

ORIGINAL ARTICLE

Profile of care and safe surgery protocol in a cardiovascular intervention unit

HIGHLIGHTS

1. First study in Mato Grosso to characterize hemodynamic care.
2. Catheterization was the most frequently performed procedure.
3. Safe surgery checklist in hemodynamics qualifies care.
4. Lack of records causes a drop in quality indicators.


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ABSTRACT

Objective: To describe the profile of care and safe surgery protocols performed in a cardiovascular intervention unit in the mid-north region of Mato Grosso, Brazil. **Method:** Quantitative, cross-sectional, descriptive study conducted at a cardiovascular intervention unit. Patients aged 18 years or older treated in 2022 were included. Data were collected from medical records related to patient characteristics, procedures performed, and the Safe Surgery Checklist, and were organized into a database for descriptive statistical analysis. **Results:** 1,239 patients participated. 58.76% (n=728) were men, between 50 and 69 years old (52.78%, n=654) with initial symptoms of unstable angina (34.22%, n=424). The checklist is used in all medical records, and the item with the lowest adherence rate was checking the medication in use (50.12%, n = 621). **Conclusion:** The patient profiles identified in this study are consistent with those reported in the literature. Furthermore, it is necessary to implement strategies to improve actions to promote patient safety.

DESCRIPTORS: Health Profile; Cardiovascular Surgical Procedures; Hemodynamics; Patient Safety; Cardiovascular Diseases.

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INTRODUCTION

In Brazil, cardiovascular diseases (CVD) account for approximately one-third of deaths, making them the leading cause of death in the country. Among these diseases, the leading cause of mortality is ischemic heart disease¹. The prevalent number of individuals in Brazil who had CVD in 2019 was 12,946,932, of whom 51% were male, and the highest number of cases by age was in the 50-69 age group. The state of Mato Grosso had a CVD incidence in 2019 of 15,572.9 thousand cases per 100,000 people. As a result of so many cases of CVD, there were a total of 85,518 hospitalizations for coronary angioplasty surgical procedures, representing the most common surgical procedure performed for cardiovascular diseases¹.

A cardiovascular intervention unit is understood to be a sector that performs highly complex therapeutic and diagnostic processes, requiring advanced technologies with a focus on the circulatory system. The procedures performed include cardiac catheterization (CAT), ultrasounds, orthotic and prosthetic implants, valvuloplasties, angioplasties, ablations, drainages, and therapeutic embolizations².

This unit requires professionals with anatomical knowledge and an efficient and agile team to respond to complications and prevent adverse events, given that cardiac interventions are complex and sensitive². It is necessary to maintain a high level of patient safety, even when procedures are minimally invasive. Such a procedure is performed percutaneously and requires the use of anesthesia, which may be local and/or sedation, and/or general. In this context, it is essential to apply the Safe Surgery Manual, which contains a checklist, to ensure safe care for patients undergoing percutaneous procedures³.

About two decades ago, patient safety gained notoriety among developed nations due to significant problems and weaknesses that the healthcare system was facing in operating rooms, resulting in adverse events that cause disability, harm to patient health, and death, as well as implications for the public system that are often avoidable⁴⁻⁵.

In 2008, the World Health Organization (WHO) launched the Second Global Challenge for Patient Safety, titled "Surgeries Save Lives," which included the Manual for Safe Surgery and the Surgical Safety Checklist—aiming to reduce complications and deaths in the operating room⁵. In 2013, the Ministry of Health established the National Patient Safety Program (PNSP⁶, acronym in Portuguese).

This *checklist* is standardized and designed for use in any institution and may be modified according to the needs of the unit⁵. The checklist should be completed quickly, preferably by a single person, before the end of the intraoperative procedures⁵. The list consists of three phases, before the following methods: anesthesia, surgical incision, and patient discharge from the operating room. With its implementation, there was a decrease in the risk of morbidity and mortality⁷, as well as an impact on communication, teamwork, work processes, and the quality of care⁵.

In 2022, there were 5,135,135 surgeries in Brazil through the Unified Health System (SUS) alone, of which 290,885 were circulatory system surgeries⁸. This significant number necessitates a quality assessment and documentation of complications during and after surgery. With the high volume of surgeries performed, there is a need to identify the patient profiles treated by each unit to understand their demand better and improve care strategies, aiming to make them more specialized, qualified, and safe.

Similar studies on the care profile in Hemodynamic Units have been conducted in other regions of the country, such as in Rio de Janeiro⁹, two studies in Rio Grande do Sul¹⁰⁻¹¹, and one in Paraná¹². Furthermore, no studies were found in Brazil on patient safety or the completion of the checklist in these units.

The characterization of care and patients can inform strategies for improving the care provided, particularly for nurses who perform managerial activities within the care process. This support can lead to improvements in treatment, prevention, and the implementation of protocols to minimize adverse events, ultimately increasing patient safety. It also promotes the dissemination of the topic and supports improvements in the systematization of actions, practices, and evidence in the areas of care, management, and education.

Given the above, the study aims to describe the profile of the care provided and the safe surgery protocols in a cardiovascular intervention unit in the mid-north of Mato Grosso, Brazil.

METHOD

This is a quantitative, cross-sectional, descriptive study. It was conducted in a private cardiovascular intervention unit located in a hospital in the interior of Mato Grosso, Brazil, which serves as a reference for the city and region in which it is situated. The study population consisted of all individuals aged 18 years or older, of both sexes, treated at the cardiovascular intervention unit between January 1, 2022, and December 31, 2022. Information on the subjects was collected by accessing the physical medical records stored on site. Two erased and/or illegible medical records, as well as two medical records of underage patients, were excluded, resulting in a total of 1,239 medical records.

Data collection was conducted between February and April 2024 at the cardiovascular intervention unit, in the presence of a responsible person, according to the previously established days and times by the institution and the researchers. A checklist-type instrument, previously developed by the author, was utilized, based on the files contained in the patients' medical records, with open and closed questions to be completed using the *Google Forms*® application.

The study variables were related to patient characteristics, including age, gender, city of residence, use of continuous medication, previous pathologies, and reason for hospitalization. Additionally, the variables pertained to the procedures performed, such as admission, type of discharge, indication/symptoms, post-procedure complications, type of anesthesia, and site of arterial access. And, concerning the safety checklist: confirmation by all team members, need for intensive care unit (ICU) in the postoperative period, known allergies, need for blood transfusion, antimicrobial prophylaxis in the last 60 minutes, instrument count, medications in use, LEE cardiac risk index, comorbidities, neuroaxis opioid prescription, and complete instrument.

The data were organized in a database using Microsoft Office Excel software and analyzed using the Epi Info statistical program, version 7.2.6.0. The data analysis was descriptive, and the results were presented in tables that included both absolute and relative frequencies.

This research was approved by the Human Research Ethics Committee of the State University of Mato Grosso (CEP/UNEMAT) under opinion number 6,507,165 of November 15, 2023, and CAAE number 73644923.4.0000.5166.

RESULTS

From January to December 2022, 1,239 patients were treated at the cardiovascular intervention unit. Of these, 58.76% (n = 728) were male, 52.78% (n = 654) were aged between 50 and 69, with a range of 21 to 94 years, and an average age of 62.9. Fifty-four percent (n = 625) of patients reside in locations other than the unit's city, representing various cities in the region (Table 1).

Table 1. Demographic characteristics of patients treated at the cardiovascular intervention unit. Tangará da Serra, MT, Brazil, 2022

Variables	n	%
Gender		
Male	728	058.76
Female	511	041.24
Age group		
18-49	186	015.01
50-69	654	052.78
70+	399	032.20
City of residence		
Other	625	050.44
Head office	614	049.56
TOTAL	1,239	100.00

Legend: n=1239.

Source: The authors (2024).

Regarding clinical aspects, 29.54% (n=366) of patients had two pre-existing conditions, with systemic arterial hypertension (SAH) (65.13% n=238), coronary artery disease (43.91% n=161), dyslipidemia (41.40% n=151), and diabetes mellitus (DM) 20.90% (n=76) being the most prevalent. 84.75% (n = 1,050) use continuous medications, with one to four medications per patient, accounting for 38.26% (n = 474). Regarding the most used types of medication, acetylsalicylic acid stands out at 40.92% (n = 429), followed by clopidogrel bisulfate at 31.23% (n = 327), and losartan at 20.58% (n = 216). Regarding the indication for performing the hemodynamic procedure, 34.22% (n = 424) were due to symptoms of unstable angina, and 97.42% (n = 1,207) had no risk factors for renal injury at the time of care (Table 2).

Table 2. Health characteristics of patients treated at the cardiovascular intervention unit. Tangará da Serra, MT, Brazil, 2022

Variables	n	%
Risk factors for kidney damage		
Not applicable	1,207	097.42
Diabetes Mellitus - insulin dependent	23	001.86
Previous kidney disease / (GFR <60=ml/1.75m)	7	000.56
Diabetes Mellitus - insulin dependent, Previous kidney disease / (GFR <60=ml/1.75m)	2	000.16
Pre-existing pathologies		
None	94	007.59
1	350	028.25
2	366	029.54
3	298	024.05
4-6	131	010.57
Indication/symptoms		
Unstable Angina	424	034.22
Others	276	022.28
Blank	216	017.43
Stable angina	184	014.85
Post-Acute Myocardial Infarction	110	008.88
Angina + other symptoms	29	002.34
Continuous medication		
Yes	1,05	084.75
No	189	015.25
Number of medications used		
0	306	024.69
1-4	474	038.26
5-9	419	033.82
10+	40	003.23
TOTAL	1,239	100.00

Legend: n=1,239.

Source: The authors (2024).

Regarding the characteristics of the procedures performed, more patients were admitted privately, representing 45.52% (n = 564) of cases, with coronary angiography being the primary reason for hospitalization in 59.08% (n = 732) of cases. Regarding the percutaneous access route, the radial artery was the predominant choice, with 78.29% (n = 970) of cases, and 88.70% (n = 1,099) of cases were performed under local anesthesia only. As for post-procedure complications, 99.52% (n = 1,233) of cases resulted in no complications. Regarding patient discharge, 55.86% (n = 692) were referred to the Intensive Care Unit (ICU) or Inpatient Unit (IU), which included both local hospitals and other locations (Table 3).

Table 3. Characteristics of procedures performed on patients treated at the cardiovascular intervention unit. Tangará da Serra, MT, Brazil, 2022

Variables	n	%
Admission		
Particular	564	045.52
Health Insurance	390	031.48
Judicial	213	017.19
Consortium	72	005.81
Reason for hospitalization		
Coronary angiography	732	059.08
Angioplasty with drug-eluting stent implantation	362	029.22
Cardiac catheterization + angioplasty	60	004.84
Others	43	003.47
Cerebral/carotid/aortic/pulmonary/carotid arteriography + of 1 cardiac catheterization	35 0007	002.82 000.57
Arterial access site		
Radial	970	078.29
Femoral	228	018.40
Femoral + other access	23	001.85
Venosa	10	000.81
Brachial	8	000.65
Type of anesthesia		
Locoregional	1,099	088.70
Blank	112	009.04
Sedation	11	000.89
General	8	000.65
Sedation, Locoregional	7	000.56
Sedation, General	2	000.16
Post-procedure complications		
No	1,233	099.52
Bleeding	3	000.24
Hematoma	2	000.16
Hematoma, Bleeding	1	000.08
Type of discharge		
ICU transfer	692	055.86
Hospital	495	039.95
Other	49	003.95
Death	2	000.16
Blank	1	000.08
TOTAL	1,239	100.00

Legend: n=1,239.

Source: The authors (2024).

Regarding the safe surgery checklist, it is noteworthy that the instrument was present in 100% (n = 1,239) of the medical records. Regarding the checklist, it was observed that most items were checked as described below: known allergies (98.31%, n=1,218), comorbidities (82.65%, n=1,024), confirmation by all team members (82.65%, n=841),

instrument count (97.58%, n=1,209), LEE cardiac risk index (80.55%, n=998), need for blood transfusion (98.47%, n=1,220), need for ICU after the procedure (96.53%, n=1,196), prescription of neuroaxial opioids (51.33%, n=636), and administration of antimicrobial prophylaxis in the last 60 minutes (96.13%, n=1,191). However, 50.12% (n = 621) of cases did not have the medication in use checked, and 77.56% (n = 961) of the checklists were incomplete in the medical records (Table 4).

Table 4. Description of the safe surgery checklist of activities carried out in the cardiovascular intervention unit. Tangará da Serra, MT, Brazil, 2022

Variables	n	%
Known allergy		
Yes	1,218	098.31
No	21	001.69
Comorbidities		
Yes	1,024	082.65
No	215	017.35
Confirmation by all		
Yes	841	067.88
No	398	032.12
Instrument count		
Yes	1,209	097.58
No	30	002.42
LEE Cardiac Risk Index		
Yes	998	080.55
No	241	019.45
Medicines in use		
Yes	621	050.12
No	618	049.88
Blood transfusion required		
Yes	1,22	098.47
No	19	001.53
Need for post-operative ICU		
Yes	1,196	096.53
No	43	003.47
Neuroaxis opioid prescription		
Yes	636	051.33
No	603	048.67
Antimicrobial prophylaxis carried out in the last 60 minutes.		
Yes	1,191	096.13
No	48	003.87
Complete instrument		
Yes	961	077.56
No	278	022.44
TOTAL	1,239	100.00

Legend: n=1,239.

Source: The authors (2024).

DISCUSSION

This study stands out because, to date, no records of investigations with a similar focus have been found in scientific literature, aimed at characterizing the profile of patients, care, and the use of the safe surgery *checklist* in a cardiovascular intervention unit in the state of Mato Grosso. This finding reinforces the importance of understanding the dynamics of these services, thereby contributing to the development of improvement strategies in this area.

It was observed that patients had a previous history of coronary artery disease before undergoing any procedure at the institution. This finding is consistent with the expected profile, since individuals with coronary artery disease are those who most frequently require hemodynamic interventions due to the higher risk of severe lesions from stenosis or thrombosis in the coronary arteries¹³.

The patients treated reside in various municipalities, different from the location of the institution. This was expected, as the unit serves as a reference for its region, being situated in the state's interior.

Regarding clinical aspects, the results vary. Although insulin-dependent diabetic patients were identified, the number of patients using prior insulin is slightly more than double that number, with an average of 259 patients being diabetic. This suggests a limitation in the results due to incomplete filling out of medical records. This situation restricts the analysis of risk factors for renal injury, as insulin dependence is one of the variables associated with this factor, which also highlights the association between diabetes mellitus and percutaneous procedures¹⁴.

Unstable angina was the clinical aspect with the highest frequency of symptoms and indications for procedures, in line with current original studies¹⁰⁻¹¹. Angina is perceived as a very relevant aspect for the diagnosis of CAD and one of the main symptoms reported in cases of coronary injury¹⁵. This explains why patients had angina before the procedure was performed.

In this study, individuals who underwent hemodynamic procedures are adults approaching old age, have health problems, and are more likely to use medications. Acetylsalicylic acid and clopidogrel bisulfate are the most frequently prescribed drugs, as they act to reduce potential complications¹⁶ and are some of the medicines of choice for the treatment and prevention of AMI, especially after angioplasty to prevent restenosis or intra-stent atheromas¹³.

In this sense, the use of one or more medications by participants is justified, as older adults generally use polypharmacy, especially if they have SAH. The combination of drugs can increase the likelihood of adverse events, and in particular, the simultaneous use of five drugs presents a 58% risk of adverse events. In addition, another study points out that hypertensive patients usually have more than one prescription for the treatment of SAH¹⁷.

Notably, the institution in question performs a higher proportion of coronary angiography (CAT) procedures compared to other interventions. This contrasts with findings in the literature, which reported more angioplasties than CAT¹¹. In addition, this study differs from another study in which more than half of the patients undergoing CAT also underwent angioplasty¹⁰.

The choice of radial artery access is considered the safest, mainly because it presents a lower risk of bleeding and causes less pain and discomfort to the patient¹⁸. CAT and trans radial angioplasty significantly reduce the rate of major vascular complications, such as death, heart attack, and stroke, compared to the femoral approach, in addition to providing more comfort and faster recovery than other routes.

In addition, local anesthesia was used in the procedures, since local-regional anesthesia has a higher safety profile and is less invasive, especially in patients with acute coronary syndrome. This approach contributes to faster recovery, reduces the risk of systemic complications, and enhances the overall patient experience¹³.

It is noted that the most common discharge was transfer. This is in line with the institution's protocol, which requires all patients undergoing angioplasty to be transferred to the intensive care unit (ICU) for 24-hour monitoring, regardless of their stability. However, in some cases, patients were already under hospital care due to the high complexity and severity of their life-threatening vascular conditions¹².

Additionally, complications are more likely when the procedure is performed through femoral access¹⁹. This may explain the low complication rate in this study, as radial access is more frequently used.

When analyzing the medical records, it was observed that most were not completed. This was evidenced, for example, by the lack of definition of post-procedure complications and the incompleteness of the safe surgery checklist.

In this context, the absence of records regarding the identification of errors and complications for the prevention of new cases may impact the institution's indicators, revealing weaknesses in the patient safety culture. Furthermore, when comparing the results of this study with those of other studies reporting low complication rates, such as 3.0% total complications, 15% hematomas, and 6.8% ecchymoses, a failure in recording post-procedure complications is evident^{9,20}. This may have been due to inadequate completion of medical records or the fact that most patients are transferred to another department or institution, which makes it difficult to follow up on these cases.

When it comes to patient safety culture and adherence to the WHO Safe Surgery Checklist, rates of close to 100% are expected for each item and across all periods⁵. The survey results confirmed the institutional interest of the unit in adopting this tool, as the list was presented in all medical records analyzed.

However, although this study found that the checklist was present in all medical records, the rate of complete completion was low. This analysis examines adherence to the checklist in a hospital in the state of Maranhão²¹, where professionals were required to complete the protocol at three points during the intraoperative period. However, adherence in the third stage proved unsatisfactory. In addition, the completion rate was the same for half of the items, falling below 90% for five of the ten items. Regarding the periods at this institution during which the research was conducted, only the intraoperative moment is considered.

The item with the highest non-compliance rate is related to medications in use. This has a direct impact on the patient's health, as they may have previously consumed medicines that interact with those used during the procedure, or that may result in an overdose. Many patients are already on continuous medication, and in cardiac emergencies, drugs from the same class are often administered, which can increase the risk of serious complications, such as bleeding¹³.

An integrative review of the literature reveals that 15% of healthcare professionals in general (nurses, nursing technicians, and physicians) believe that the use of the checklist results in delays. In comparison, 11% are not convinced of its effectiveness. These data provide insight into understanding the results of this study, which showed low adherence to the checklist's completeness. In addition, the lack of administrative support, the absence of a center dedicated to patient safety, and the scarcity of continuing education programs focused on safety protocols stand out²².

The Patient Safety Center (NSP), according to RDC No. 36/2013, is "the health service body created to promote and support the implementation of actions aimed at patient safety." One of its principles and guidelines is to ensure good practices in the functioning of the health service and specific competencies, including analyzing and evaluating data on incidents and adverse events resulting from the provision of health services and promoting mechanisms to identify and evaluate the existence of non-conformities in the processes and procedures performed, proposing preventive and corrective actions. Additionally, the functioning of the NSP is mandatory²³.

The lack of an NSP poses several challenges, such as a lack of coordination in the implementation of safety protocols, problems in monitoring the quality of treatment, difficulties in promoting a culture of safety, lack of incentive for open communication about errors, problems in organizational learning to prevent the reproduction of issues, and the need to ensure that patient safety is placed first in all phases of the process, including the monitoring of complications and the implementation of preventive measures²⁴.

The study had some limitations, and caution is needed in generalizing the results to the entire state, as this is the only study conducted in Mato Grosso. Socioeconomic, cultural, and demographic differences may influence the data. Nevertheless, the considerable sample size provides confidence in the results for the specific region and for the phenomenon under study. The scarcity of similar studies makes it challenging to discuss the results, particularly regarding the use of the Safe Surgery Checklist. However, this may represent an opportunity to present new data and stimulate further scientific discussion on the topic.

CONCLUSION

The study achieved its objectives by identifying patient profiles and describing the use of the safe surgery protocol. Data analysis reveals that the demographic and clinical characteristics of the study population align significantly with those of previous research. However, regarding aspects related to the reason for hospitalization, there was a divergence from the literature.

Although the safe surgery checklist was present in all medical records, a significant gap existed in their completeness, particularly regarding critical items, such as verifying the medications in use.

Given this scenario, the importance of the safe surgery checklist as an essential tool for nursing practice is emphasized, especially in highly complex environments, such as cardiovascular intervention units. The nursing team's performance is fundamental to the practical application of this protocol, as these professionals are directly involved in all stages of perioperative care. The systematic and complete use of the checklist contributes to the standardization of conduct, error prevention, and strengthening of the safety culture, positively impacting the quality of care provided.

The data highlight the need to strengthen adherence to safety protocols, ensuring complete verification of items essential to patient safety. Despite being low-cost and easy to apply, low adherence to the surgical checklist persists, indicating the importance of further studies investigating the barriers to its implementation.

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - **Vendramini ACMG, Biffi APR**. Drafting the work or revising it critically for important intellectual content - **de Macêdo GS, Cenzi CM, Biffi APR**. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - **de Macêdo GS, Cenzi CM, Biffi APR**. Review and update of the literature - **Favetti ALC, Carvalho CC**. All authors approved the final version of the text.

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