

Care of infarcted patients undergoing angioplasty before and during COVID-19: a cross-sectional study

Atendimento a pacientes infartados submetidos à angioplastia antes e durante a COVID-19: estudo transversal

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Submission: 05/01/2022

Approved: 03/28/2023

ABSTRACT

Objective: To compare the care provided to infarcted patients submitted to angioplasty before and during the COVID-19 pandemic. **Method:** Cross-sectional research, with a retrospective approach, conducted with 498 patients through the assessment of electronic and physical medical records, referring to care provided before and during the pandemic in the hemodynamics clinic of a reference hospital for cardiovascular diseases. Descriptive and inferential statistics were used. **Results:** In 2019, pre-pandemic period, 157 percutaneous coronary angioplasties were performed. In 2020, at the pandemic's beginning, 166 procedures were performed — an increase of 5.73%. In 2021, there were 175 procedures — an increase of 11.46% compared to 2019. **Conclusion:** There was an increase in percutaneous coronary angioplasties by 11.46% from 2019 to 2021, with a consequent increase in nursing and multidisciplinary care during the COVID-19 pandemic.

Descriptors: Myocardial Infarction; Critical Care Nursing; Cardiovascular Diseases.

RESUMO

Objetivo: Comparar o atendimento de infartados submetidos à angioplastia antes e durante a pandemia da COVID-19. **Método:** Pesquisa transversal, de abordagem retrospectiva, com 498 pacientes, por meio de prontuários eletrônicos e físicos, referente a atendimentos antes e durante a pandemia, no serviço de hemodinâmica de hospital de referência para doenças cardiovasculares. Dados analisados por estatística descritiva e inferencial. **Resultados:** Em 2019, pré-pandemia, realizaram-se 157 procedimentos de intervenção coronária percutânea. Em 2020, início da pandemia, 166 procedimentos, aumento de 5,73%. Em 2021, ocorreram 175 procedimentos, acréscimo de 11,46% em comparação a 2019. **Conclusão:** Houve aumento no número de procedimentos de ATC, em 11,46% de 2019 a 2021, com consequente elevação da assistência de enfermagem e multiprofissional durante a pandemia da COVID-19.

Descritores: Infarto do Miocárdio; Enfermagem de Cuidados Críticos; Doenças Cardiovasculares.

INTRODUCTION

COVID-19 is a highly transmissible viral disease caused by SARS-CoV-2, identified in China in December 2019 in Wuhan. Since its emergence, global cases have grown exponentially, with negative impacts on individual and collective health, in addition to leaving scars on the world economy in all sectors, directly impacted by the long pandemic period and the need for social distancing, aggravated by the lack of adherence to biosafety norms and delay in vaccination⁽¹⁾.

Given the great epidemiological expression of the cases, 20% require hospital care due to respiratory difficulties, of which approximately 5% require ventilatory support in an intensive care unit (ICU)^(2,3).

All regions of the country had records of declines in consultations, tests, and surgeries, and the consequent increase in deaths from other illnesses, such as Acute Myocardial Infarction (AMI). The main hypothesis is that patients stopped seeking care for fear of the new coronavirus⁽⁴⁾.

According to notary data from the Association of Natural Persons of Brazil, from March 16 to May 31, 2020, 15,870 people died from cardiovascular diseases (CVD) at home. In the same period of the previous year, there were 11,997 deaths, an increase of almost 25%⁽⁴⁾.

Because they are the main causes of death in Brazil and the world⁽⁵⁾, CVDs require greater attention from health services during the pandemic, especially in Brazil, which is among the 10 countries with the highest rate of cardiovascular deaths, especially AMI.

Given the importance of early diagnosis and rapid intervention to save lives, some tools stand out, such as the electrocardiogram (ECG), clinical history, complementary tests (laboratory and imaging), and physical examination of the patient⁽⁶⁾ for rapid diagnosis of AMI in addition to the percutaneous coronary intervention, also known as Transluminal Coronary Angioplasty (TCA), for restoration of blood flow from the heart. The success of the reperfusion depends on several factors, among them the time from the diagnosis until the start of the chosen reperfusion therapy, known as the door-to-balloon time, which should not exceed 90 minutes^(6,7).

A previous study in China showed an increase in the meantime from the onset of AMI symptoms to the first medical contact during the pandemic⁽⁷⁾. In Brazil, a decline in hospitalization rates was identified in an ecological study in five capitals of different Brazilian regions, which identified a decline of 16.15%, from 77.7 hospitalizations per 100 thousand people to 65.15 during the pandemic⁽⁸⁾.

The fear of contamination by COVID-19 during medical care made patients stay home, which can lead to death. The COVID-19 pandemic led the country to a serious health crisis. In this way, researchers observing the behavior of diseases, such as AMI, can contribute to keeping them as priorities in health policies and services⁽⁹⁾.

Given the above, nurses working in highly complex units, such as the hemodynamic ward, ensure the use of technologies involving the TCA procedure in patients in emergencies. In addition, hemodynamic nurses maintain leadership, critical thinking, theoretical/practical training, and participate in events to accompany the constant innovations in this field⁽⁹⁾. Thus, raising the clinical profile of infarcted patients undergoing TCA before and during COVID-19 can reveal elements to improve service quality and the pandemic's impact.

Based on what is known about the pathophysiology of SARS-COV-2, this research aimed to compare the care provided to infarcted patients submitted to angioplasty before and during the COVID-19 pandemic.

METHOD

A cross-sectional, retrospective research was conducted with an exploratory character and a quantitative approach. Furthermore, the description of this section followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE: cross-sectional studies) checklist⁽¹⁰⁾.

The study was carried out using secondary data obtained from electronic and physical medical records of patients treated at a reference hospital for the treatment of cardiac and neurological diseases belonging to the municipality, which receives patients from the public and private network and serves 20 municipalities located in the fifth Health Region of Guarapuava-PR, Brazil, from January 2019 to December 2021. In addition, this is the only hospital to have a hemodynamics service in the region.

Inclusion criteria were individuals aged 18 years, of both sexes, with infarction, and undergoing primary TCA during the study period. The exclusion criterion was incomplete filling regarding the clinical characteristics of the patients, the procedures, the duration of the assistance, the blood pressure levels, and the degree of obstruction. Five hundred thirty-six medical records were located for patients admitted in the period, and the variables above were organized in an electronic spreadsheet. After selecting and exploring the database, we identified the need for exclusions in the descriptive analysis due to incomplete filling of clinical data, such as cardiovascular risk (CVR), the exam performed, and the blood pressure levels. Thus, 38 records were excluded, constituting a sample for the analysis of 498 records. Data collection followed the biosafety protocol against COVID-19 of the municipal health department and the hospital institution.

The extracted variables from the hospital records were: age, gender, Body Mass Index (BMI), blood pressure levels, CVR, and characteristics/results of hemodynamic procedures, including access route used, number/location/extent of arterial lesions, left ventricular function, and the result of the injuries among others related to the patient with AMI.

Patients with the suspected coronary syndrome were admitted to the emergency room, with the possibility of having exams that would be necessary to confirm the diagnosis of AMI requested. Subsequently, the patients were referred to the hemodynamics ward for a coronary angiogram (CAG) and TCA.

After extracting the information from the medical records, we classified patients' nutritional status using the BMI index. BMI was calculated by dividing the patient's weight in kilograms by the square of the height in meters. Values between 17 and 18.4 kg/m² were considered low weight, 18.5 to 24.9 kg/m² normal weight (eutrophic), 25 to 29.9 kg/m² overweight, 30 to 34.9 kg/m² grade I obesity, 35 to 40 kg/m² grade II obesity, and greater than 40 kg/m² grade III obesity.

Statistical analysis was performed using the IBM Statistics SPSS 20 software, and graphs were created using the Microsoft Excel program. Data were described using frequencies, percentages, means, and standard deviations. Normality was tested using the Kolmogorov-Smirnov test, and homogeneity using Levene's test. For comparison of numerical variables, one-way ANOVA tests with Bonferroni's post hoc were applied when there was normality or homogeneity of variances. In cases where these requirements were not met, the Kruskal-Wallis test was used. For categorical variables, Pearson's chi-square test was used. All associations were tested at a significance level of 0.05.

This article is part of a term paper linked to the Residency Graduate Program in Urgency and Emergency of the Nursing Program at the State University of the Midwest (UNICENTRO) and a scientific initiation project from the Araucária Foundation. The study complied with the ethical precepts of Brazilian Resolution 466/12 and was approved by the Research Ethics Committee (CEP) of UNICENTRO, as per opinion number 4,757,809, in 2021.

RESULTS

Of the 498 TCA records selected during the study period in 2019, 157 were performed. In 2020, 166 procedures were performed, an increase of 5.73% concerning the number of visits, and in 2021, 175 procedures were performed, an increase of 11.46% compared to 2019.

Of all the medical records analyzed between 2019 and 2021, the mean age was 63.15 ± 11.30 years. There was a higher percentage of males (65.7%), with a mean age of 62.58 ± 11.56 years, and women represented 34.3%, with a mean age of 64.25 ± 10.73 years. Regarding 2019, 2020, and 2021, the Chi-square test showed no association with the gender of the participants ($X^2_{(2)} = 0.191$; $p = 0.909$) and the extent of arterial disease (Table 1).

As for chronic diseases and CVR, the most prevalent were systemic Arterial Hypertension (SAH, 77.5%), hypercholesterolemia (64.8%), smoking (40.8%), Diabetes Mellitus (DM, 28.7%), overweight (27.6kg/m²), Peripheral Arterial Disease (PAD)(16.2%), and 51% had two or more comorbidities, as shown in Table 1.

In this population, the average daily use of anti-hypertensive drugs was two pills. A percentage of 62.7% of the participants used anticoagulants, and there was an association between the years 2019 and 2021, according to the Chi-square test ($X^2_{(2)} = 21.494$; $p < 0.001$), while 37.3% did not use anticoagulants, as shown in Table 1. The presence of PAD was 16.2% on a three-year average, and an association was found by the Chi-square test ($X^2_{(2)} = 8.202$; $p = 0.017$), with a Cramer's V of 16.5%.

According to Table 1, there was an association between the years of interest and left ventricular function in most participants ($X^2_{(2)} = 26.685$; $p < 0.001$), with a 16.1% association by Cramer's V, and almost 31% had a slight deficit. In addition, an association between years and the outcome for the first artery in the Chi-square test was found ($X^2_{(2)} = 14.530$; $p = 0.024$), with 12.1% by Cramer's V.

As for the TCA procedure conducted for clearing the first artery, it was observed that, between 2019 and 2021, 88.36% of the participants had a successful TCA. A rate of 5% failed due to not going beyond the lesion (unobstructed). Another 3.3% were unsuccessful in clearing the lesion without dilating the artery, and finally, 3.2% were unsuccessful with total and acute occlusion of the arterial lesion. In the second artery, in all years, the success rate reached 100% (Table 2). There was a significant difference in the duration of the procedure, which increased from 21.93 minutes in 2019 to 30.33 minutes

Table 1 - Clinical and hemodynamic characteristics of patients undergoing transluminal coronary angioplasty between 2019 and 2021 (N and percentage). (N=498) Guarapuava, PR, Brazil, 2022

Parameters		2019	2020	2021
Sex (n=498)	Male	95 - 60.5%	117 - 70.5%	115 - 65.7%
	Female	62 - 39.5%	49 - 29.5%	60 - 34.3%
Allergic reactions (n=318)	Yes	9 - 10.5%	8 - 6.2%	7 - 6.9%
	No	77 - 89.5%	122 - 93.8%	95 - 93.1%
SAH (n=331)	Yes	73 - 82%	98 - 74.2%	84 - 76.4%
	No	16 - 18%	34 - 25.8%	26 - 23.6%
Hypercholesterolemia (n=323)	Yes	57 - 65.5%	84 - 63.6%	68 - 65.4%
	No	30 - 34.5%	48 - 36.4%	36 - 34.6%
DM (n=397)	Yes	21 - 23.9%	44 - 33.3%	31 - 29%
	No	67 - 76.1%	88 - 66.7%	76 - 71%
Smoking (n=323)	Yes	40 - 45.5%	46 - 36.5%	44 - 40.4%
	No	48 - 54.5%	80 - 63.5%	65 - 59.6%
Previous interventions (n=306)	Yes	7 - 8.9%	17 - 13.8%	15 - 14.4%
	No	72 - 91.1%	106 - 86.2%	89 - 85.6%
Anticoagulant use (n=324)*	Yes	68 - 77%	88 - 66.2%	47 - 45.6%
	No	20 - 22.7%	45 - 33.8%	56 - 54.4%
PAD (n=303)*	Yes	8 - 10.1%	16 - 13.1%	25 - 24.5%
	No	71 - 89.9%	106 - 86.9%	77 - 75.5%
Previous cardiac circulation (n=305)	Yes	1 - 1.3%	3 - 2.4%	1 - 1.0%
	No	78 - 98.7%	120 - 97.6%	102 - 99%
Disease extension (n=498)	single artery	13 - 8.3%	17 - 10.2%	11 - 6.3%
	Biarterial	112 - 71.3%	119 - 71.7%	144 - 82.3%
	three-vessel	32 - 20.4%	30 - 18.1%	20 - 11.4%
Pre-intervention left ventricular function (n=498)**	Normal	96 - 61.1%	96 - 57.8%	139 - 79.4%
	discreet deficit	56 - 35.7%	66 - 39.8%	30 - 17.1%
	moderate deficit	4 - 2.5%	4 - 2.4%	6 - 3.4%
	severe deficit	1 - 0.6%	-	-
Collateral circulation (n=496)	Absent	155 - 100%	166 - 100%	175 - 100%
	Gift	-	-	-

Source: Prepared by the authors, 2022.

SAH - Systemic Arterial Hypertension; DM - Diabetes Mellitus; PAD - Peripheral Arterial Disease; N = number of participants; % = percentage. * Association through the Chi-square test with Cramer's V; ** Intervention in Fisher's Exact test with the association by Cramer's V. The results referring to continuous variables were expressed in frequencies and as proportions or percentages.

in 2021. In addition, there was a difference between 2020 and 2021 concerning the degree of obstruction of the first artery after the procedure; a rate of 14.8% of the patients had some degree of obstruction after the procedure in the first artery and, in 2021, this value reduced

to 5.94% with a significant difference ($p=0.006$), as shown in Table 3.

DISCUSSION

The study revealed an increase in the number of TCA procedures by 11.46% from 2019 to 2021. The hemodynamic wards require experience from

Table 2 - Injury sites and results of transluminal coronary angioplasty of patients in the hemodynamic wards between 2019 and 2021 (N and percentage). (N=498) Guarapuava, PR, Brazil, 2022

Parameters	2019	2020	2021	
Injury sites	1st MG	4 - 2.54%	5 - 3.03%	2 - 1.15%
	RC	51 - 32.48%	55 - 33.33%	68 - 39.08%
	CX	15 - 9.55%	17 - 10.3%	23 - 13.22%
	AD	72 - 45.86%	67 - 40.61%	65 - 37.36%
	RPL	1 - 0.64%	-	-
	PV	1 - 0.64%	-	-
	RC/RC	5 - 3.18%	3 - 1.82%	3 - 1.72%
	RC/CX	2 - 1.28%	-	1 - 0.57%
	RC/AD	1 - 0.64%	1 - 0.61%	3 - 1.72%
	CX/1st MG	1 - 0.64%	-	1 - 0.57%
	CX/CX	1 - 0.64%	1 - 0.61%	-
	CX/AD	2 - 1.28%	2 - 1.21%	1 - 0.57%
	AD/1st MG	0.64%	2 - 1.21%	1 - 0.57%
	2nd MG	-	2 - 1.21%	-
	AD/2nd MG	-	1 - 0.61%	-
	AD/AD	-	5 - 3.03%	2 - 1.15%
	DLI	-	1 - 0.61%	-
	KVR	-	1 - 0.61%	-
	RDP	-	1 - 0.61%	-
	SAF-RC	-	1 - 0.61%	-
Access used (n=473)	RC/1st MG	-	-	1 - 0.57%
	AD/CX	-	-	1 - 0.57%
	LCT	-	-	2 - 1.15%
	Right Radial	118 - 84.9%	121 - 75.2%	138 - 79.8%
	Right Femoral	18 - 12.9%	30 - 18.6%	34 - 19.7%
	Left Femoral	1 - 0.7%	1 - 0.6%	-
	Femoral	1 - 0.7%	5 - 3.1%	-
	Brachial	-	3 - 1.9%	-
	Right Brachial	-	-	1 - 0.6%
	Right Radial/Right Femoral	1 - 0.7%	-	-
	Left Radial /Right Femora	-	1 - 0.6%	-
	Success	134 - 85.9%	143 - 86.1%	163 - 93.1%
	TCA results in the first artery (n=497)*	Failure - did not go beyond the lesion	7 - 4.5%	14 - 8.4%
Failure - passed through the lesion and did not dilate		10 - 6.4%	3 - 1.8%	3 - 1.7%
Failure - acute occlusion		5 - 3.2%	6 - 3.6%	5 - 2.9%
TCA results in the second artery (n=40)	Success	13 - 100%	13 - 100%	12 - 100%
	Failure	-	-	-

Source: Prepared by the authors, 2022.

R - Right; L - Left; TCA - Transluminal Coronary Angioplasty; AD (anterior descendant); PV (Posterior Ventricle); RC (Right Coronary); CX (Circumflex); MG (Marginal); LCT (Left Coronary Trunk); RDP (Lower Artery Wall) and RPL, KVR and DLI (Upper Artery Wall). N = number of participants; % = percentage. * Association through the Chi-square test with Cramer's V. The results referring to continuous variables were expressed in frequencies and as proportions or percentages.

Table 3 - Mean and standard deviation of the duration of the procedures, pressure levels, and degree of obstruction between 2019 and 2021. (N=498) Guarapuava, PR, Brazil, 2022

Parameters	2019	2020	2021	P-value
Age (years) (n=497)	64.17±12.01	62.32±11.04	63.03±10.89	0.337
BMI (n=210)	26.58±5.05	28.42±5.39	27.79±5.96	0.348
Duration (minutes)^a (n=464)	21.93±7.01	23.18±8.09	30.33±12.54	<0.001*
SBP^a (n=487)	129.53±19.86	134.36±19.42	133.38±23.81	0.068
DBP^a (n=487)	79.06±12.24	80.93±11.71	81.22±15.37	0.247
PP^a (n=485)	50.46±14.42	53.43±15.15	52.64±17.24	0.221
Degree of obstruction of the 1st artery (n=498)	94.64±10.18	95.34±8.38	94.07±9.31	0.457
Degree of obstruction of the 2nd artery (n=40)	86.23±13.88	86.13±11.66	89.75±14.43	0.739
Degree of obstruction of the 1st artery after the procedure (n=498)	13.97±34.13	14.84±34.34	5.94±22.79	0.006*
Degree of obstruction of the 2nd artery after the procedure (n=40)	0.77±2.77	1.33±5.16	0±0	0.607

Source: Prepared by the authors, 2022.

^aKruskal-Wallis test; BMI - Body Mass Index; SBP - Systolic Blood Pressure; DBP - Diastolic Blood Pressure; PP - Pulse Pressure. * = statistically significant value (p<0.05).

nursing professionals, who must understand the pathophysiology of AMI and obtain knowledge in handling materials for patient safety. In addition, it is suggested that nurses conduct the nursing process to implement systematic nursing care and identify factors associated with CVR, such as aging, gender, SAH, DM, hypercholesterolemia, smoking, overweight, and PAD^(1,5,11).

Differently from our findings, in another study⁽⁸⁾, the daily number of emergency consultations decreased by 45%, non-elective hospitalizations by 50%, and TCA procedures by 29% for treating AMI during the period of social isolation due to the COVID-19 pandemic.

Likewise, a study in England, which also investigated the impact of the COVID-19 pandemic on interventional cardiology procedures, showed a 40% decrease in consultations in 2020⁽¹¹⁾. Corroborating these findings, a Spanish study found that 73 Health Centers had a significant decrease of 56% in the number of diagnostic procedures, 48% in coronary therapy, 81% in structural therapy, and 40% in severe AMI treatments⁽¹²⁾. There was a prevalence in attendance among males during the three years analyzed. Men have higher rates of associated comorbidities and early mortality from CVD, while women have a

longer life expectancy, with a greater functional and hormonal decline in the later stages of life. Thus, historically, women seek health services more frequently, in addition to natural female hormones, such as estrogen, which protect them against the development of Coronary Artery Diseases (CAD)⁽¹³⁾.

Men, in turn, do not constantly seek care as women do. Consequently, they develop CAD more frequently⁽¹³⁾, and when they seek health services, the disease is in a more advanced state, which justifies the predominance of men undergoing angioplasty in the three years of the study. Factors associated with CVD and CVR (SAH, DM, overweight, smoking, arterial stiffness, and hypercholesterolemia) increase the risk of AMI^(14,15). The population of this study presented similar CVR factors that may be associated with the onset of coronary artery disease in adults and elderly people with AMI.

The progression and lack of control of SAH are the main risk factors for CVR for AMI in elderly people. This pathology causes changes in the vascular walls, hypoperfusion, ischemia, and cardiac and cerebral hypoxia. When the blood pressure is high, the heart's blood vessels can become clogged or narrowed, preventing the

passage of blood and, consequently, oxygenation and normal functioning⁽¹³⁻¹⁵⁾.

Systolic Blood Pressure (SBP) and Pulse Pressure (PP), resulting from the subtraction of BP and Diastolic Blood Pressure, are early and independent markers of CVR. It was identified that of all the patients submitted to TCA in this study, 77.5% were hypertensive, and when the blood pressure levels were checked, the PP reached a three-year average of 52 mmHg, meaning that the blood pressure values were high, even in the presence of normal or pre-hypertensive systolic and diastolic blood pressure values^(13,16).

Studies have shown that men and women with PP \geq 50 mmHg had a double increase in risk/future cardiovascular events, even when other CVD factors were ruled out^(4,13,14). Thus, of the 498 patients over 60 years of age, 388 had CVR factors. Antihypertensive therapy reduces cardiovascular morbidity and mortality in hypertensive patients^(13,15). However, it was insufficient to control blood pressure levels even in patients using one or more antihypertensive drugs.

Hypercholesterolemia is a condition in which the individual's body has high rates of bad cholesterol (LDL). These high values can increase the chances of AMI or Cerebral Vascular Accident (CVA). Excess cholesterol in the body will be deposited on the artery walls, forming fatty plaques that clog arteries, making it difficult for blood to pass through⁽¹⁶⁾.

Smoking is considered an independent CVR factor for CVD, according to the 2021 Brazilian Familial Hypercholesterolemia Guideline⁽¹⁵⁾. Another study points out that smokers are twice as likely to have a heart attack than people who do not smoke, as tobacco tends to increase free radicals in the body, which can contribute to greater clogging of the arteries⁽¹⁷⁾.

PAD is a systemic atherosclerotic pathology resulting in the narrowing and occlusion of the arteries that supply blood to the lower limbs. This disease is considered the third leading cause of atherosclerotic cardiovascular morbidity, after Coronary Artery Disease (CAD) and Cerebral Vascular Accident (CVA). The risk of coronary events is higher in individuals with PAD than those without it. These patients are considered at high cardiovascular risk, as they have some common risk factors for patients with acute coronary syndromes⁽¹⁸⁾.

Nowadays, obesity is present in many people, and it is considered a public health problem in all

regions, being a risk factor for numerous diseases that can affect various systems and organs of the human body, including the heart. Obesity is defined as a BMI equal to or superior to 30 Kg/m². Epidemiological studies describe DM as an important CVR factor for the development of AMI. Some suggested mechanisms for this association include insulin resistance and deficiency, impaired insulin receptors, hyperglycemia toxicity, adverse effects of advanced glycation end products, cerebrovascular damage, and vascular inflammation⁽¹⁹⁾. The worldwide prevalence of DM continues to increase, and the diabetic patients in this study represent 28.7% of the entire sample, which may characterize an increased risk of developing AMI. In addition, DM-related conditions, including obesity, sedentary lifestyle, SAH, dyslipidemia, hyperinsulinemia, and Metabolic Syndrome (MS), can also be risk factors for AMI⁽²⁰⁾.

A study showed a decrease in hospitalizations during the COVID-19 pandemic in four Brazilian capitals⁽¹⁰⁾; however, in this study, it was possible to verify a progressive increase in consultations from 2019 to 2021. In addition, social isolation predisposes the appearance of mental disorders, and stressors were present in 50% of patients⁽¹⁰⁾.

The highest anatomical incidence of lesions treated by TCA evidenced in this study was the anterior descending (AD) coronary artery, the right coronary (RC), and the circumflex coronary artery (CX), predominant in the three years investigated. It was possible to observe these data in important scientific evidence⁽²⁰⁾, showing that AD was the site of injury in 62.2% of cases, followed by RC in 29.7%, and CX in 8.1%. The most used route for intervention was the right radial, followed by the right femoral, as shown in Table 2, and there was a similarity with the literature⁽²⁰⁾. On the other hand, another study disagrees, with the femoral and radial arteries being the preferred routes⁽⁷⁾.

Evidence shows that using radial arteries reduces complications, such as bleeding and mortality. Important scientific evidence has shown that interventionists currently prefer the right radial arteries, as the vast majority are right-handed, and angiography tables are generally designed on the right side, which makes manipulation safer and more comfortable⁽²¹⁾.

This study has limitations, such as the scarcity of recent studies subsidizing the subject addressed.

In addition, the limitations may be specific to the 498 medical records surveyed in the Central-West Region of Paraná. Thus, expansion into other territories is suggested. Some patients examined

showed acute increases in blood pressure levels due to stress during the measurement. Another limitation may be related to the cross-sectional design with the inherent restrictions of this type of methodology.

CONCLUSION

There was an increase in the number of TCA procedures by 11.46% from 2019 to 2021, with a consequent increase in nursing and multidisciplinary care during the COVID-19 pandemic.

ACKNOWLEDGMENTS

To the hemodynamic service of Hospital São Vicente de Paula de Guarapuava-PR.

CONFLICT OF INTERESTS

The authors have declared that there is no conflict of interests.

FUNDING

This paper was carried out with the support of the Araucária Foundation - Scientific Initiation Scholarship, developed at State University of the Midwest (UNICENTRO).

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