadas para correção das disparidades; estratégias de priorização e racionalização do acesso aos serviços.
Oliveira, Bombarda e Moriguchi (2019)	Cadernos de Saúde Coletiva	Fisioterapia em cuidados paliativos no contexto da atenção primária à saúde: ensaio teórico	Revisão da Literatura	Para atuação qualificada, há necessidade de integração das perspectivas e da filosofia dos CP em sua totalidade e em consonância com as diretrizes de atuação na APS durante a formação profissional do fisioterapeuta, com a necessidade também de investimentos no desenvolvimento de pesquisas nesse cenário.
Côbo *et al.* (2019)	Boletim Academia Paulista de Psicologia	Cuidados paliativos na atenção primária à saúde: perspectiva dos profissionais de saúde	Estudo descritivo e exploratório	A APS é feita por profissionais identificados com seus princípios e diretrizes, direcionada por sua demanda, sendo que há uma cultura que impõe uma visão imediatista sobre a saúde.
Oliveira *et al.* (2021)	Revista de APS	Cuidados paliativos na Atenção Primária à Saúde: atribuições de enfermeiros e enfermeiras	Revisão Integrativa da Literatura	Percebe-se a necessidade de mais estudos que demonstrem as atribuições da equipe de enfermagem na APS, haja vista a mudança do perfil epidemiológico, o aumento da prevalência das doenças crônicas não transmissíveis (DCNT's), causas externas e câncer.
Silva, Nietsche e Cogo (2022)	Revista Brasileira de Enfermagem	Cuidados paliativos na Atenção Primária à Saúde: revisão integrativa de literatura	Revisão Integrativa da Literatura	Evidências encontradas relacionando cuidados paliativos na Atenção Primária à Saúde apontam para a possibilidade desse cuidado; equipes de saúde atuam de maneira próxima a família e seu domicílio, porém ainda se percebe a necessidade de ampliação deste tema
Fonseca *et al.* (2022)	Revista Brasileira de Cancerologia	Atuação do Enfermeiro em Cuidados Paliativos na Atenção Primária à Saúde: Revisão Integrativa	Revisão Integrativa da Literatura	Os enfermeiros possuíam conhecimento superficial acerca dos CP na APS, evidenciando a necessidade de educação continuada para promover a sua atuação em CP. Ademais, estudos com maior rigor metodológico com o foco no enfermeiro como agente disseminador da prática são necessários.

Chart 1 – Synoptic table with distribution of references according to authorship, journal, article title, method and conclusion, 2016 – 2022.

The increase in chronic non-communicable diseases (CNCDs) has represented one of the main causes of death of individuals, implying a great challenge for the health system. These CNCDs are associated with physical and social limitations with aging, causing comorbidities. Thus, there is a need for continuous care [25,29].

These non-communicable pathologies, such as cancer, diabetes, hypertension and others, cause the subject to gradually lose their functional independence, greatly impacting their quality of life, compromising their autonomy. In addition, deaths from these diseases are preceded by a decline in physical and nutritional conditions, trauma, physical and psychological symptoms, requiring a comprehensive approach to NCD patients [27].

The fact is that people with no possibility of curing certain diseases, in the terminal phase, are, for the most part, kept in hospitals, sometimes receiving inadequate care since the focus is on keeping them alive. Therefore, invasive methods and technologies are applied that do not consider the suffering of the patient and their families, who stay in their homes apprehensive, not really knowing how the loved one is, or how their feelings are in the face of the cold environment of the hospital. It is important to consider the home as a place where the patient can be at the end of life and, in this perspective, PHC is the closest level of care to the community, being thus the most appropriate for providing palliative care of the terminal patient, also giving full support to the family [29].

It should be noted that palliative care in PHC, at home, aims to assist the subjects in their terminality, as well as their family members, allowing the individual to live their last days with dignity, minimal suffering, intensity and better quality of life, since they will be next to their loved ones. In order to guarantee this right, the Ministry of Health launched the Better at Home Program in 2011, which allows the health team to get to know the patient's reality more deeply, helping to improve the quality of life of the subject and their families [29].

Analyzing the principles established by the Unified Health System (SUS) within the scope of PHC, there is comprehensive care, that is, considering the patient as a whole. The National Primary Care Policy points out this principle as follows:

Set of services performed by the health team that meet the needs of the population enrolled in the fields of care, health promotion and maintenance, prevention of diseases and injuries, healing, rehabilitation, harm reduction and palliative care. It includes accountability for the provision of services at other health care points and the adequate recognition of the biological, psychological, environmental and social needs that cause diseases, and management of the various care and management technologies necessary for these purposes, in addition to expanding the autonomy of people and collectivity (PNAB, 2017, s/n).

Therefore, palliative care, according to the aforementioned Law, includes one of the approaches used by PHC professionals with a view to guaranteeing the integrality of health actions. Assistance is provided by a multidisciplinary team, including diagnosis, illness process, end of life and mourning, and the team needs to recognize the subject in all its dimensions [31].

Among the few norms that mention Palliative Care are Ordinance No. 741, of December 19, 2005, its update, Ordinance No. 140, of February 27, 2014, and Ordinance No. 483, of April 1, 2014. Ordinance No. 741 defines and Ordinance No. 140 updates the criteria for the performance of the High Complexity Assistance Units in Oncology (UNACON), the High Complexity Assistance Centers in Oncology (CACON) and the High Complexity Reference Centers in Oncology. Ordinance No. 483 redefines the Health Care Network for People with Chronic Diseases within the SUS, establishing guidelines for the organization of its lines of care [8].

For Pessalacia, Zoboli and Ribeiro (2016), the health system in Brazil is not prepared to meet the demands arising from a new population profile that needs PC, still being linked to curative and hospital-centric practices. In this way, there is a great overload of the secondary care sector, which has resulted in an increase in the costs of financing health actions. [26]

However, for Azevedo et al. (2016), although there is a lot of evidence on the positive impacts of early palliative care, this type of care has been given to patients who are in advanced stages of the disease. Many are referred late, which minimizes the chances of having a better quality of life in their finitude [5].

It is known that PHC constitutes the first level of the Health Care Network, being its gateway and whose characteristics encompass both individual and collective health actions, including promotion, health protection, disease prevention, diagnosis, treatment, rehabilitation and maintenance of health, being developed with participatory management and health practices, through a multidisciplinary team focused on populations in well-defined territories [28].

Studies by Silva, Nietsche and Cogo (2022) aimed to analyze scientific evidence on the implementation and performance of palliative care in Primary Health Care. For the authors, palliative care is part of the work of PHC professionals, clearly contemplating the assessment of symptoms through the multidisciplinary team in its holistic approach[30].

Like Silva, Nietsche and Cogo [30], studies by Fonseca et al. [31], address the holistic issue in patient care. Fonseca and collaborators analyzed the role of nurses, who are an integral part of the PHC team, in palliative care in primary health care. According to this study, this type of care is defined as holistic, that is, it aims to assist the patient in their physical, mental and spiritual dimensions, seeking to assist the subject with life-threatening illnesses, through the relief of symptoms and consequent quality

of life improvement, both for him and for his family and caregivers. Thus, palliative care is based on careful pain assessment, symptom control and other physical manifestations.

It is concluded by stating that, with the emergence of non-communicable chronic diseases, a model of care that includes palliative care is essential. It is necessary to attend to the patient in an integral way, adopting a holistic approach, considering that the terminality of some health problems go beyond the proximity of death, they are a background for other needs that may involve family, social, cultural and economic problems.

FINAL CONSIDERATIONS

Palliative care at home aims at quality of life for the patient through assistance based on humanization and compassion towards those who are at the end of their life and who are inserted in a sociocultural context. Through these care established with a professional-patient-family bond, maintaining continuity of care, the terminal patient lives more comfortably and safely with their families.

We know that countless patients die before receiving palliative care and suffer from the disease, often without the minimum quality of life and with a lot of suffering in the face of the situation. Thus, it is necessary to think and reflect on Palliative Care, which should be available as close as possible to the patient, that is, in Primary Health Care.

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ORIGINAL ARTICLE

RISK PREDICTORS FOR THE DEVELOPMENT OF ACUTE POSTOPERATIVE PAIN IN PATIENTS WITH ORTHOPEDIC TRAUMA

CAIO BARROS, ANTONIO CARNEIRO, TOLOMEU CASALI, MILENA MOREIRA

ABSTRACT

Aim: To identify the incidence os acute postoperative pain and predictors for its development.

Methods: Prospective, observacional and longitudinal was conducted in a orthopedic trauma center that is a regional reference, with patients thas had any orthopedic injury and needed surgery. For statistical analysis, patients were divided in four groups (without pain, mild pain, moderate pain and severe pain), acording to analogue visual escale after 24 hours of surgery.

Results: 82 pacients were included. 26 (31,7%) showed moderate to severe pain afer 24 hours postoperative. Three risk fator were associated with pain intensity after 24 hours of surgery: age, pre operative anxiety and pain. Preoperative pain had significantly association.

Conclusion: Patients with preoperative pain had a greater risk of development of acute postoperative pain. Pain intensity is directly related in pre and postoperative periods. Identify these risk factors can guide the pain team in their decisions. In this context, the anesthesiologist has an elementar role on the prevention and control of acute postoperative pain.

KEYWORDS: ACUTE POSTOPERATIVE PAIN; ORTHOPEDIC PROCEDURES; TRAUMATOLOGY CENTERS; RISK FACTORS; OPIOID.

INTRODUCTION

Orthopedic traumas are quite relevant to public health, considering the high number of patients who are victims of this situation. More than 125 million people suffer an orthopedic injury annually[1]. Erivan et al. demonstrated a 59.6% increase in orthopedic surgical procedures in 10 years. Femur fracture was the main type[2]. Orthopedic injuries constitute 50% of injuries admitted to a tertiary trauma center. [3]

Orthopedic surgery is considered one of the procedures most associated with acute postoperative pain (APOP). Many patients complain of severe pain after the surgical procedure, with pain scale scores greater than 6 out of 10 points [4]. Inadequate control of APOP is intrinsically related to the development of chronic postoperative (PO) pain [5] .

The study of APOP pathophysiology has developed over the last 20 years. It is a specific entity resulting from both an inflammatory process and an injury to nerve tissue. But despite the evidence based on experimental studies, there is a difficulty in extrapolating them to clinical practice, delaying the development of more effective treatments for APOP [6].

It is necessary to identify those who are more likely to experience severe APOP and, consequently, have a greater risk of complications [7]. Both severe acute pain and chronic pain have consequences for patients, with increased morbidity, delayed recovery, increased use of opioids, worsening in quality of life in addition to higher costs for health services [8,9].

An observational study with 153 patients undergoing orthopedic surgery showed that smokers, with comorbidities (American Society of Anesthesiologists' physiological status classification - ASA >2) and higher opioid consumption were significant risk factors for severe postoperative pain [5].

Arefayne et al. demonstrated that patients who were anxious prior to surgery and who believed they would feel PO pain are significantly associated with moderate to severe pain 24 hours after the orthopedic surgical procedure [10].

A cohort conducted with surgical patients victims of orthopedic trauma identified female sex and previous surgery as risk factors for severe acute pain [9].

The identification of factors associated with the risk of developing APOP in the preoperative evaluation is essential for signaling patients who will need a more careful approach, helping to control postoperative pain and reducing the consumption of opioids [11].

This is already an opportune moment to share responsibilities for the treatment with the patient, aligning their postoperative expectations with the goals outlined togeth-

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er with the team. Such approaches represent an important step in optimizing perioperative pain management [12].

Therefore, there are pre and intraoperative factors that predispose to the development of APOP, influencing the complete recovery of patients undergoing orthopedic surgical treatment. The identification of these factors can guide the assistant team in the adequate pain management, combating the perpetuation of the nociceptive stimulus and reducing the chances of severe APOP.

OBJECTIVES

To identify risk factors for the development of APOP in patients with orthopedic trauma undergoing surgical treatment.

METHODOLOGY

Type of study and place of development

This is a prospective longitudinal observational study carried out in a tertiary orthopedic trauma center.

Data collection was carried out through the application of questionnaires in November and December 2021 and January 2022. All patients and/or guardians were "clarified about the nature of the research, its objectives, methods, expected benefits, potential risks and the discomfort it could cause them, as far as they are understood and respected in their singularities", meeting the norms of the National Health Council (CNS) (466/2012).

SAMPLING

The sample size was calculated with the G-Power program using the Chi-square test, considering a power of 85%, alpha of 0.05 and sample loss of 15%. Data from the first 8 participants in each group (no pain, mild pain, moderate pain and severe pain) were considered. For this calculation, the value of VAS at the entrance was considered. Thus, a sample size of 32 participants, 8 per group, was calculated.

INCLUSION CRITERIA

Patients aged 18 years or older were included; of both genders; able to communicate; admitted to the aforementioned unit for orthopedic surgical treatment involving bone, muscle, ligament or tendon injuries, due to some trauma mechanism; submitted to any type of anesthesia; with immediate PO in the ward or ICU and who signed the Free and Informed Consent Term (TCLE), in accordance with CNS resolution 466/12.

EXCLUSION CRITERIA

Patients with cognitive impairment (acute or chronic); who presented with a Glasgow Coma Scale (GCS) lower than 15 in the post-anesthesia care unit (PACU) due to residual sedation or who refused to participate in the research.

EXECUTION

Initially, the research team received a daily updated list from the Internal Regulation Nucleus team (NIR) of patients admitted to the unit, either in the ward or in the ICU. Afterwards, the researchers selected the patients who were candidates to participate in the research, based on the inclusion/exclusion criteria.

PREOPERATIVE EVALUATION

The interviewer looked for the patient in his hospital bed, on the day of his admission, for the initial presentation of the work. The patient who accepted to participate in the research and signed the informed consent was submitted to a preoperative form applied by the interviewer. This moment occurred between 06:00h and 18:00h, as patients admitted at night, from 18:00h, were interviewed from 06:00h of the following day. At that moment, anamnesis was performed and personal data, sociodemographic information, medical history and preoperative expectations were collected. Patients were asked about the presence of pain and emotional conditions.

INTRAOPERATIVE EVALUATION

During the surgical procedure, necessary information was obtained to complete the supplementary form through the electronic medical record, such as pain assessment at the entrance to the operating room (OR), surgical time (in minutes), surgery performed, surgical size, type of anesthesia performed and drugs used intraoperatively.

POSTOPERATIVE EVALUATION

In the PO, the same pain assessment was performed at PACU admission and discharge, as well as 24 hours after PACU discharge, the latter being used to categorize patients into 4 groups (no pain, mild pain, moderate pain and severe pain) .

PAIN ASSESSMENT

Pain assessment was performed before (admission and arrival at the OR) and postoperatively (arrival at the PACU, discharge from the PACU and 24 hours after discharge from the PACU), using the VAS. The VAS is an instrument that consists of a 10-centimeter long straight line, the left end being "absence of pain" and the right end being "the greatest possible intensity of pain".

The patient was asked to place the finger on the cursor, between the two extremes, indicating the point corresponding to the pain at that moment. Subsequently, the intensity of the result was classified into: group without pain (GWP) (VAS=0), group with mild pain (GMP) (VAS 1-3), group with moderate pain (VAS 4-6) and group with severe pain. (GSP) (VAS ≥ 7) 13. The scale is a validated instrument, in addition to being the measurement standardized by the institution, facilitating its application.

There was no interference from the investigators regarding the signaling of pain to the assistant team, nor about procedures aimed at patients' analgesia.

ASSESSMENT OF EMOTIONAL CONDITIONS

After the initial data collection, the interviewer instructed the participants on the questionnaire for the assessment of anxiety, the Beck Anxiety Inventory (BAI). Proposed by Beck et al. in 1988, the questionnaire proved to be useful in measuring the level of anxiety, without overlapping symptoms of depression confounding the assessment [14]. It is a 21-item scale that describes common symptoms of anxiety.

The patient responded by rating how much each symptom bothered him in the last week on a scale ranging from 0 (Absolutely not) to 3 (Severely – Difficult to bear). The sum of individual scores ranges from 0 to 63. Anxiety severity was defined in four stages: minimal (from 0 to 10), mild (from 11 to 19), moderate (from 20 to 30) and severe (from 31 a 63) [14]. The BAI is an instrument validated in the Portuguese version 15, easy to apply because it consists of simple and brief questions, focusing on somatic symptoms of anxiety in the short term [16].

Analyzes were performed in absolute values and severity categories. Patients who already had a diagnosis of anxiety and/or were under anxiolytic drug treatment were not evaluated by the BAI questionnaire.

OPIOID CONSUMPTION

The standardization of the equivalent of milligrams of morphine (MME) was used to compare the treatment with opioids in the different surgical procedures. This value represents the estimated equianalgesic dose of the different opioids and is useful for monitoring those most at risk for abuse and overdose.

For the calculation, the daily dose of a given opioid is multiplied by the conversion rate to determine the MME in milligrams per day (mg/day). An MME less than 20 mg/day has a 1.44 lower risk of overdose than an MME between 20-49 mg/day, 3.73 lower than an MME between 50 and 99 mg/day, and 8.87 less than an MME greater than 100 mg/day [17]. Based on recent literature, the following conversion values were used: intravenous morphine (x3), intravenous fentanyl (x300), oral codeine (x0.15) and intravenous tramadol oral (x0.1)[18].

STATISTICAL ANALYSIS

The Statistical Package for the Social Sciences (SPSS) version 20 for Windows was used for data analysis. Data normality was verified using the Kolmogorov-Smirnov test and parametric variables were expressed as mean ± standard deviation and non-parametric variables as median (interquartile range 25-75%), as well as nominal variables were expressed as frequency (percentage).

To compare the groups with and without APOP, the One-Way Anova test was used for parametric variables and its non-parametric equivalent, the Kruskal-Wallis test. For associations of categorical variables, the chi-square test was used, with Cramer's V being used for variables with more than two response categories. A significance level of 5% was adopted.

The association between APOP and the other variables was established using the Pearson or Spearman correlation coefficient for parametric and non-parametric data, respectively, and the correlation coefficients were classified as a weak correlation (r between 0.2 and 0.39) ; moderate (r between 0.4 and 0.69) and strong (r between 0.7 and 0.89) [19].

To compare the categories of groups that performed or not peripheral blocks in lower limb surgeries, Student's t test was used for parametric variables and its nonparametric equivalent Mann-Withney test. To compare the categorical variables, the chi-square test was used. A significance level lower than or equal to 5% was adopted.

ETHICAL ASPECTS

The study was approved by the Research Ethics Committee (CEP) of the Centro Universitário de Brasília (UNICEUB) CAAE: 53142221.3.0000.0023 and the participating institution, in accordance with resolution 466/12 CNS. Data collection was performed only after this approval.

The patients or their respective guardians signed the consent form for authorization as a participant in this research, which was signed after receiving all the information related to the phases and procedures of this project, and its objectives, in addition to possible ways of disclosing the results and confidentiality.

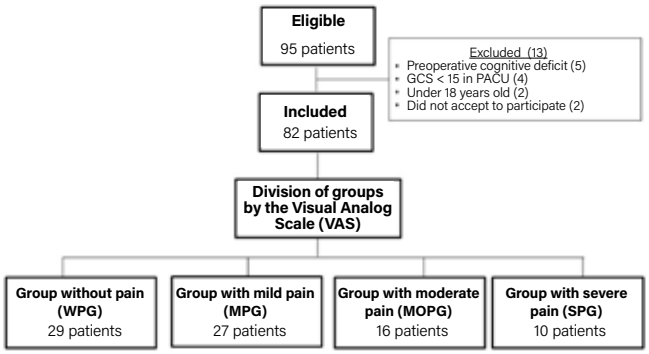
They were clarified about the possible benefits and risks and ways of repairing these, such as the possibility of compensation, if they cause harm to the patient and reimbursement of expenses that the participant, perhaps, would have with the research.

All information was given as clearly and simply as possible for them to decide whether or not to participate in the study. They did not receive any remuneration or bonus for this and were free to withdraw their consent to continue the research at any time and at any stage of the research, without penalty or any detriment to their assistance.

The data were confidential and the names of the patients were kept confidential during all stages of the study, with an explicit commitment that they would not be identified.

RESULTS

Of the hospitalized patients, 95 were eligible for the study, but 13 were excluded, totaling 82 patients (Figure 1). The 82 patients were divided according to the VAS score after 24 hours postoperatively into groups without APOP (WPG=29), with mild APOP (MPG=27), moderate APOP (MOPG=16) and severe APOP (SPG=10). Most of the population studied (53.6%) had incomplete elementary education, followed by 15.8% who were illiterate. Schooling was not a significant factor in predicting the development of APOP.



Caio Barros - Figure 1. Study flowchart

The mean age between the groups was 59.7 years, and the group with severe pain had the lowest median (46 years) (p = 0.09). No significant differences were observed for sociodemographic variables (Table 1).

Regarding preoperative data, no significant differences were observed between the groups for the admission interval (p=0.07), surgeries (p=0.72) and previous pain (0.54) and trauma mechanism (p=0.72). =0.75). However, patients in the pain-free group had the lowest median interval of days between the trauma and the surgical procedure (3 days), while the group with severe pain had the longest interval, with a median of 6 days (p=0.07).

Variável (n=82)	GSD (n=29)	GDL (n=27)	GDM (n=16)	GDF (n=10)	p valor
Sexo					
Feminino	15 (51,7)	20 (74,1)	9 (56,2)	5 (50)	0,31
Masculino	14 (48,3)	7 (25,9)	7 (43,8)	5 (50)	
Idade (anos)	59 (43,5-68)	64,5 (53,2-77)	69,5 (46,2-79,2)	46 (30-72)	0,09
IMC (kg/m²)	24,3±4,6	26,1±3,9	24,8±4,5	24,9±6	0,46
Escolaridade					
Analfabeto	2 (6,9)	8 (29,6)	3 (19)	0	0,47
Ensino Fundamental incompleto	18 (62,1)	12 (44,4)	9 (57,1)	5 (80)	
Ensino Fundamental completo	5 (17,3)	3 (11,1)	2 (9,5)	2 (20)	
Ensino Médio incompleto	2 (6,9)	3 (11,1)	0	2 (20)	
Ensino Médio completo	1 (3,4)	1 (3,8)	2 (4,8)	1 (10)	
Ensino Superior ou Pós graduação	1 (3,4)	0	0	0	
Religião					
Católico	20 (69)	15 (55,6)	13 (81,3)	3 (30)	0,20
Espírita	1 (3,4)	1 (3,7)	0	1 (10)	
Evangélico	8 (27,6)	11 (40,7)	3 (18,7)	6 (60)	

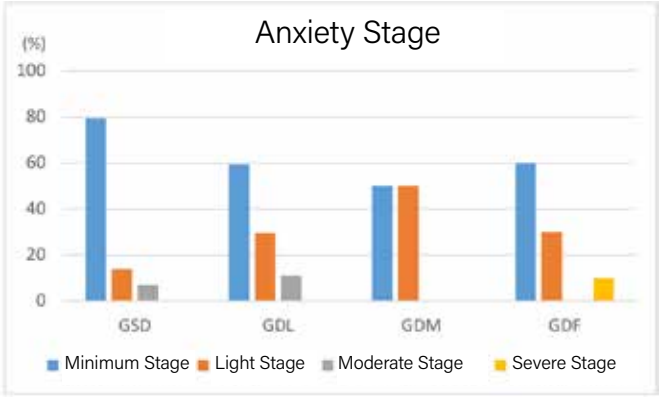
Dados apresentados em média±desvio padrão; frequência (porcentagem); mediana (intervalo interquartílico (25-75%)).

Caio Barros - Table 1. Sociodemographic Data

No differences were observed for the sensation of pain that the patient would possibly feel in the PO, as well as for the score on the anxiety scale. (Table 2).

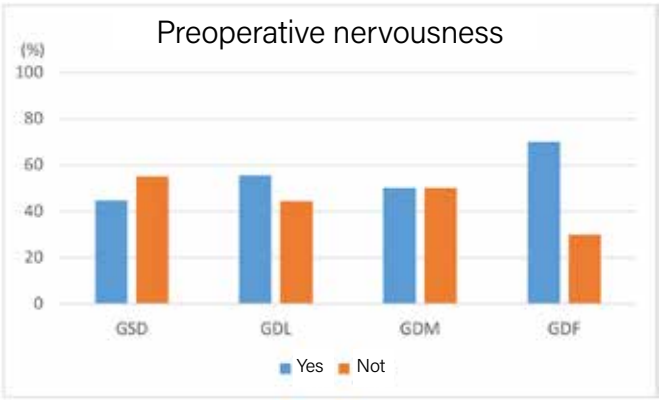
Most patients (59.7%) were hospitalized due to a fall from their own height, 24.3% due to a car accident, 10.9% due to a fall from a level and 4.8% due to a work accident or violent cause.

Regarding emotional conditions in the preoperative period, there was no statistical difference for the score on the BAI anxiety scale and most patients were in the minimum stage (p=0.16) (Figure 2).



Caio Barros - Figure 2. Classification of preoperative anxiety in the 4 groups

The pain-free group had a higher percentage of patients who were not nervous/anxious, while in the severe pain group, most patients (70%) reported being nervous/anxious before surgery, with no significant difference between them (p=0.56) (Figure 3).



Caio Barros - Figure 3. Self-report of preoperative nervousness/anxiety in the 4 groups

Regarding the intraoperative findings, it was observed that the WPG had a significantly lower number (p=0.05) of patients with pain at the entrance to the OR when compared to the MPG, MOPG and SPG. There was a progressive increase between the groups, with 90% of the patients in the SPG presenting with preoperative pain. However, none of the patients in this group received analgesia. In addition, higher scores on the VAS at entry were observed for the groups with moderate pain and severe pain, with a difference between the groups (p=0.02). After performing the Kruskal-Wallis test, it was evidenced that this difference occurred specifically between the WPG and the groups with mild pain (p=0.03), moderate pain (p=0.01) and severe pain (p=0. 03).

Variável (n=82)	GSD (n=29)	GDL (n=27)	GDM (n=16)	GDF (n=10)	p valor
Intervalo trauma-cirurgia (dias)	3 (0-9)	5 (4-7)	4 (3-5)	6 (3,75-17,5)	0,07
Cirurgias prévias					
Sim	24 (82,8)	20 (74,1)	11 (68,7)	8 (80)	
Não	5 (17,2)	7 (25,9)	5 (31,3)	2 (20)	0,72
Dor prévia ao trauma					
Sim	11 (37,9)	13 (48,1)	10 (62,5)	4 (40)	0,54
Não	18 (62,1)	14 (51,9)	6 (37,5)	6 (60)	
Mecanismo de trauma					
Queda da própria altura	16 (55,2)	18 (66,7)	10 (62,5)	5 (50)	0,75
Queda de nível	3 (10,3)	3 (11,1)	2 (12,5)	1 (10)	
Acidente automobilístico	8 (27,6)	5 (18,5)	4 (25)	3 (30)	
Violência	0	1 (3,7)	0	1 (10)	
Acidente de trabalho	2 (6,9)	0	0	0	
Sentirá dor					
Sim	14 (48,3)	17 (63)	10 (62,5)	5 (50)	0,42
Não	15 (51,7)	10 (37)	6 (37,5)	5 (50)	
BAI (categoria)					
Estágio Mínimo	23 (79,3)	16 (59,3)	12 (75)	6 (60)	
Estágio Leve	4 (13,8)	8 (29,6)	4 (25)	3 (30)	0,16
Estágio Moderado	2 (6,9)	3 (11,1)	0	0	
Estágio Grave	0	0	0	1 (10)	
Nervosismo					
Sim	13 (44,8)	15 (55,6)	8 (50)	7 (70)	0,56
Não	16 (55,2)	12 (44,4)	8 (50)	3 (30)	

Legenda: BAI: Inventário de Ansiedade de Beck (Beck Anxiety Inventory – BAI). Dados apresentados em frequência (porcentagem) e medias (intervalo interquartílico (25-75%)).

Caio Barros - Table 2. Preoperative data

Regarding the surgical size, most patients in the pain groups (MPG, MOPG and SPG) underwent medium-sized surgeries, while the pain-free group mostly performed small surgeries (p=0.16). The patients' surgical time was longer in the MOPG and SPG (p=0.22) (Table 3).

After surgery, a significant difference was observed between the groups for pain (p<0.01) and 24-hour VAS (p>0.01), which was expected since the groups were divided according to the latter variable.

Variável (n=82)	GSD (n=29)	GDL (n=27)	GDM (n=16)	GDF (n=10)	p valor
Dor na entrada do CC					0,05*
Sim	14 (48,3)	22 (81,5)	14 (87,5)	9 (90)	
Não	15 (51,7)	5 (18,5)	2 (12,5)	1 (10)	
EVA na entrada do CC	0 (0-4,5)	3 (1-5)	4,5 (2-8)	5 (2,5-5,7)	0,02**
Analgesia na entrada do CC					
Sim	6 (20,7)	3 (11,1)	5 (31,2)	0	0,15
Não	23 (79,3)	24 (88,9)	11 (68,8)	10 (100)	
Porte cirúrgico					
Pequeno	17 (58,6)	11 (40,7)	5 (31,3)	3 (30)	0,16
Médio	9 (31)	15 (55,6)	8 (50)	7 (70)	
Grande	3 (10,6)	1 (3,7)	3 (18,7)	0	
Sedação					
Sim	29 (100)	25 (92,6)	16 (100)	9 (90)	0,27
Não	0	2 (7,4)	0	1 (10)	
Anestesia Geral Balanceada	1 (3,4)	2 (7,4)	0	1 (10)	0,6
Bloqueio Neuroeixo					
Sim	12 (41,4)	9 (33,3)	8 (50)	6 (60)	0,46
Não	17 (58,6)	18 (66,7)	8 (50)	4 (40)	
Bloqueio Periférico					
Sim	19 (65,5)	18 (66,7)	8 (50)	5 (50)	0,59
Não	10 (34,5)	9 (33,3)	8 (50)	5 (50)	
Tempo cirúrgico (minutos)	60 (60-100)	90 (60-120)	110 (63,7-146,2)	100 (75-135)	0,22

egenda: EVA: escala visual analógica. Dados apresentados em frequência (porcentagem) e mediana (intervalo interquartílico (25-75%)). * p≤ 0.0 este Qui-quadrado **p≤ 0.05 Teste de Kruskal-Wallis

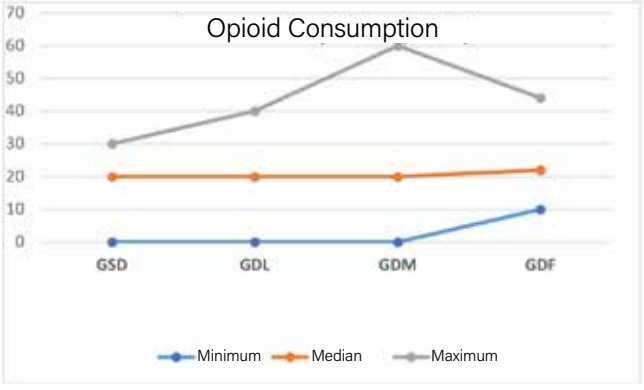
Caio Barros - Table 3. Intraoperative data

In relation to MME, no statistically significant differences were observed (p=0.36) (Table 4). However, it can be observed that only in the GSP group were not found patients who did not consume opioids. Likewise, the highest MME values were found in the GSP. (Figure 4).

Variável (n=82)	GSD (n=29)	GDL (n=27)	GDM (n=16)	GDF (n=10)	p valor
Dor na entrada da SRPA					0,23
Sim	0	3 (11,1)	1 (6,2)	0	
Não	29 (100)	24 (89,9)	15 (93,8)	10 (100)	
EVA na entrada da SRPA	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0,24
Analgesia na entrada da SRPA					
Sim	0	0	0	0	0,70
Não	29 (100)	27 (100)	16 (100)	10 (100)	
Dor na alta da SRPA					
Sim	0	3 (11,1)	1 (6,2)	0	0,23
Não	29 (100)	24 (88,9)	15 (93,8)	10 (100)	
EVA na alta da SRPA	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-0)	0,23
Analgesia na alta da SRPA					
Sim	0	1 (3,7)	0	0	0,56
Não	29 (100)	26 (96,3)	16 (100)	10 (100)	
Dor em 24 horas de PO					<0,01**
Sim	0	27 (100)	16 (100)	10 (100)	
Não	29 (100)	0	0	0	
EVA em 24 horas de PO	0 (0-0)	2 (1-3)	5 (4-6)	7,5 (7-9,2)	<0,01*
Analgesia em 24 horas de PO					0,81
Sim	28 (96,6)	26 (96,3)	16 (100)	10 (100)	
Não	1 (3,4)	1 (3,7)	0	0	
Local de internação no PO					
Enfermaria	22 (75,9)	21 (77,8)	11 (68,8)	6 (60)	0,70
UTI	7 (24,1)	6 (22,2)	5 (11,2)	4 (40)	
MME 24 horas	20 (0-30)	20 (4,5-20)	20 (10-30)	22 (10-25,5)	0,36

genda: SRPA: sala de recuperação pós-anestésica; EVA: escala visual analógica; EMM: equivalentes de miligrama de morfina. Dados apresen
- frequência (porcentagem) e mediana (intervalo interquartílico (25-75%)). * p≤ 0.05 Teste Chi-quadrado **p≤ 0.05 Teste de Kruskal-Wallis

Caio Barros - Table 4. Postoperative data



Caio Barros - Figure 4. Opioid consumption in the 4 groups

DISCUSSION

SOCIODEMOGRAPHIC PROFILE

The SPG had the lowest median age (46 years) among the 4 groups. The literature shows in recent articles that age is a risk factor for APOP. A meta-analysis on APOP identified that younger patients have a 1.18-fold greater risk of having poor pain control in PO [11]. Schnabel et al. showed that patients younger than 54 years of age had a 1.27-fold greater risk of experiencing severe pain in the postoperative period [20]. In line with previous studies, a recent multicentric retrospective cohort with 11,510 patients showed a reduction of 0.2 points in the VAS for each increase of one decade of life [21].

In the population studied, the age difference between the groups with pain approached statistical significance, despite not having reached it. A larger number of patients may be needed to reach significance. But such data are similar to recent literature, indicating that age is a significant risk factor for APOP, despite this difference in reported pain being very small, and perhaps not clinically relevant.

Patients with a low educational level (incomplete elementary school or illiterate) corresponded to 69.4% of the sample. A cohort of 344 elderly people with hip fracture identified 40.1% of patients with less than 8 years of schooling. Low education was an independent risk factor for severe APOP [22]. In an orthopedic emergency scenario, patients have less time to acquire preoperative information and prepare to face this moment. Those with shorter study time have an increased risk of developing more intense APOP. However, in the present study, there was no statistical difference between this factor and pain intensity at 24h PO (p=0.47).

POST-OPERATIVE ACUTE PAIN

In the present study, it was observed that 26 patients (31.7%) had moderate or severe pain within 24 hours of PO, being 12% of the SPG.

Van Boekel et al. investigated the incidence of APOP in different surgeries in 1579 patients and found that 55% of them had pain 24 hours after the surgical procedure with VAS scores between 4 and 10. Of these, 15% reported a VAS between 8 and 10, resulting in 8.25% of the entire sample studied [23].

It is known that orthopedic surgeries are among the most painful surgical procedures. A large prospective cohort comparing the intensity of pain on the first PO day in different surgeries reported that among the 40 surgeries with the greatest pain stimulus, 22 were orthopedic/traumatic [4].

A cohort in an orthopedic trauma center with patients undergoing surgical correction showed that 56% presented with severe PACU pain [9].

Another multicentric prospective cohort aimed to analyze risk factors associated with APOP after emergency orthopedic surgeries. It was found that 29% of patients had moderate to severe APOP within 24 hours of PO [10].

Liu et al. reported that 40% of patients undergoing gastrointestinal surgery had moderate or severe acute pain on PO [24]. This same study showed that the preoperative expectation of feeling pain after surgery was associated with APOP, with statistical significance (p< 0.001).

The percentage of patients who had moderate to severe APOP in this research is equivalent to what is described in the literature in similar articles. However, it is important to emphasize that some studies use different pain measurement scales, which can make such comparisons difficult. In addition, there are few recent studies that have investigated APOP in the orthopedic trauma population.

PRE-OPERATIVE ANXIETY

This research did not show significant differences in the influence of preoperative anxiety on APOP (p=0.16). However, it is described in recent literature that patients who were previously anxious about surgery develop more intense acute pain in the PO. Yang et al showed in a meta-analysis of risk predictors for APOP, without defining which type of surgery, that patients with a history of anxiety symptoms (by self-report or moderate to severe scores on the Hamilton Scale, State Anxiety Inventory or Numerical Scale for Anxiety) had a 1.22-fold greater risk of experiencing more severe pain within 24 hours of PO [11].

A prospective multicenter study evaluated 200 orthopedic trauma patients who underwent a corrective surgical procedure. It was identified that those who had preoperative anxiety had a 6.42-fold risk of developing moderate to severe APOP (95% CI: 2.59-15.90) [10]. In a group of patients undergoing gastrointestinal surgery, the Anxious state prior to surgery was also an independent risk predictor for APOP (p<0.001) [24].

Lemos et al. assessed the level of anxiety before the surgical procedure using the BAI inventory in 72 women scheduled for surgical treatment of endometrial cancer. Half of the population received preoperative information about their treatment and the other half did not. The first group had a greater number of patients with minimal or mild classification compared to the group that did not receive information [16].

One result of this study that drew attention was that when asked if patients felt nervous/anxious about the surgery, in the WPG less than half (44.8%) answered yes, while in the SPG 70% said they were nervous (Figure 3).

The reason that this factor did not present a statistical difference can be explained by the non-inclusion of patients with a previous diagnosis of anxiety. Studies that analyzed preoperative anxiety did not report such a distinction.

It is noticed that the psychological and emotional state of patients who will undergo surgery is a relevant factor for their pain experience in the PO. In the context of traumatic and urgent injuries, the level of stress and anxiety become even greater. Therefore, the sooner a preoperative evaluation is carried out, presenting the patient with the therapeutic plan, understanding their expectations and desires and bringing realistic goals, the better the control of APOP will be.

TRAUMA-SURGERY INTERVAL

The time elapsed between the trauma and the surgery showed a difference between the groups with and without pain, approaching statistical significance. WPG had a median of 3 days, while SPG had a median of 6 days (p=0.07).

A prospective cohort of patients undergoing hip fracture surgery demonstrated an interval between hospital admission and surgery of 7.4 days, with no significant association with APOP (p=0.9) [22].

Dutch study researched factors associated with APOP in a university hospital for 6 years. Among them, the interval between admission to the institution and the day of surgery was a risk predictor for moderate and severe pain in the first 3 postoperative days, being significantly higher in the first 24 hours [23].

The mean number of days between hospital arrival and surgery was shorter than described in other articles. However, there is a scarcity of studies that cite this time interval as a risk factor for APOP, especially Brazilian studies. Delay in the surgical procedure may be associated with longer pain time until surgical correction, sensitizing the nociceptive pathways and contributing to the development of acute and chronic postoperative pain. In addition, waiting for surgery can increase the level of anxiety and psychological stress.

Although not statistically significant, the result approached relevance. Surgical planning should be optimized in order to reduce the interval between trauma and surgery to avoid risks such as thromboembolic phenomena and longer pain stimulus time before correction. In those patients in whom surgery is expected to be delayed (use of anticoagulants, active infections, among other factors that require a postponement of the procedure), it is imperative to mobilize the assistant team to optimize pain control.

PREOPERATIVE PAIN INTENSITY

Higher VAS scores in the preoperative period showed a significant correlation with the development of moderate and severe pain at 24 hours postoperatively (p=0.02).

Yang et al. showed through a meta-analysis that the presence of preoperative pain was significantly associated with poor postoperative pain control [11].

A multicentric cohort of 200 patients undergoing emergency orthopedic surgery showed that patients with pain prior to surgery had a 7.92-fold greater risk of having moderate or severe pain in the PO, compared with those who had no pain before surgery [10].

In a study that evaluated the presence of APOP in the PACU and persistent pain after orthopedic trauma, the presence of higher scores on the VAS before surgery was not associated with the intensity of acute pain in the PACU. However, this same factor was statistically significant for

persistent pain at 3 months after surgery (p=0.02) [9].

The presence of preoperative pain seems to be one of the main risk predictors for APOP. This work showed similar results to most studies using the same patient profile. It was evident that patients with poorly treated pain while waiting for surgery have a higher risk of having APOP and the pain intensity is directly proportional in the pre and postoperative periods.

Once again, it is clear that a risk stratification at hospital admission is essential to guide the appropriate pain management for each patient. Those who wait longer for surgery and still have high scores on pain scales will undergo a more intense and prolonged process of neuronal sensitization at the central and peripheral levels, significantly influencing their recovery and rehabilitation process. Designating a responsible team to act at this stage, including an anesthesiologist, is highly recommended.

SURGICAL TIME

Surgical time was not statistically relevant for APOP (p=0.22). But it is observed that MOPG and SPG patients had longer surgeries (with medians of 110 and 100 minutes, respectively) than the groups with mild pain and without pain.

A prospective cohort carried out in Serbia with patients undergoing hip surgery for fracture showed a mean surgical time of 92.5 minutes, with no statistical significance for association with APOP (p=0.7) [22].

In an observational study in patients undergoing surgery for breast cancer, the surgical time was longer in patients with moderate and severe APOP, averaging 111 and 136 minutes, respectively (p<0.01) [25].

Longer duration of surgery and anesthesia was also associated with greater intensity of acute PO pain in a multicenter study with emergency orthopedic surgery (p=0.6) [10].

Surgery time proved to be a factor with conflicting results in the literature, not being one of the main risk predictors for APOP. Studies evaluating different types of surgery make comparisons difficult, since each procedure has its complexity and requires a different time. Compared with similar populations of orthopedic trauma in other studies, this research brought concordant results. Considering that the present study analyzed such factors in patients undergoing orthopedic surgeries of the upper and lower limbs, it is important to highlight that performing an analysis for each specific procedure would be a way to highlight the real interference of surgery time in the development of APOP. However, a larger sample is needed to perform this comparison.

This study has as limitations the fact that it was carried out in a single center. Therefore, caution should be exercised when expanding the results found in this research to other centers. Despite the number of patients analyzed having exceeded the sample size calculation, it is believed that a larger sample of subjects could bring more results with statistical relevance.

The exclusion of patients with previously diagnosed anxiety and/or who were using anxiolytic drugs may have affected the analysis in relation to preoperative anxiety. It is questioned whether the inclusion of these patients will interfere in the comparison with the intensity of APOP.

It was not possible to compare the intensity of pain in the 24 hours postoperatively between the groups that performed peripheral block or not, which is a highly relevant factor for the outcome studied.

CONCLUSION

APOP has a complex and multifactorial pathophysiology. It is necessary to know its multiple activation pathways in order to block pain signaling with different mechanisms of action.

Several factors were found to be associated with the development of severe PO pain. Some of them can be modified during hospital stay if recognized early.

In this study, it was concluded that patients with more severe pain in the preoperative period had a higher incidence of moderate and severe APOP with statistical significance. Early identification and targeted action to combat pain will have a positive influence on APOP, optimizing postoperative recovery.

Based on the aforementioned evidence, it is necessary to create a team responsible for the treatment of acute pain for the development of an admission screening based on previously selected risk predictors, well-defined therapeutic protocols, continuing education policies with patients and professionals. assistants and evaluation criteria of the actions practiced.

The anesthesiologist plays a fundamental role in this team due to his knowledge about pain management, in addition to being able to be present in the three phases of the patient's hospital journey: pre, intra and postoperative, ensuring a more consolidated bond with the patient and a global view of his recovery.

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CASE REPORT

CHONDRO-OSTEOSARCOMATOUS MATRIX-PRODUCING METAPLASTIC BREAST CARCINOMA

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ABSTRACT

Metaplastic carcinoma is a heterogeneous group of invasive breast carcinomas (IMC) characterized by the differentiation of neoplastic epithelium to squamous cells and/or mesenchymal-like elements. It presents clinically as a palpable nodule and as a mass lesion on mammography and ultrasound. The present report evidenced a 50-year-old woman with a clinically hardened, irregular, ill-defined nodule measuring 2 cm, in the UQS and with a free axilla. Mammography and ultrasonography showed BI-RADS 5. After anatomopathological and immunohistochemical study, the diagnosis of chondro-osteosarcomatous matrix-producing metaplastic invasive breast carcinoma was made. It is noteworthy that some metaplastic carcinomas may have components that resemble true soft tissue sarcomas.

KEYWORDS: BREAST CANCER; INVASIVE METAPLASTIC CARCINOMA; MESENCHYMAL

INTRODUCTION

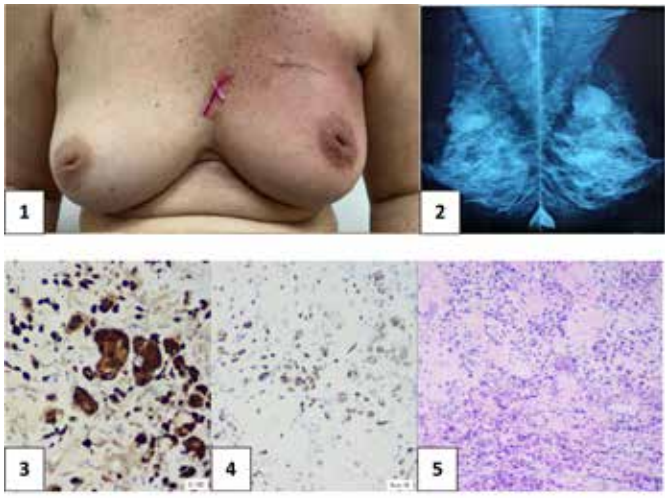
Metaplastic carcinoma is a heterogeneous group of invasive breast carcinomas (IMC) characterized by the differentiation of neoplastic epithelium to squamous cells and/or mesenchymal-like elements, including, but not restricted to, spindle, chondroid and bone cells. It presents clinically as a palpable nodule and as a mass lesion on mammography and ultrasound. Calcifications are uncommon, but when present they are often associated with ductal carcinoma in situ and/or bone differentiation[1].

Mesenchymal components may be differentiated with minimal atypia or with typically malignant characteristics that resemble the patterns found in true soft tissue sarcomas[2].

Immunohistochemical analysis reveals the expression of epithelial markers, usually high molecular weight cytokeratins.

CASE REPORT

F.B.C.D. female, 50 years old, presented a hardened, irregular, ill-defined nodule measuring 2 cm in the UQS of the left breast and with a free axilla. Mammography and ultrasound showed BI-RADS 5. Core biopsy indicated CDI G2. Estrogen receptor (ER) and progesterone receptor (PR) negative tumor, in addition to HER-2 negative, with Ki-67 of 80%. Pre-chemotherapy labeling with iodine seed was performed. The patient underwent neoadjuvant chemotherapy and subsequent quadrantectomy with sentinel lymph node. After anatomopathological and immunohistochemical study, the diagnosis of chondro-osteosarcomatous matrix-producing metaplastic invasive breast carcinoma was made. The chemotherapy regimen used was dose-dense AC followed by weekly taxol for 12 cycles. When performing PET-CT, the patient did not present foci of metastasis.



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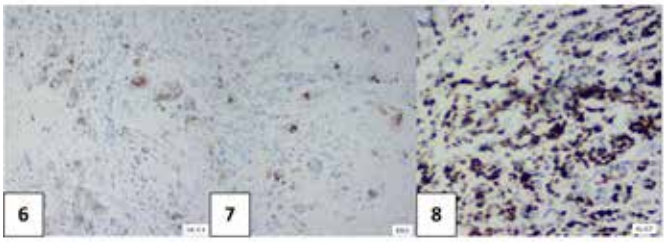

Figure 1: Postoperative period; Figure 2: Mammographic appearance; Figure 3: S-100; Figure 4: Sox-10; Figure 5: Histological aspect; Figure 6: CK-5.6; Figure 7: EMA; Figure 8: Ki-67.

DISCUSSION

Metaplastic carcinoma is a rare triple negative carcinoma of the breast that presents transformation of part or all of its carcinomatous glandular component into a non-glandular or metaplastic component[1].

These aggressive tumors are composed of a mixture of differentiated mesenchymal components, including chondroid, bony, rhabdomyoid and rarely neuroglial elements. This type of metaplastic carcinoma is further subclassified by the WHO into 1 of 3 categories: carcinoma with chondroid differentiation, carcinoma with bone differentiation, and carcinoma with other types of mesenchymal differentiation. These tumors are often large at the time of diagnosis[2].

The differential diagnosis is broad. However, identification of an atypical epithelial or carcinomatous component and immunohistochemical evidence of carcinomatous differentiation are extremely helpful in the differential diagnosis. Recent genetic and molecular studies are clarifying the crucial determinants of metaplastic carcinomas with chondroid and bone differentiation. Future investigations aimed at understanding the relationship between the phenotypic diversity of metaplastic carcinomas, patterns of gene and protein expression and their relationship with biological behavior will be important for the development of specific and effective therapies[2].

CONCLUSION

Based on the above, it appears that invasive breast carcinoma can present itself in different ways. In the present case, the carcinoma is of the metaplastic type and the neoplastic epithelium has differentiated into chondroid and bone cells, with production of chondro-osteosarcomatous matrix. It is noteworthy that some metaplastic carcinomas may have components that resemble true soft tissue sarcomas.

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CASE REPORT

MALE INVASIVE SOLID PAPILLARY CARCINOMA: A CASE REPORT

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ABSTRACT

The most common type of invasive carcinoma in the male breast is carcinoma without a special type (NST), followed by papillary carcinomas, of which the lobular and metaplastic types are the rarest. Solid papillary carcinomas are tumors characterized by a solid patterned growth with delicate fibrovascular nuclei. They may present clinically as a palpable mass, a mammographic abnormality, and a bloody nipple discharge. The present report showed a 67-year-old male patient who presented with a hardened nodule in the left breast with 2 months of evolution. The patient underwent left mastectomy with sentinel lymph node investigation. The anatomopathological and immunohistochemical study led to the diagnosis of invasive solid papillary carcinoma.

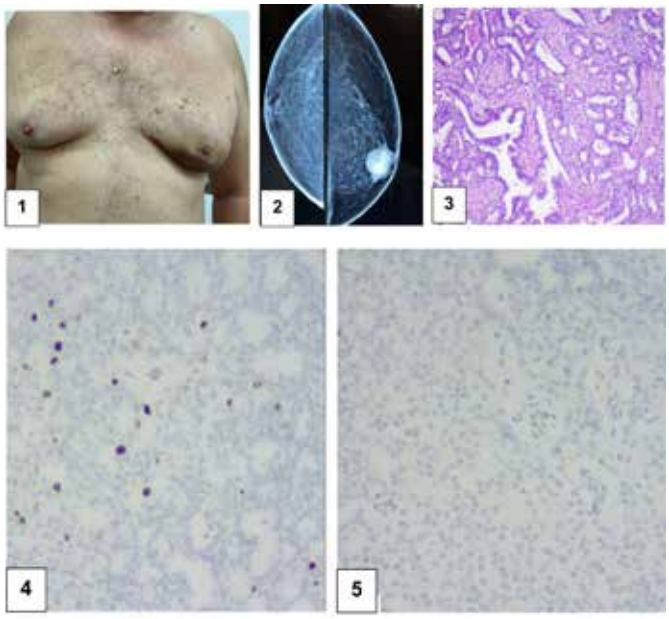
KEYWORDS: MALE BREAST CANCER; INVASIVE SOLID PAPILLARY CARCINOMA; MASTECTOMY

INTRODUCTION

It is known that male breast cancer usually presents with a slightly eccentric retro-areolar unilateral painless mass, and that almost half of patients have tumors smaller than 20 mm. The most common type of invasive carcinoma in the male breast is No special type carcinoma (NST), followed by papillary carcinomas, of which the lobular and metaplastic types are the rarest. Solid papillary carcinomas are tumors characterized by a solid patterned growth with delicate fibrovascular nuclei. They often show neuroendocrine differentiation and are biologically indolent. They may present clinically as a palpable mass, a mammographic abnormality, and a bloody nipple discharge. The tumor may be rounded, with a circumscribed mass on mammography and solid and well-defined, hypoechoic or heterogeneous on ultrasound. Coexisting stromal distortion suggests an invasive component[1].

CASE REPORT

J.L.L.O., 67 years old, male, presented a hardened nodule in his left breast with 2 months of evolution. On physical examination, the nodule was irregular, indurated, measuring 2 cm in its longest axis, located in the retroareolar region. Mammography and ultrasound showed BI-RADS 5, the nodule being solid-cystic. Chest radiography, bone scintigraphy and upper abdominal ultrasound were performed and there were no alterations. The patient underwent left mastectomy with sentinel lymph node investigation. The anatomopathological and immunohistochemical study led to the diagnosis of invasive solid papillary carcinoma.



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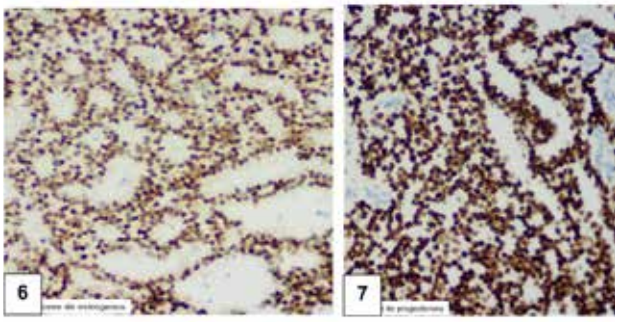

Figure 7 – A. Ultrasonography (irregular nodule in the retroareolar region of the left breast, solid-cystic). B. Macroscopy of the surgical specimen. Solid-cystic nodular lesion in a 67-year-old man.

DISCUSSION

The lifetime risk of developing breast cancer in males is 1:1000 and the median age at diagnosis is 67 years. The incidence rate is directly related to the advancing age of individuals.

Regarding the histological classification, invasive ductal carcinoma is the most recurrent type, representing approximately 90% of cases. Invasive lobular carcinoma, on the other hand, makes up less than 2% of all cases, given the absence of acini and lobules in healthy male breast tissue. Solid papillary carcinoma is a rare form of breast cancer manifestation in men[1].

Regarding the immunohistochemical classification, the neoplasms show a greater propensity for positivity in relation to estrogen and progesterone receptors and a low expression of human epidermal growth factor (HER-2).

The clinical presentation of male breast cancer is similar to that of women. The main signs and symptoms that may be present are: presence of a retroareolar nodule, usually painless, or thickening of the breast tissue, retraction or inversion of the nipple, changes in the skin, such as erythema and ulcerations and papillary effusion[2].

The findings evidenced in these patients are usually eccentric retroareolar masses with spiculated, indistinct or microlobulated margins. Microcalcifications are infrequent, in contrast to females, in which they are usually present. Skin retraction or ulceration and lymph node involvement may be found. Breast ultrasound may also be useful for these patients, revealing malignant lesions such as solid lesions or complex cystic lesions (Figure 7).

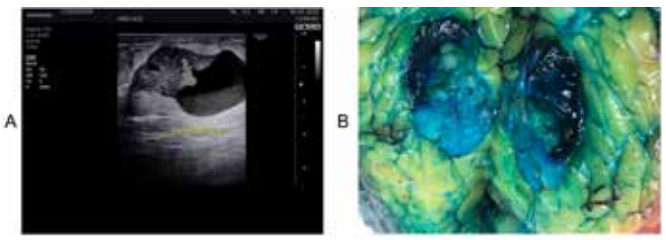

Figura 7 – A. Ultrassonografia (nódulo irregular em região retroareolar de mama esquerda, sólido-cístico). B. Macroscopia da peça cirúrgica. Lesão nodular sólido-cística em homem de 67 anos.

For patients diagnosed with tumors at earlier stages, localized and with clinically negative axilla, a modified radical mastectomy associated with a sentinel lymph node biopsy is usually adopted. Studies report the effectiveness of breast-conserving surgery associated with radiotherapy. However it is still little adopted due to the scarcity of surrounding breast tissue and the centralized location of tumor masses[3].

Hormone therapy with tamoxifen is commonly adopted in men who have hormone receptor-positive tumors (ER+ and PR+). The American Society of Clinical Oncology (ASCO) recommends that patients who meet these criteria should receive at least 5 years of Tamoxifen therapy [1-3].

CONCLUSION

Male breast cancer is 100 times rarer than female breast cancer, and invasive solid papillary carcinoma is even rarer. In the present report, the diagnosis of invasive solid papillary carcinoma was made in a male patient, which is quite uncommon. It is necessary to consider the morphological characteristics and the immunohistochemical profile, as well as the clinical history and imaging tests of the tumor, in order to define the correct diagnosis. The patient had no metastasis and was treated with mastectomy and sentinel lymph node in the left armpit. The proposed adjuvant treatment was tamoxifen 20 mg. Chemotherapy and radiotherapy were not required.

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CASE REPORT

PERCUTANEOUS CORONARY INTERVENTION IN CHRONIC TOTAL OCCLUSION (CTO): CASE REPORT OF HIGH-RISK CORONARY INTERVENTION

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ABSTRACT

High-risk percutaneous coronary intervention (CHIP-PCI) refers to targeted percutaneous revascularization for patients with extensive coronary artery disease (CAD). It requires a skill set, personnel, equipment and logistical support beyond fabrication for conventional PCI. PCI in chronic total occlusion (CTO) is an expanding field of interventional cardiology. Despite this, an ICP-CTO corresponds to only 10% of the total number of procedures. The guidelines recommend that current CTO PCI should be considered for reduction of blood in the corresponding myocardial territory and/or for reduction of angina. In this paper, we describe a case of a CHIP-PCI in a symptomatic coronary artery disease patient with the protective device in case of comorbidities and high PC at surgical risk.

KEYWORDS: CORONARY ARTERY DISEASE / COMPLICATIONS; CORONARY OCCLUSION; PERCUTANEOUS CORONARY INTERVENTION

INTRODUCTION

An increasing number of patients with coronary artery disease (CAD) require complex and clinically indicated percutaneous coronary interventions (CHIP-PCI). Advanced age, multiple comorbidities and some anatomical circumstances such as disease of the left trunk and/or bifurcation, long and calcified lesions and chronic total occlusions are factors that can lead a patient to be considered a candidate for CHIP-PCI [1].

High-risk CHIP-PCI refers to clinically guided percutaneous revascularization of patients with extensive coronary artery disease (CAD). It requires a set of skills, personnel, equipment and logistical support in addition to those needed for regular PCI. The CHIP concept was highlighted in a 2016 position paper. CHIP assignment was based on demographic factors (age), comorbidities (advanced kidney disease, previous coronary artery bypass graft surgery, heart failure), or anatomical and procedurals (extension of CAD, treatment of the left main trunk or chronic total occlusion injuries, use of mechanical cardiac support or use of atherectomy devices). However, the clear definition for CHIP has not been agreed and data on the outcome of CHIP in relation to PCI or more usual conventional bypass surgery are lacking [2].

All proposed risk definitions for revascularization procedures incorporate specific characteristics from three spheres: patient risk factors and comorbidities (including those that preclude surgical or percutaneous revascularization); location and complexity of coronary arteries anatomy (including suitability of vessels for PCI or for surgical targets); and hemodynamics, ventricular function and concomitant valve disease. It is the composite risk derived from the integration of each of these three areas that leads to the cumulative process of the individual risk profile of any CAD patient for whom revascularization is considered [3].

PCI in patients with factors such as left ventricular systolic failure (function defined as ejection fraction <35%), unprotected left trunk disease, severe three-vessel disease (SYNTAX score >33), or last patent vessel is associated with in-hospital mortality higher rates between 5% and 15% [2,3].

Chronic total occlusions, often called CTO in Brazil, are defined as coronary obstructions that produce total occlusion of the vessel lumen with a TIMI 0 flow and a duration of more than three months. They are present in 18-52% of patients undergoing coronary angiography and who have coronary artery disease4. However, PCI for CTO treatment corresponds to only 10% of all procedures, and remains one of the most challenging interventions in the specialty[5].

Current guidelines recommend that CTO PCI should be considered to reduce ischemia in the corresponding

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myocardial territory and/or to reduce angina. Thus, CTO revascularization will be indicated when there is objective evidence of viability, ischemia of a sufficiently large territory and/or symptoms of angina[4].

Currently, PCI is an excellent option in the management of CTO, but the correct selection of patients, a careful evaluation of the anatomical aspects of the lesion, the availability of devices dedicated to the management of occlusions (laser and materials - microcatheter, polymeric guide low weight), availability of drug-eluting stents and training of specialized operators [7,8,9].

In patients with clinical indication for CTO revascularization, careful evaluation of coronary angiography is essential to ensure the success of the procedure and define the appropriate strategy. In addition, the use of angiographic scores, such as J-CTO, PROGRESS-CTO, CL, ORA and EUROCTO, can help to establish the degree of difficulty of the procedure and the probability of success, allowing to guide clinical decision-making, as well as the best choice of cases according to operator experience [11].

The decision to attempt CTO-PCI should be weighed against the risk of higher volume of contrast, longer fluoroscopy time, and higher rates of major cardiovascular events (MACE) compared with non-CTO-PCI 4 patients.

Although the number of randomized and controlled studies is still limited, results from large multicenter registries allow us to safely offer this intervention to patients, as another treatment option along with optimized drug treatment and coronary artery bypass graft surgery [4,7].

Current CTO-PCI data show a continuous increase in procedure success rates in experienced centers, reaching a 90% success rate in high volume and experience centers. As well as low MACE rates, below 2%[10,12].

Thus, this study aims to report a case of high-risk PCI for CTO treatment in a symptomatic coronary artery disease patient with multiple comorbidities.

The Research Ethics Committee of the Hospital de Urgências de Goiânia, linked to Plataforma Brasil, approved the present study (CAAE: 53038921.2.0000.0033).

CASE REPORT

A 52-year-old male hypertensive, insulin-dependent, dyslipidemic, obese (BMI 44.1 kg/m2) and coronary artery disease patient in outpatient follow-up with a cardiologist reports dyspnea and fatigue for 2 years.

He was previously submitted to coronary artery bypass graft surgery in 2009 due to three-vessel coronary artery disease with a high SYNTAX score (42.5), with implantation of three bypasses, as described below: left internal thoracic artery (LITA)-DA, saphenous vein-CD and saphenous vein-CX.

To investigate the clinical picture, a myocardial perfusion scintigraphy was initially requested on 01/29/2021, which showed 22% of perfusion defects, 15% of which were persistent in the inferior and inferolateral walls, with an ischemic load of 7% and left ventricular ejection fraction (LVEF) of 38% at rest and 35% at stress.

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The case was discussed with the institution's heart team, with reoperation for coronary artery bypass grafting contraindicated, when a complex angioplasty was performed, as it is a symptomatic patient (CCS class III), diabetic, with very high cardiovascular risk. and high surgical risk (STS score of 5.927% and Euroscore-II of 8.53% for mortality risk).

In the pre-intervention planning, a transthoracic echocardiogram (TT Echo) and a coronary tomography angiography were requested to assess segmental alteration in ventricular contractility and left ventricular ejection fraction (LVEF), as well as to know the coronary anatomy of the patient.

The TT ECHO performed on 04/22/2021 showed moderate impairment of left ventricular systolic function (LVEF 40%), diffuse LV hypokinesia, moderate LV diastolic dysfunction, tricuspid regurgitation (PSVD 49 mmHg vel peak 3.1 m/s).

The coronary CT angiography of 04/22/2021 revealed three-vessel atherosclerotic disease with proximal occlusions in the DA, circumflex (CX) and right (RC) arteries (with the presence of contrast in the distal bed - filling by collaterals?), presence of a graft from the left internal thoracic artery to the middle third of the patent DA artery and aortic vascular graft occluded in an ostium (Figures 1A, 1B, 1C and 1D).

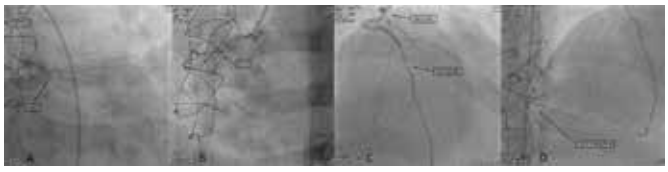

Figure 1 – Pre-procedure three-vessel pattern: (1A) Circumflex artery occlusion; (1B) Right coronary artery occlusion; (1C) Occlusion in the middle third of the native bed of the anterior descending artery and (1D) Presence of collateral from the anterior descending artery to the right coronary artery.

Thus, the complex PCI would be carried out in two steps.

The first step was performed on 05/27/2021 with recanalization of the CTO in the CX artery through a 7F femoral access with implantation of a drug-eluting stent (everolimus-eluting 3.0 x 38 mm) at the origin and proximal third of the first left marginal branch and another drug-eluting stent (3.5 x 38 mm everolimus-eluting stent) in the TBI, at the or-

igin and proximal third of the circumflex artery. Due to the presence of significant calcification in the lesions, rotational atherectomy with a 1.75 mm arch followed by balloon angioplasty (2.25x20 mm and 3x20 mm) was necessary. After that, there was still an important residual lesion in the middle third of the marginal branch, so it was decided to use a cutting balloon (3.0x10 mm) with good response. Thus, after adequate preparation of the vascular bed, the stents were implanted and expanded. In this intervention, the rope scaling technique was used, in which the following guidewires (0.014"x180 cm) were required: PT2®, Fielder FC®, Finecross® microcatheter (Figures 2A, 2B, 2C and 2D). After recanalization of the CX artery, the presence of grade 3 collateral circulation to the CD artery was observed.

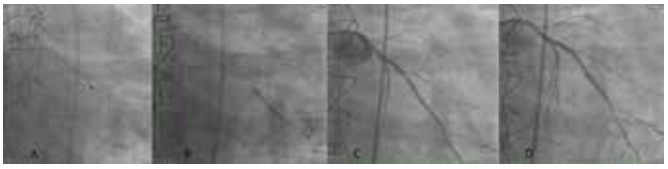

Figure 2 – First stage of the CTO percutaneous intervention: (2A) Rotational atherectomy with a 1.75 mm arch; (2B) Presence of significant calcification in the circumflex artery after rotational atherectomy; (2C) Result after treatment of a circumflex artery lesion; (2D) Result after treatment of a lesion in the first left marginal branch.

Additionally, during the procedure, intracoronary ultrasound was used to define the characteristics of the proximal cap and facilitate re-entry into the true lumen, limiting the dissection plane and confirming the distal positioning of the guidewire in the true lumen.

The second stage took place on 08/04/2021 and angioplasty was performed via breast graft and vascular access through the 6F left radial artery with implantation of a drug-eluting stent (everolimus-eluting 3.0 x 18 mm) in the native bed of the AD artery distally to the LITA graft (Figures 3A and 3B).

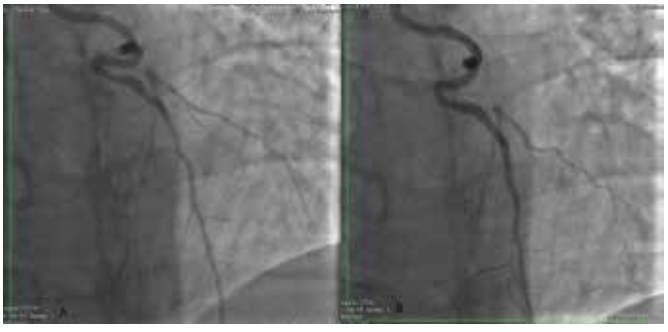

Figure 3 – Percutaneous CTO intervention using the retrograde technique: (3A) Injury in the middle third of the anterior descending artery and (3B). Final result after treatment of the anterior descending artery through the left internal mammary graft.

DISCUSSION

CHIP-PCI has become a subspecialty in interventional cardiology because it addresses an extensive CAD population in need of revascularization and who have many risk factors for procedural and long-term adverse events. The benefits of revascularization in addition to optimized medical therapy (OMT) in this population have been questioned by some studies, but confirmed in a large meta-analysis with 100 studies covering more than 93,553 patients. Coronary artery bypass graft surgery and PCI with second-generation drug-eluting stents had a similar reduction in mortality compared with medical therapy alone (relative risk [RR], 0.80; 95% CI, 0.70-0.91 and RR, 0.80; 0.75; 95% CI, 0.59-0.96, respectively). Coronary artery bypass graft surgery reduced the risk of infarction compared with BMT (RR 0.79; 95% CI 0.63-0.99) and second-generation stents showed a tendency to reduce the risk of myocardial infarction. (RR 0.75; 95% CI 0.55-1.01) [13].

Kinnaird et. al. (2020) analyzed all CHIP-PCI procedures performed for stable angina in England and Wales between 2007 and 2014. CHIP-PCI was defined by patient characteristics (age ≥80 years, LVEF <30%, CABG surgery previous history or chronic renal failure) and/or by characteristics of the procedure (PCI of the left main coronary artery, chronic total occlusion, left ventricular support, use of rotational atherectomy or laser atherectomy). The authors observed an increase from 28.1% in 2007 to 36.2% in 2014 for CHIP-PCI ($p < 0.001$). Between 2012 and 2014, a total of 30,268 cases of CHIP-PCI were performed [14].

In the study by Riley et. al (2020), data were prospectively collected for PCIs performed during the first 12 months of practice for the lead author and compared to procedures performed in the 12 months prior to the study period. Of the 371 PCIs performed during the study period, 53.4% (198/371) were considered complex, including 126 CTO procedures. Compared to the previous 12 months, there was a significant increase in the number and complexity (median J-CTO score 2.1 vs. 1.3; p 0.04) of CTOs performed during the study period. CTO procedure characteristics and complication rates were similar to those previously published in large US registries, with technical success in 93.4% (118/126) and procedural success in 85.7% (108/126) [15] .

The retrospective study by Neupane et. al. (2020) evaluated the clinical and procedural results of Tandem Heart-assisted CTO-PCI (TH) from April 2016 to January 2019. From the results we have that thirteen CTO-PCIs were assisted by TH (25%), with the the most common reason for hemodynamic support being the use of the retrograde CTO-PCI technique in the case of left ventricular dysfunction (38%). Eleven patients (92%) had decreased left ventricular function with severe symptoms of conges-

tive heart failure before the procedure. The most treated CTO vessel was the right coronary artery in 38% of patients. The retrograde approach was used in 6 PCIs (46%). Technical success was achieved in 12 PCIs (92%) despite very complex and very difficult CTO injuries, as indicated by a median J-CTO score of 3 and CTO Progress score of 2. Procedural success was achieved in 10 patients (77%). The TH was removed at the end of PCI in 11 procedures (85%). There were no major bleeding complications. However, one patient developed an arteriovenous fistula at the arterial cannula insertion site. One patient had coronary perforation requiring pericardiocentesis. One patient died as a result of cardiogenic shock secondary to right ventricular wall hematoma [16].

CONCLUSION

The evolution of CPI has witnessed unprecedented advances over the past two decades. In the wake of this progress, interventional cardiologists are attempting the revascularization of more complex coronary anatomy in patients often refused surgical intervention. However, with greater complexity comes greater risk, hence the need for new techniques and equipment, as well as the training of specialized operators, increasing the success rate and reducing adverse events.

Although the current evidence is in favor of PCI, good quality prospective randomized controlled trials including complex and high-risk patients are still needed to define the best indications and the most appropriate techniques for intervention in this challenging management population.

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REVIEW ARTICLE

ATRIAL FIBRILLATION AND EXERCISE

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ABSTRACT

Atrial fibrillation (AF) is common in adults and the cardiologist and other health professionals, such as physical therapists and physical education teachers, are often faced with situations in which exercise prescription for this population becomes challenging. This article proposes, through an extensive literature review, to address AF in its epidemiological aspects, its pathophysiology, aspects of pharmacological treatment, repercussions of exercise as a trigger for the onset of AF and its effect as part of the treatment. of this arrhythmia. The article will also offer suggestions for an approach through exercise in individuals with AF who seek cardiovascular rehabilitation programs.

KEYWORDS: ATRIAL FIBRILLATION; REHABILITATION; CARDIOLOGY; EXERCISE THERAPY

INTRODUCTION

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia in adults worldwide and is associated with significant morbidity and mortality, in addition to representing an important health problem, with high consumption of financial resources. Currently, the estimated worldwide prevalence of AF in adults varies between 2 and 4%. Studies show that the incidence and prevalence of AF has increased in the last 20 years and will continue to increase in the next 30 years, making it one of the biggest epidemics and public health challenges [1,2].

In Brazil, according to the Brazilian AF Guidelines, about 1.5% of the Brazilian population has this arrhythmia. The trend towards an increase in new cases of AF over the years is notorious. A 2 to 3 fold increase is expected in the coming decades, largely due to population aging and the increase in the prevalence of diseases such as systemic arterial hypertension (SAH), coronary artery disease (CAD), obesity and diabetes mellitus (DM) [2].

The evolution of technology in medicine has provided, in recent years, optimization in the diagnosis and treatment of this arrhythmia; however, mortality and morbidity in patients with AF are still high. Of all patients with ischemic stroke, 20 to 30% have AF. Left ventricular dysfunction and heart failure (HF) have also been reported in patients with AF with high prevalence, reaching 56% in patients with permanent AF [2].

Thus, it is important to emphasize that individuals affected by this arrhythmia are associated with AF repercussions, such as increased mortality and increased risk of sudden death; Increased risk of HF; Insanity; Risk of stroke increased by 5 times, with more serious events; Symptoms such as fatigue and exercise intolerance, compromising health-related quality of life [2].

The practice of regular physical exercises, through the improvement of cardiorespiratory fitness, can reduce or delay the onset of atherosclerotic events and cardiovascular diseases, as well as reduce the incidence of coronary heart disease. However, there are still limited data on cardiovascular rehabilitation, especially with regard to intensity, for patients with AF [3].

METHODOLOGY

This article is an integrative literature review, carried out by searching Pubmed, Lilacs, Scielo and Medline databases, using the following keywords as search criteria: Atrial Fibrillation; Rehabilitation; Cardiology; Exercise Therapy; and their Portuguese equivalents. The period selected for searches was from 2013 to 2021. An article from 1993 was used due to its historical relevance on the topic (Ueshima et al) [12]. Two book chapters also served as instruments for gathering information in writing this update [3,4].

PATHOPHYSIOLOGY OF AF

AF is characterized by being a supraventricular tachycardia with uncoordinated and disorganized atrial electrical activation, in a fibrillatory and non-linear manner, leading to ineffective atrial contraction. Due to the alteration in the atrial tissue, one or more foci of autom-

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atism – triggers or micro-reentry – fire at a high frequency, causing fibrillation of the atria. Multiple reentry circuits in the structure of the atria block and conduct the waves that perpetuate fibrillation. Repeated episodes of AF lead to a process of cellular adaptation that ends up facilitating the maintenance of fibrillary conduction [3].

AF DIAGNOSIS

Documentation of the electrocardiogram (ECG) is necessary to establish the diagnosis of AF. A twelve-lead pattern ECG recording or a 30-second single-lead tracing showing altered atrial activation with a heart rhythm with no identifiable P waves and irregular RR intervals (when atrioventricular conduction is not impaired) is a diagnostic criterion for clinical FA. The QRS complex is irregular and small undulations in the baseline with different amplitudes and morphologies replace the P waves [3]. On physical examination, an irregular arterial pulse and absence of an A wave in the jugular venous pulse are indicative of AF. Considering the clinical history, a history of heart disease should also be investigated, especially when there is suspicion of arrhythmia (unproven AF), with recurrent paroxysms, in which the crisis episodes were very short, and it was not possible to record the ECG. . In the follow-up of AF, Holter monitoring and echocardiography are also suggested to evaluate the evolution/control of the disease. [4] Figure 1 shows the ECG of an individual with AF.

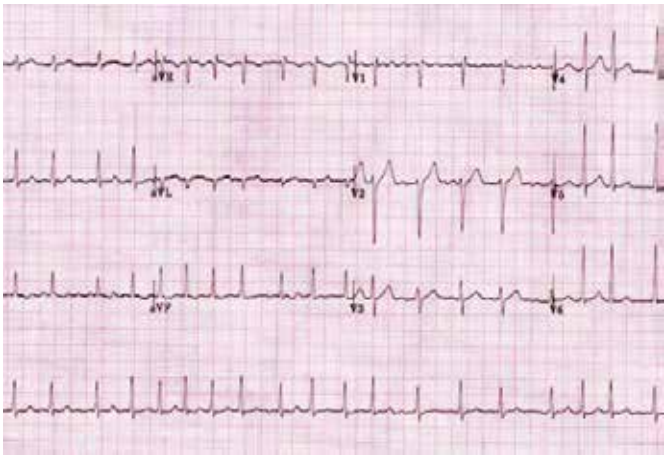

Figure 01. ECG of an individual with AF, with heart rhythm without identifiable P waves and irregular RR intervals.
Source: Authors' personal archive.

Various cardiac and non-cardiac alterations can cause electrophysiological disturbances and affect the atrial myocardium. As a result, the atrial muscle hypertrophies and starts to present contractile dysfunction, arrhythmogenic alterations in the transport and function of ion channels, increased sympathetic and thrombogenic activity and sympathetic discharge [3,4,5].

Systemic arterial hypertension can lead to pressure overload, inducing physiological changes observed in AF, such as myocyte hypertrophy, and atrial stretching and dilation. The reduction in atrial contractility and fibrosis of the atrial muscle, observed in heart failure (HF), promote greater neurohumoral activation, sympathetic hyperactivity and atrial dilatation, which are also precipitating factors for arrhythmias. Controlling blood pressure and treating HF can act in the prevention of atrial remodeling, oxidative stress and increased sympathetic activity, with a consequent reduction in the risk of developing AF [3,4,5].

AF frequently occurs in individuals with predisposing factors, such as those of genetic origin, continuous use of alcohol, and changes in the autonomic nervous system, of vagal or adrenergic origin, triggered by exercise or emotion.[6].

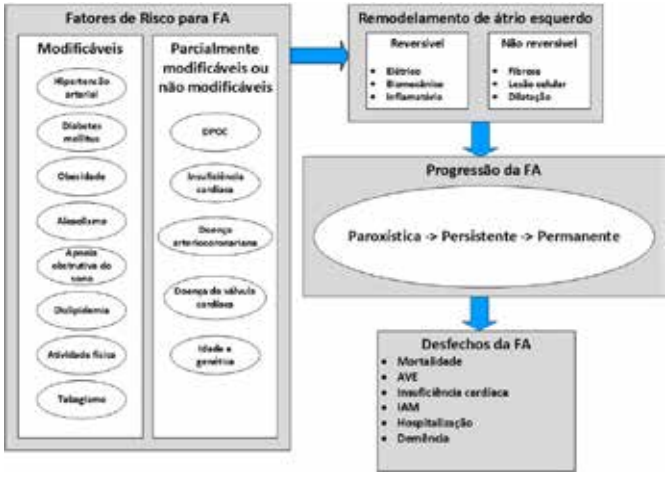

Figure 2: Main risk factors, outcomes and management of AF. COPD= Chronic Obstructive Pulmonary Disease; CVA= Cerebrovascular accidents (stroke); AMI = Acute Myocardial Infarction
Source: Adapted from Hindricks G, Potpara T, Dagres N, Arbelo E, Bax JJ, Blomström-Lundqvist C, et al; ESC Scientific Document Group. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS). Eur Heart J. 2021 Feb 1;42(5):373-498 [6]

AF CLASSIFICATION

Regarding its classification, AF can be defined according to the duration of the arrhythmia, symptoms or its clinical presentation and possible pathophysiology. [6].

By its duration it is classified as:

- Single-episode AF: When presented only once
- AF that ends spontaneously within seven days: paroxysmal
- AF lasting more than seven days: persistent (including episodes terminated by cardioversion)
- AF that lasts for more than one year: long-term
- Long-standing AF not responding to cardioversion: permanent.

The classification "permanent" should not be used in the context of a rhythm control strategy with antiarrhythmic drug therapy or ablation. If a rhythm control strategy is adopted, the arrhythmia will be classified as long-term persistent.

The evolution of paroxysmal to non-paroxysmal AF (or from subclinical to clinical AF) is observed by the advancement of atrial structural remodeling or worsening of atrial cardiomyopathy, which includes atrial architectural, contractile and electrophysiological changes with relevant clinical manifestations. The pathophysiological classification and clinical presentation of AF can assist in the stratification, treatment and prognosis of the disease [6], as described in Chart 1.

Chart 1. PATHOPHYSIOLOGICAL CLASSIFICATION OF ATRIAL FIBRILLATION

TYPE OF ATRIAL FIBRILLATION	CLINICAL PRESENTATION	PATHOPHYSIOLOGY
AF secondary to heart disease	Patients with left ventricular systolic or diastolic dysfunction or other structural heart disease. Common cause of hospitalization and predictor of poor outcome.	Elevated left atrial pressure, with remodeling and fibrosis, along with activation of the sympathetic system and renin angiotensin
Focal AF	Secondary to repetitive high-frequency atrial tachyarrhythmia and short episodes of paroxysmal AF, typically occurs in young people without heart disease	Arrhythmogenic triggers from the pulmonary veins can lead to progression of supraventricular tachycardias to AF
Postoperative AF	Occurs after major surgery (especially cardiac) in patients with no previous history of AF	Inflammation, oxidative stress, hydro-electrolyte disturbance, high sympathetic tone, and volume overload as precipitating factors
AF in athletes	Paroxysmal AF in high performance athletes, related to training intensity	Increased vagal tone and cardiac remodeling
Polygenic AF	AF in carriers of genetic variants	The presence of genetic variants may be associated with AF and influence treatment
Monogenic AF	Patients with hereditary cardiomyopathies including channelopathies	Include arrhythmogenic mechanisms responsible for sudden death

Source: Adapted from Hindricks G, Potpara T, Dagres N, Arbelo E, Bax JJ, Blomström-Lundqvist C, Boriani G, Castella M, Dan GA, Dilaveris PE, Fauchier L, Filippatos G, Kalman JM, La Meir M, Lane DA, Lebeau JP, Lettino M, Lip GYH, Pinto FJ, Thomas GN, Valgimigli M, Van Gelder IC, Van Putte BP, Watkins CL; ESC Scientific Document Group. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS). Eur Heart J. 2021 Feb 1;42(5):373-498 [6]

The most recurrent symptoms reported by patients with AF are fatigue, dyspnea, palpitation, syncope and dizziness. The goals of treating this arrhythmia include alleviating such symptoms, preventing stroke and controlling associated factors such as high blood pressure, obesity (very associated with sleep apnea) and diabetes mellitus, which can increase the rate of recurrence of AF. and the mortality rate in these patients [6].

AF can also be classified based on its symptoms, as shown in Chart 2.

Chart 02. Classification of symptoms caused by AF.

Grade	Symptoms	Description
1	None	Asymptomatic patient
2a	Discreet	Activities of daily living (ADLs) are not affected
2b	Moderate	Do not interfere with ADLs, but symptoms bother
3	Important	Activities limited by the discomfort of symptoms
4	Incapacitating symptoms	Normal daily activity interrupted

Source: Adapted from Alves LS, Scanavacca MI, Chizzola PR, Guimarães GV. Physical exercise and atrial fibrillation in Exercise cardiology from the athlete to the cardiac patient. 4. ed. São Paulo: Manole; 2019 [4]

AF can have important hemodynamic consequences. During such an arrhythmic event, the atria cannot properly eject blood and do not contribute to the stroke volume, causing a reduction in cardiac output by about 20 to 30%. Irregular ventricular rate, usually high, also promotes a greater reduction in ventricular filling and stroke volume, which may contribute to the development or worsening of HF. [7].

The prevention of left ventricular dysfunction and heart failure are fundamental in the patient with AF and can be achieved through a rhythm and heart rate control strategy. Patients who present with AF can be entered into such a strategy according to their electrocardiographic clinical characteristics and response to previous treatments. [7].

Therapeutic approach to AF

The ideal heart rate (HR) target is much discussed when following HR control. The RACE II study [8] proposed two beats per minute control strategies (bpm):

- more rigid, with HR at rest less than or equal to 80, and below 110 bpm in moderate physical activity;
- more tolerant: with resting HR less than 110 bpm.

The frequency of hospitalization and adverse events was similar in the two groups; however, for patients with HF or who remain symptomatic in the more tolerant strategy, stricter HR control is recommended in order to avoid further left ventricular dysfunction due to its persistent elevation.

Classically, the drugs used to control HR are beta-blockers, calcium channel blockers and digoxin. Beta-blockers are used especially in the presence of increased adrenergic tone and in myocardial ischemia in the presence of AF. Patients with HF and ventricular dysfunction benefit from the use of beta-blockers for rate control.

The rhythm control strategy is associated with the use of pharmacological antiarrhythmic measures, usually associated with electrical cardioversion (EC). Beta-blockers are the drugs of choice when there is no contraindication. Attempting to restore this patient's sinus rhythm should only be performed based on the severity of symptoms, presence of comorbidities, probability of successful cardioversion, and time of AF diagnosis. Its main action is based on blocking adrenergic tone through competitive inhibition of catecholamine-beta

receptor binding. They are able to reduce the spontaneous depolarization ramp in the sinus node cells and conduction through the atrioventricular node, and also promote an increase in the refractoriness of the His-Purkinje system. [7,8].

EC involves the delivery of an electrical shock synchronized with the intrinsic activity of the heart, to avoid the induction of ventricular fibrillation that usually occurs when the shock impinges on the ascending phase of the T wave. The success of reversion to sinus rhythm depends on the baseline heart disease and the density of electrical current received by the atrial myocardium. It should be performed with the patient fasting and under anesthesia or adequate deep sedation. Starting electrical EC with higher doses of energy is more effective, resulting in fewer shocks and less cumulative energy. Initial single-phase shocks of 100 Joules are generally ineffective for the EC of the AF and it is recommended to start with energy equal to or greater than 200 Joules. For biphasic shocks, it is also recommended to start with the application of 100 Joules or more, especially in patients with long-standing AF. [2]

Controlled studies have not yet been able to demonstrate superiority of rhythm control (maintenance of sinus rhythm) when compared to the rate control strategy in terms of mortality and morbidity. Controlling HR in patients with HF seems to be able to reduce symptoms and improve quality of life with a lower rate of adverse events, especially in elderly patients. [7,8].

For adequate control of HR in patients with AF, it should be taken into account that both reduced values for HR and higher values can lead to different clinical consequences. Elevated HR (close to 110 bpm) can lead to increased symptoms of AF, increased risk of HF and stroke, as well as being linked to high costs for the health system. Lower HR maintenance is associated with adverse effects of rate-control drugs such as decreased exercise tolerance, onset of pro-arrhythmic events, and hepatotoxicity Lower HR is also associated with a higher rate of cardiac pacemaker implants and higher costs [8].

In association with risk factors, AF represents the main cardioembolic source, when compared to acute myocardial infarction (AMI) and valvular diseases. The formation of thrombi in the vascular beds or in the heart chambers themselves, in this arrhythmia, is related to multiple factors and make up Virchow's triad: atrial blood stasis, endothelial injury and hypercoagulability state (deficiency of anticoagulant molecules and excess of components responsible for anticoagulation). Complications resulting from such changes, present in AF, such as stroke, can have a great impact on the functional capacity of individuals and are associated with greater morbidity and mortality.[7,8]

According to national guidelines, in patients with AF, regardless of its classification (paroxysmal, persistent or permanent), the risks and benefits of anticoagulation should be evaluated. It is therefore necessary to weigh the risks in preventing bleeding and the benefits in controlling embolic events in patients with arrhythmias. Not all patients with AF develop such complications, evidencing that other factors must be considered to assist in clinical decision making. To stratify the risk of thromboembolic events in patients with AF, the CHADS2 score was created and, later, incorporating factors such as gender, presence of peripheral vascular disease and age, the CHA2DS2-VASc score. With categorization using the CHA2DS2-VASc score, patients classified as very low risk would not require anticoagulation[2]

Table 1 presents the CHA2DS2-VASc score, used to assess the risk of thromboembolic phenomena in patients with AF, even in an outpatient setting. Patients with a score of 0 have a low risk of thromboembolic events and therefore would not need antithrombotic medications. Patients with score 1 are at moderate risk and can be anticoagulated or antiaggregated, while patients with score 2 are at high risk and should be anticoagulated unless there is a contraindication.

CHA2 DS2 -VASc score used for risk assessment for thromboembolic events in patients with atrial fibrillation

CHA2 DS2 -VASc		SCORE
C	Cardiac insufficiency	1
H	Hypertension	1
A_2	Age (≥ 75 years)	2
D	Diabetes Mellitus	1
S^2	Transient ischemic attack or previous stroke	2
V	Vascular disease (previous AMI, peripheral artery disease, or aortic plaque)	1
A A_2	Age (65 to 74 years old)	1
Sc	Gender (Female)	1

Table 1: AMI = Acute Myocardial Infarction
Source: Adapted from II Brazilian Guidelines on Atrial Fibrillation[2]

AF ABLATION THERAPY

Invasive therapy of AF through catheter ablation may be considered in rate or rhythm control scenarios. [2] Refers to the technique of electrical isolation of arrhythmogenic foci located in the pulmonary veins that generate AF. Catheter ablation is indicated to improve symptoms and quality of life related to paroxysmal or persistent AF. Among the various techniques available, conventional, point-to-point radiofrequency ablation, with the aid of electroanatomical mapping, is currently the most used technique. [3].

EFFECT OF PHYSICAL TRAINING ON ATRIAL FIBRILLATION

Regular physical activity and physical training are identified as safe therapy in the prevention and control of cardiovascular diseases and there are several mechanisms that act to decrease cardiovascular risks. [9]

Figure 3 identifies the main cardioprotective effects of regular moderate to high intensity physical activity.

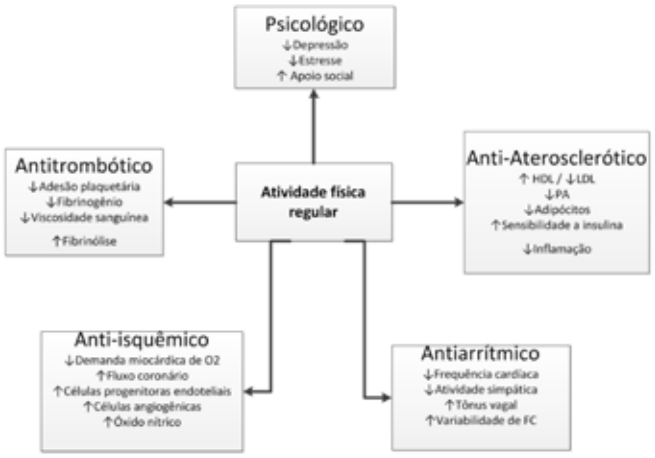

Figure 3: Main cardioprotective effects of regular physical activity
Source: Adapted from Franklin and collaborators (2020) [9]

At this point, it is important to differentiate between physical training and physical activity. Physical training refers to a subcategory of physical activity, being defined as any intervention planned and structured with the objective of maintaining or improving the individual's cardiorespiratory fitness and health. Aerobic capacity can be determined through cardiopulmonary tests with measurement of gas exchange (peak oxygen consumption) and estimation of work done [6, 10].

The risks of coronary and cardiovascular diseases decrease linearly in association with increasing levels of physical activity and physical training. The reduction in the risk of developing and worsening cardiovascular diseases, however, is shown to be about twice as high in individuals who show improvement in cardiorespiratory fitness achieved through physical training compared to the reduction observed with the increase in physical activity. [9,10]

Patients with AF have an altered hemodynamic response due to an irregular rhythm, usually with a rapid ventricular response at rest and during exercise. In individuals with AF, heart rate increases more in the initial phases of exercise, which may limit cardiac performance during exercise by compromising cardiac output (CO), associated with decreased atrial contribution, filling and reduced ventricular diastolic time. The association of these events seems to be responsible for the decrease in exercise tolerance observed in patients with AF when compared to healthy individuals.[11]

A positive impact is observed in reducing the incidence of AF or reducing the burden of AF (based, among other factors, on the reduction of symptoms perceived by the patient), with changes in lifestyle aimed at increasing cardiorespiratory fitness. The recurrence of AF and the severity of symptoms may be reduced in patients who increase their cardiorespiratory fitness through training programs compared to individuals who do not show a gain in aerobic interval training. [8,10,11]

Researchers have suggested that exercise tolerance in patients with isolated AF is similar to normal age-matched individuals. In a group of patients with AF it was reported that despite an increase in maximal and submaximal HR of about 25 beats on average when compared to healthy subjects, there was no difference in exercise capacity. On the other hand, higher lactate values during exercise were described in patients with AF when compared to healthy subjects, indicating early anaerobic metabolism and greater need for chemical and ventilatory buffering. [11]

To assess the response of patients with chronic AF to exercise, Ueshima et al [12] studied 79 men, aged around 64 years, who underwent echocardiography at rest and an ergospirometry. Patients were classified by heart disease into the following groups: isolated AF (n:17), AF + SAH (n:11), AF + CAD (n:13), AF + cardiomyopathy (n:26) AF + valvular heart disease (n: 13). Patients with morphologic disease had approximately 20% lower maximal oxygen consumption than patients with isolated AF or hypertensive AF patients without structural disease. The maximum oxygen consumption, considering the entire sample, was 20% lower than expected for a normal group of the same age. Although exercise capacity in AF is strongly influenced by the underlying disease, this reduction seems to be also intrinsic to the hemodynamic alteration that accompanies this arrhythmia.

In a study carried out to verify the impact of improved cardiorespiratory fitness on AF recurrence (paroxysmal or persistent) in 308 obese individuals, the authors observed that an increase of 1 MET in baseline cardiorespiratory fitness was associated with a 9% decline in the risk of recurrence of AF in the long term, regardless of the benefit conferred by weight loss alone. Such a decline was also due to favorable changes in cardiometabolic risk factors, inflammatory status and cardiac remodeling. The exercise program used was prescribed according to the FITT principle (frequency, intensity, time and type of exercise), taking into account age and cardiorespiratory fitness by estimating metabolic equivalents (MET) [13].

Systolic blood pressure (SBP) responses to the exercise test have been similar to those observed in individuals in sinus rhythm (progressive increase according to the effort performed). SBP in isolated AF is significantly higher than in AF with associated heart disease [11, 12]. In general, studies support blood pressure control as it becomes a strategy to reduce the risk of stroke and other cardiovascular events in patients with AF.

Patients with AF are typically anticoagulated because of the increased risk of ischemic events secondary to thrombus formation and embolism. Thus, it is important to remember that they should not be encouraged to practice physical contact sports, due to the increased risk of unwanted bleeding. It should also be noted that this population benefits from the practice of adequate physical ac-

tivity, and should not be excluded from rehabilitation protocols for fear of complications.

ATRIAL FIBRILLATION IN ATHLETES

Endurance athletes are at increased risk of cardiac arrhythmias, especially AF. Data suggest that the relationship between exercise volume and cardiovascular events presents a curve behavior similar to the letter U, in which moderate to high doses are able to confer cardiovascular protection and health benefits, however, when performed at a very intense volume they are associated with a higher risk for AF [14].

In a study that sought to identify different mechanisms of atrial fibrillation, 144 athletes and non-athletes were evaluated using echocardiography to measure left atrial and ventricular volumes and ventricular function. The authors observed that athletes had low atrial tension and, when associated with AF, had increased left atrial volumes and reduced atrial emptying. In this aspect, AF in athletes can be triggered by atrial myopathy resulting from exercise-induced stretch from increased cardiac output. [15].

The mechanisms responsible for the increased prevalence of AF among athletes are still poorly understood. It is known that physical exercise performed in an exaggerated manner can trigger AF and the presence of risk factors such as atrial ectopia, increased vagal tone, atrial dilatation, and atrial stretch due to high exercise volumes may be associated with the development of AF in athletes. Practitioners of intense resistance physical activity, such as cyclists and runners, are 2 to 10 times more likely to develop AF. [15].

High-intensity exercise (greater than 2000 hours of training or 20 years of training) was strongly associated with increased risk of AF, while moderate-intensity exercise appears to reduce the risk [16]. In a non-linear regression meta-analysis, including 19 studies in patients with AF, it was observed that individuals who performed 5 to 20 MET-hours of training per week had a significantly lower risk of developing AF, while highly active individuals (55 MET - hour per week) tended to increase the risk of developing AF [17].

Figure 4 shows the dose-response association between physical activity volume and relative risk for developing AF. Higher volumes of physical activity (above 55 MET-hours/week) appear to be associated with an increased risk of AF.

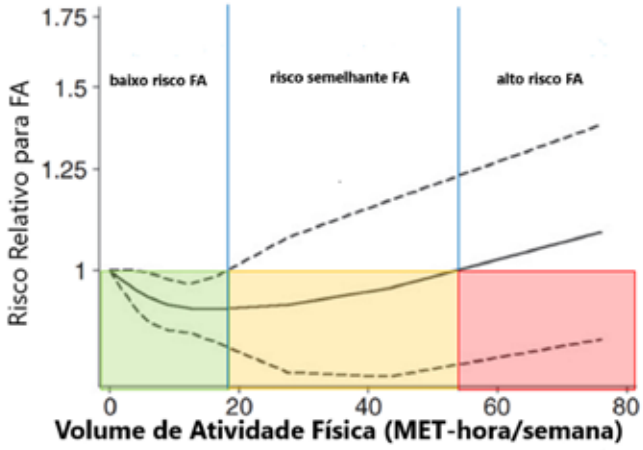

Figure 4: Dose-response association between physical activity volume and relative risk for AF
Source: Adapted from Ricci and collaborators, 2018 [17]

High training volumes and vigorous intensities are both associated with cardiac maladaptives including left atrial remodeling, accelerated coronary artery calcification, exercise-induced release of biomarkers, and myocardial fibrosis enabling the emergence of AF.

EXERCISE PRESCRIPTION FOR PATIENTS WITH AF

It is known that the practice of moderate physical activity can reduce the risk of developing AF and reduce its recurrence, but there are still few studies that address the prescription of exercise for patients with AF.

In order to evaluate the effects of a cardiac rehabilitation program, researchers recruited 51 patients with symptomatic AF (paroxysmal or persistent) determined by electrocardiogram (ECG). Patients were divided into two groups (control and intervention group) to perform three sessions per week of walking or running on the treadmill for 12 months. The protocol of 60 – 70% of maximum cardiac HR was used followed by 4 intervals at 85 - 95% of maximum cardiac HR. The Borg scale was used to assess intensity. The results of the study demonstrated a reduction in arrhythmic load in patients with AF who underwent cardiac rehabilitation. Such results also accompany improvement in maximal exercise capacity, left atrial and ventricular function, lipid levels and improved quality of life. [18].

In another study, carried out with 119 patients who had persistent AF, the authors observed that previously active patients, who also had mild to moderate HF, were able to remain physically active when included in a rehabilitation program, contributing to the improvement and maintenance of their condition. Physical aptitude. The rehabilitation program included supervised physical exercise 2 to 3 times a week, with the final evaluation score of the study being physical exercise for at least 150 minutes per week of moderate intensity (3-6

MET) or 75 minutes. vigorous intensity (greater than 6 MET). However, no benefit was observed in maintaining sinus rhythm, and there was no improvement in the quality of life score of these patients. [19].

In a 12-week randomized clinical trial, 76 patients with paroxysmal and persistent AF were allocated to low- or high-intensity exercise (50% and 80% of maximal perceived exertion). The results were observed according to the change in maximal oxygen consumption (VO2 max) and number of hospitalizations in one year. High-intensity physical exercise was not superior to low-intensity exercise in reducing atrial fibrillation burden. High-intensity exercise was well tolerated by individuals with AF, with no higher risk observed compared to low-intensity exercise. [20]

These results support the theory that interventions aimed at lifestyle and risk factor control should be valued in the management of patients with AF. Patients with atrial fibrillation tend to adopt a sedentary lifestyle due to fear of exercise-induced AF episodes. Moderate-high intensity physical activity is recommended to prevent and control cardiovascular diseases, including AF, but the effect of exercise intensity on the onset and burden of atrial fibrillation still needs to be studied further.

SUGGESTION FOR EXERCISE PRESCRIPTION IN PATIENTS WITH AF

In patients with AF, according to current evidence, a prescription of moderate-intensity aerobic exercise should be performed, aiming to achieve a minimum of 90 and a maximum of 150 minutes of activity per week, preferably divided between 3 and 5 sessions per week. It is important that periodic assessments of the individual's functional capacity are carried out to readjust the training.

HIGHLIGHT

In the authors' experience, a regular exercise program can be smoothly started or resumed after about 30 days when a successful catheter ablation procedure is performed to treat AF.

Chart 3. Moderate-intensity prescription methods for aerobic exercise

Method	*Description*
Subjective feeling of exertion (Borg)	Exercises with self-perceived exertion as moderate, medium or heavy, ranging from 3 to 5 on the Borg 0-10 scale or 10 to 13 on the 6-20 scale
Speech test	Execution of the exercises at an intensity in which breathing is panting, but controlled, so that a sentence can be completed without pauses
Peak HR percentages	Exercises at intensity between 70 and 85% of peak HR* target HR = peak HR x percentage
Reserve HR (Karvonen)	Exercises at intensity between 50 to 80% of HR reserve (HR peak – HR rest)* target HR = resting HR + reserve HR) x percentage
Thresholds in cardiopulmonary exercise testing	Execution of exercises at the intensity between ventilatory thresholds 1 and 2 (anaerobic threshold and respiratory compensation point)
HR: heart rate. * The use of peak HR obtained in a maximal exercise test is preferred, since there are individual variations that cause errors in the prediction of HR by age, especially in patients using medications with a negative chronotropic effect (beta-blockers)	

Source: Adapted from the Brazilian Cardiovascular Rehabilitation Guideline (2020)**(21)**

Chart 3 illustrates suggestions for prescribing aerobic physical training in patients with AF
Source: Adapted from the Brazilian Cardiovascular Rehabilitation Guideline (2020)[21]

It is important to emphasize that in AF, the workloads and the subjective perception of effort can be used in situations where the HR is not a good control parameter. Often, individuals with AF find it difficult to use frequency meters to control the intensity of effort guided by HR, due to the greater appearance of interference in this device. Palpation of the radial pulse in order to monitor the training intensity can also be inefficient, due to the irregular rhythm of the beats.

In addition to aerobic physical training, resistance training should be incorporated into cardiovascular rehabilitation programs for patients with AF. To this end, we suggest the adoption of resistance training between 2 and 3 times a week, in addition to the aerobic training program.

Suggestion of prescription of resistance training

- 90 minutes per week, divided between 2 and 3 sessions.
- 50 to 80% of a maximum repetition or use of the OMNI-RES perception scale between 5 and 8
- 6 to 8 exercises per session, covering the main muscle groups.
- 2 to 3 sets per exercise, with 8 to 10 repetitions.

In addition, all lifestyle changes that are part of a comprehensive cardiovascular rehabilitation program should be emphasized in patients with AF, such as smoking cessation, alcohol consumption, diet, stress management, and others.

Few patients with AF participate in cardiovascular reha-

bilitation programs, despite the benefits of exercise in this population. It is assumed that the term "cardiac arrhythmia" arouses fear on the part of individuals with AF and the exercise professionals who will train them. Importantly, the rate of exercise-related adverse events is low, with one occurrence for every 11,452 minutes of exercise. It is essential, however, that patients with AF in rehabilitation programs maintain adequate pharmacological treatment. ([0

CONCLUSION

AF is a complex arrhythmia and understanding its mechanisms is important for cardiovascular physical therapists who intend to work with this population. Individuals with AF benefit from a regular exercise program, which should be prescribed at moderate intensity. Training should consist of aerobic training combined with resistance training for greater benefits. Large volumes of exercise for long periods are associated with a higher incidence of AF in practitioners. The prescription must be individualized. Control of cardiovascular risk factors such as hypertension, obesity and others is associated with improvement in AF.

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REVIEW ARTICLE

CORE NEEDLE BIOPSY IN BREAST INJURIES. REVIEW ARTICLE

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ABSTRACT

The breast lesion biopsies, in general, tend to be invasive. In this context, the biopsy performed with a core needle guided by an ultrasound or by palpation of the lesion, presents as a good alternative, because of the simplicity of the technique and the convenience for the patients who will not need a surgical environment and will receive only local anesthesia. Objective: The present study aims to analyze and describe an ultrasound-guided thick needle technique. Results: Core needle biopsies are comfortable for patients, simpler to be performed by the physician and with faster results due to the low complexity of the procedure. Conclusion: Core biopsy is an advantageous technique in several aspects. It is cheaper than conventional methods as it is a more comfortable technique for the patient, since the results are faster to be released.

KEYWORDS: BREAST, CORE BIOPSY, CORE NEEDLE

INTRODUCTION

Core needle biopsy (core biopsy) allows the histological study of the lesion. It is simple and relatively comfortable, widely available and on an outpatient basis. It can be guided by ultrasound, mammography or magnetic resonance imaging or by freehand when the lesion is palpable. Also known as core biopsy, tru-cut or core biopsy, it is cheaper than mammotomy and surgery. A spring-loaded device or pistol is used to propel the needle through the lesion. The needle, which is disposable, has an average of 12 cm and 14 gauge G1 (Figures 1 and 2).

PRINCIPLES OF THE METHOD AND LITERATURE REVIEW

Three to five fragments are obtained under local anesthesia with 2% lidocaine and fixed in formalin, which will later be processed and stained with Hematoxylin-Eosin (HE) (Figures 3 and 4).

Compared to other biopsy techniques, core biopsy is less invasive and less expensive than mammotomy and surgery, not requiring hospitalization; providing a faster diagnostic result, and consequently the early start of treatment[2].

Commercially available biopsy devices, also called "guns", contain springs that propel the needle through the lesion. The needle, which is disposable, has two components that fit coaxially, the cannula and the mandrel. The chuck has a small chamfer of 1 to 2 cm, depending on the manufacturer, in which the fragment is retained. The fragments obtained have an average diameter of 2 mm[3].

THE TECHNIQUE

After identifying the lesion on ultrasound, the patient is positioned in lateral or dorsal decubitus, facilitating less needle access. The needle is positioned parallel to the transducer in the longitudinal direction, facilitating visualization in the same cutting plane. It is recommended to wrap the transducer with a condom to protect the transducer, the patient and the professional team, leaving a layer of gel between the transducer and the condom. Antisepsis is performed with 70% alcohol and local anesthesia with 5 to 10 ml of 2% lidocaine. It is not necessary to use complex surgical drapes, but an environment that is clean and comfortable for the patient[4].

An orifice is made in the skin with a number 11 or 15 scalpel blade to facilitate the introduction of the needle. This orifice can be made with a 40x12 pink needle or 40x16 white needle when a scalpel blade is not available.

The needle should be introduced until it is almost touching the lesion, that is, before the nodule, however, without going beyond it. After making sure that the needle is correctly positioned, several shots are performed in

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different regions of the nodule, upper, middle and lower, seeking different regions of the lesion[5].

The number of fragments can vary from 3 to 5, depending on the strength and complexity of the lesion and the examiner's experience. When the biopsy is accurate, a fragment is sufficient for the histopathological diagnosis in paraffin by hematoxylin and eosin staining. However, due to immunohistochemistry, which requires at least 4 slides to study RE, RP, HER2 and Ki-67, it is recommended to remove at least 3 fragments[6].

It is important to check the macroscopic aspect of the fragments obtained. Classic malignant lesions, such as infiltrating ductal carcinoma, usually produce solid, hard fragments that submerge in formalin. In such cases, 3 fragments are sufficient. High-grade mucinous or medullary carcinomas originate soft, gelatinous fragments, sometimes fractionated, requiring the removal of 5 or more fragments. In benign lesions, the fragments are usually of a soft, greasy appearance, floating in formaldehyde[7].

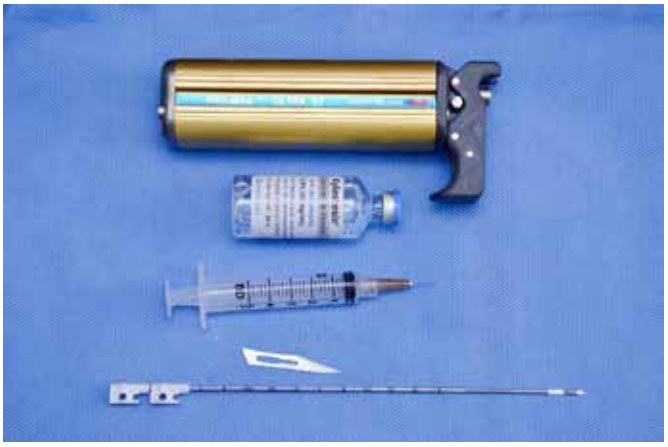

Figure 1. Core needle biopsy. Device or pistol. Disposable needle, 12 cm and 14 G gauge. Blade number 11 for skin incision and local anesthetic.

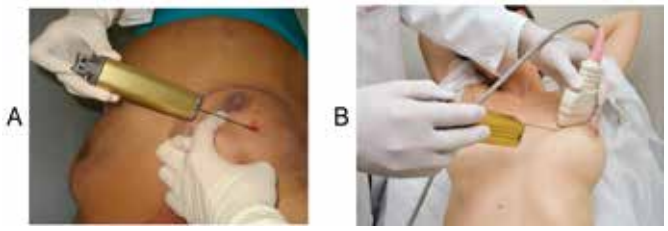

Figure 2. Core needle biopsy. A. Free hand. B. Ultrasound guided. C. Core biopsy ultrasound. Needle positioned before shooting.

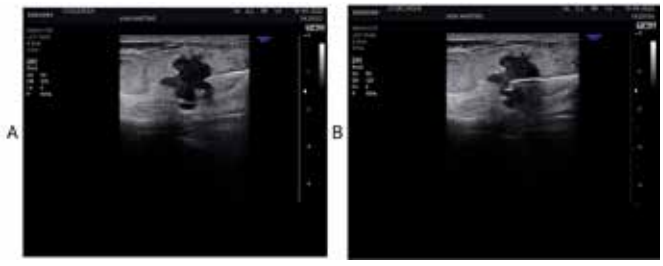

Figure 3. Core biopsy ultrasound. BI-RADS Node 5. A. Needle positioned before firing. B. Needle positioned after shooting.

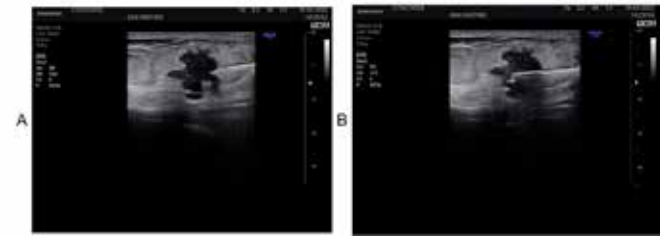

Figure 4. Core biopsy ultrasound. BI-RADS Node 5. A. Needle positioned before firing. B. Needle positioned after shooting.

CONCLUSION

Performed in a less invasive way, with relative comfort, with wide availability and lower cost, core biopsy is a relevant alternative. The use of this method is still rectified due to its faster diagnostic result, allowing an early start of treatment. To perform the technique, the physician must have sufficient technical and practical knowledge to perform the procedure in line with the dynamic follow-up of ultrasound to observe the nodule. Regarding the histopathological examination, 3 to 5 fragments should be removed, providing an appropriate immunohistochemical analysis of markers (RE, RP, HER2 and Ki-67)[8].

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REVIEW ARTICLE

FINE NEEDLE ASPIRATION PUNCTURE (FNAC)

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ABSTRACT

Objectives: The present study aims to describe and discuss the technique and relevance of FNAC application in clinical practice. Method: This is an integrative literature review. Results: Fine Needle Aspiration Puncture (FNAC) can be indicated in cysts, benign and suspicious solid nodules, complex solid-cystic lesions, axillary lymph nodes and postsurgical seromas. Papillary effusion cytology should be requested and interpreted with caution, only in selected cases, due to the low positive predictive value of the method, with false negative rates around 50%. When associated with clinical and imaging exams, FNAC offers a specificity rate of 100% and a sensitivity of 90%.

KEYWORDS: FNAC; BIOPSY; BREAST; DIAGNOSYS

INTRODUCTION

Fine needle aspiration cytology (FNAC) allows the cytological diagnosis of the lesion. It is a simple, low-cost method performed in an outpatient setting. FNAC can be performed without the aid of imaging methods (free hand), when the lesion is palpable, or guided by ultrasound, mammography (stereotaxis) or resonance, when the lesion is not palpable1 (Figure 1).

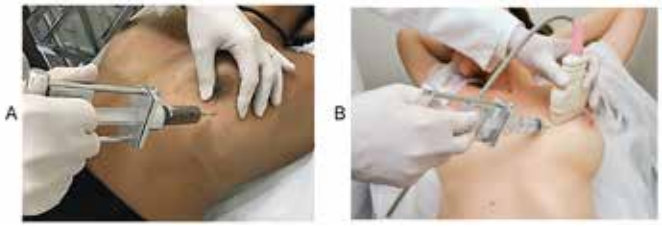

Figure 1. Fine needle aspiration puncture. A. Free hand. B. Guided by ultrasound.

LITERATURE REVIEW AND PROCEDURE TECHNIQUE

To perform the method, antisepsis and local anesthesia are used with 2% lidocaine, a cytoaspirator, to which a 10 or 20 ml syringe with a fine gauge needle is attached. Longer needles, 30 mm and fine gauge, which can be 0.6 (blue), 0.7 (black) or 0.8 mm (green) are preferred. Larger gauge needles, such as 40 x 12 (pink) or 40 x 16 mm (white) are reserved for punctures of lesions with dense (thick) content, large seromas and abscesses. For anesthesia, needles, similar to insulin needles, measuring 13 x 0.45 mm are used. The transducer must be protected with a condom due to the possibility of contamination by blood and other secretions2 (Figure 2).

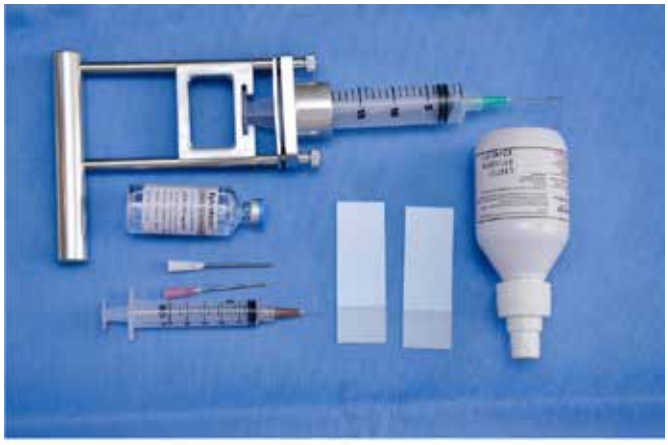

Figure 2. Fine needle aspiration puncture. Cytoaspirator coupled to a 20 ml syringe, 30 x 0.8 mm needle. 5 ml syringe and 13 x 0.45 mm needle for local anesthesia. Blades and fastener. Larger gauge needles, 40 x 12 (pink) and 40 x 16 mm (white) for punctures of lesions with dense (thick) content, large seromas and abscesses.

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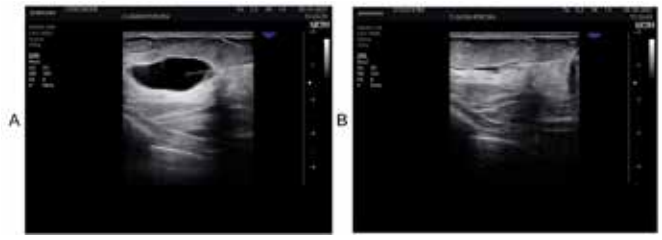

Figure 2. Fine needle aspiration of a cyst. A. Needle placement. B. Post-puncture.

The aspirated material is prepared on slides by thin smear. Fixation can be done in absolute alcohol (96°) or cytofixers, when staining by the Papanicolaou or Hematoxylin-Eosin (HE) method, or air-dried smears, without any fixation, when another special stain is used, such as, for example , Giemsa, Rapid Panoptic® or Diff-Quik®. Another option would be liquid-based cytology, which is processed and homogenized in specific systems, with cell enrichment, improving visualization on a clean background. Slides are made that will be stained later by the aforementioned methods[3].

FNAC may be indicated in cysts, benign and suspicious solid nodules, complex solid-cystic lesions, axillary lymph nodes and postsurgical seromas.

Papillary effusion cytology should be requested and interpreted with caution, only in selected cases, due to the low positive predictive value of the method, with false negative rates around 50%[4].

CONCLUSION

Fine Needle Aspiration Puncture (FNAC) is a simple, low-cost method that allows the evaluation of palpable and impalpable nodules and lesions. Therefore, in view of the integrative review of the literature, the PAAF method demonstrated ease in its application methodology and materials necessary for the procedure to be carried out in an accessible and practical way in outpatient clinics, bringing good performance of the method in everyday life. Thus, FNAC allows the cytological diagnosis of the lesion, and can be performed without the aid of imaging methods or guided by ultrasound, mammography (stereotaxis) or resonance. However, it is limited in terms of differentiating between in situ and invasive tumors[1-4].

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