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RESEARCH

# Health care for patients with acute coronary syndrome according to quality indicators

*Assistência ao paciente com síndrome coronariana aguda segundo indicadores de qualidade*

*La atención al paciente con síndrome coronario agudo según los indicadores de calidad*

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**ABSTRACT**

**Objective:** to assess in-hospital care for patients with Acute Coronary Syndrome according to quality indicators. **Method:** a longitudinal quantitative study was performed between November 2012 and March 2013 with 94 patients, including interviews and medical records. **Results:** a total of 39.4% of patients had unstable angina and 60.6% had myocardial infarction, of which 34% had ST segment elevation. Patients with TIMI and GRACE scores higher than four and 140 ($p<0.05$) respectively died. Admission to the intensive care unit totaled 2.1%; assessment of left ventricular (LV) ejection fraction, 83.0%; ASA within 24 hours of admission, 77.8%; statins, 72.7%; angiotensin-converting enzyme inhibitor, 62.8%; anti-smoking counseling, 53.3%; and timely reperfusion, 62.5%. Of all participants, 12.0% underwent an invasive strategy in 24h and 50.0% in 72h. Door-to-ECG time was $68.3 \pm 104.3$ min and door-to-balloon time, $122 \pm 54.5$ min. **Conclusions:** health care protocols are required to standardize practice and improve these indicators.

**Descriptors:** Health Care Quality Indicators; Acute Coronary Syndrome; Emergency Medical Services; Treatment Time; Health Care Quality.

**RESUMO**

**Objetivo:** avaliar a assistência intra-hospitalar ao paciente com Síndrome Coronariana Aguda segundo indicadores de qualidade. **Método:** longitudinal, quantitativo, realizado entre novembro de 2012 e março de 2013 com 94 pacientes, por meio de entrevistas e prontuários. **Resultados:** 39,4% tiveram angina instável, 60,6% infarto do miocárdio, sendo 34% com supra de ST. Tiveram óbito pacientes com escore de TIMI e GRACE superiores a 4 e 140 ($p<0,05$). A admissão em unidade de cuidados intensivos foi 2,1%, avaliação da fração de ejeção do ventrículo esquerdo em 83,0%, AAS em 24 horas de admissão em 77,8%, estatinas em 72,7%, inibidor da enzima conversora de angiotensina em 62,8%, aconselhamento antitabágico 53,3% e reperfusão oportuna 62,5%. Submeteram-se a estratégia invasiva em 24h 12,0% e, acima de 72h, 50,0%. O tempo porta–ECG foi de $68,3 \pm 104,3$ min e porta–balão de $122 \pm 54,5$ min. **Conclusão:** são necessários protocolos assistenciais para uniformização da prática e melhora destes indicadores.

**Descritores:** Indicadores de Qualidade em Assistência à Saúde; Síndrome Coronariana Aguda; Serviços Médicos de Emergência; Tempo para o Tratamento; Qualidade da Assistência à Saúde.

**RESUMEN**

**Objetivo:** evaluar la atención en el hospital para los pacientes con síndrome coronario agudo según los indicadores de calidad. **Método:** estudio cuantitativo longitudinal realizado entre noviembre de 2012 y marzo de 2013 con 94 pacientes a través de entrevistas y registros médicos. **Resultados:** el 39,4% tenían angina inestable, el 60,6% tenían infarto de miocardio y el 34% con elevación del ST. Los pacientes con puntuación TIMI y GRACE superior a 4 y 140 ($p<0,05$) murieron. Ingreso en la unidad de cuidados intensivos fue de 2,1%, la evaluación de la fracción de eyección ventricular izquierda en el 83,0%, la aspirina dentro de las 24 horas de ingreso en el 77,8%, estatinas en el 72,7%, la enzima convertidora de la angiotensina en un 62,8%, consejería anti-tabaco a 53,3% y la reperfusión oportuna en el 62,5%. El total de 12,0% de los pacientes fueron sometidos a la estrategia invasiva dentro de las 24 horas, y el 50,0% por encima de las 72 horas. El tiempo puerta ECG fue de $68,3 \pm 104,3$

min y puerta-balón de 122 ± 54,5 min. **Conclusión:** los protocolos de atención son necesarios para la normalización de la práctica y mejorar estos indicadores.
**Descriptores:** Indicadores de Calidad de Atención de Salud; Síndrome Coronario Agudo; Servicios Médicos de Emergencia; Tiempo para el Tratamiento; Calidad de la Atención de Salud.

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## INTRODUCTION

In Brazil, special attention has been given to non-communicable chronic diseases, as they are a health problem with a great impact. They account for 72.0% of causes of deaths, especially circulatory diseases, responsible for 31.3%[1]. As a result of this situation, in-hospital care services are specialized, with the development of health care quality indicators aimed at guaranteeing better results.

Initially, the theme of health care quality interested restricted groups of physicians exclusively. The academia greatly contributed to the understanding of this theme, as it was after the pioneering studies performed by Donabedian (1966) that Quality Assurance was developed and promoted, with the support of the World Health Organization (WHO) in several countries[2].

Avedis Donabedian had previously recommended that quality should be assessed in three areas: structure (health care aspects that are independent from patients, material and human resources and service organization); process (method, sequence of events promoting health care results); and result (final effect obtained, including deaths, physical disabilities, discomfort and dissatisfaction)[2].

Some of the reasons that justify the concern for health care quality are the greater variation in health care practice, compared to its results, and the difficulty to work with indicators[3]. Indicators are an important health care management tool and, consequently, they must be a part of the organizational policies and goals of any institution aiming to work with users' and professionals' safety and satisfaction, in addition to service quality[4].

In this context, among the existing medical specialties, the area of cardiology is a pioneer in terms of debates on quality. In 1999, the American College of Cardiology and the American Heart Association held a scientific forum on quality known as "Scientific Forum on Quality of Care and Outcomes Research in Cardiovascular Disease and Stroke", where quality indicators for the main cardiovascular diseases (CVD) were standardized, among which was acute myocardial infarction (AMI), in accordance with Donabedian's concepts[5].

Based on this theoretical framework, the present study aimed to assess in-hospital care for patients with acute coronary syndrome (ACS) according to quality indicators.

## METHOD

The present study was approved by the Human Research Ethics Committee of the Londrina State University.

A longitudinal, descriptive-exploratory study with a quantitative approach and a non-probabilistic convenience sample was conducted between November 2012 and March 2013 in patients diagnosed with ACS. This study was performed at a general tertiary public hospital located in Southern Brazil. This is a model hospital for high-complexity cardiology care, exclusively affiliated with the *Sistema Único de Saúde* (SUS – Unified Health System).

This institution has 313 in-hospital beds, an emergency room with 48 observation beds, of which three are for emergencies, eight for operation rooms and 27 for the Intensive Care Unit (ICU). The hemodynamics laboratory is available 24 hours a day: the team is present during 12 hours, while there is a distance shift schedule during the other 12 hours. A total of 1,500 procedures were performed in 2011[6].

The inclusion criteria were as follows: to be aged more than 18 years, to agree to participate in the present study by signing an informed consent form, and to confirm the diagnosis of ACS through medical records. Patients whose diagnosis of ACS could not be confirmed were excluded. There were no refusals to participate in this study.

A census of users admitted to the place of study was conducted daily, from Mondays to Fridays and on weekends as well, and the days were alternated by the researcher herself. An active search for patients admitted to the emergency room through an online system was performed to identify those with ACS.

A narrative review of the following Guidelines of Cardiology was conducted to select the main health care quality indicators for patients with ACS: American College of Cardiology (ACC), American Heart Association (AHA), European Society of Cardiology (ESC), *Sociedade Brasileira de Cardiologia* (SBC – Brazilian Society of Cardiology), Joint Commission on Accreditation of Healthcare Organizations (JCAHO), Institute for Healthcare Improvement (IHI), Canadian Cardiovascular Outcomes Research Team (CCORT), Brazilian Ministry of Health, and Better Health Care Practices Project from the Brazilian Private Hospital Association (ANHP). Additionally, a search was conducted in the Medline, Ibecs and Lilacs databases with the following descriptors: "indicators and quality and infarction" and "measures and performance and infarction".

This review identified approximately 38 quality indicators for ACS, of which 17 were found in the Guidelines[7-12]. Of these, 13 are in-hospital measures and were thus selected for this study: rate of patients admitted to the ICU[10], considering the fact that all those undergoing primary percutaneous coronary intervention (PPCI) must be admitted to this unit; use of early invasive strategies (less than 24 hours) in patients with a medium to high risk or hemodynamic instability[7-8]; assessment of the left ventricular (LV) ejection fraction, obtained from the echocardiography test[7-9] and recommended by all patients with ACS, especially for the purposes of

post-myocardial infraction prognosis[7-11]; prescription of acetylsalicylic acid (ASA) upon admission[7-11]; statins[7-10]; and prescription of angiotensin receptor blocker (ARB) or angiotensin-converting-enzyme (ACE) inhibitor[7-11]. There is consensus on the continuous routine administration of statins, beginning during the hospital period, when the LDL-cholesterol is higher than 130 mg/dl or at the request of a physician when it is between 100-130 mg/dl[7-8,11], as well as that of ASA in all patients suspected of ACS, at a dose from 160 to 325mg/day, which should be maintained at 100mg during hospitalization and post-discharge period[7-8,11]. The administration of ACE inhibitor or ARB are also recommended for all patients with left ventricular dysfunction[8,11].

Other indicators are as follows: anti-smoking counseling[7-10] for all smoking patients; length of hospitalization[12], which should range from six to eight days according to the *Projeto Melhores Práticas Assistenciais* (Better Health Care Practices Project)[12]; length of stay in the emergency unit; door-to-ECG time[10] in the first ten minutes after arrival at the service to diagnose patients eligible for reperfusion therapy[7,-8,11]; primary percutaneous coronary intervention (PPCI) time (door-to-balloon time)[7-12]; timely reperfusion rate[7-11] in all eligible patients, i.e. those with ST segment elevation; and in-hospital mortality[9,12].

In addition to these widely known quality indicators, some health service characteristics involved with care quality were investigated, such as admission or non-admission to the emergency room, cardiac monitoring setting, oxygen therapy, drugs administered in the first 24 hours, mechanical ventilation, indication for ICU admission, professional in charge of service, pre-hospital electrocardiogram, treatment to which one was submitted (PPCI, non-invasive or invasive strategy) and in-hospital outcomes (death and discharge).

TIMI and GRACE scores were also calculated to characterize the severity and risk of mortality of patients. Those with TIMI scores from 0 to 2 points are low risk; from 3 to 4 points, medium risk; and higher than 4 points, high risk. In addition, patients with GRACE scores of up to 108 points are low risk; from 109 to 140 points, medium risk; and higher than 140 points, high risk of mortality[7-9,11].

Data collection was performed in two stages. In the first stage, upon admission of patients to the emergency room, a form was applied through an interview, including questions about their socio-demographic characteristics and history of the current disease. In the second stage, variables related to length of time of treatment, exams performed, drugs administered and in-hospital outcomes were collected from medical records and online system and patients were followed until they were either discharged or deceased.

Data were stored into a database using the SPSS 20.0 software and subsequently submitted to statistical treatment. Categorical variables were presented as absolute and relative frequencies (%) and numerical variables as mean, median, maximum, minimum and standard deviation. Moreover, numerical variables that showed a normal distribution were analyzed by Student-t test, such as door-to-ECG time and door-to-balloon time, while those with a non-parametric distribution were analyzed by the Mann-Whitney test, such as length of hospitalization and length of stay in the emergency room. Finally, Chi-square test was used for categorical variables.

## RESULTS

The study population was comprised of 94 patients, with a mean age of 54 years, of which 52.1% were males, 55.3% were white and the majority were married. A great number of them were unemployed (59.5%) at the time of this study, while 74.4% had a monthly income of up to two minimum wages. Regarding level of education, 46.9% had between one and four years of school and 14.9% had never been to school. A total of 39.4% of participants were diagnosed with unstable angina; 34.0%, ST segment elevation myocardial infarction (STEMI); and 26.6%, infarction without ST segment elevation.

Upon admission, participants were categorized according to risk scores. Table 1 shows the GRACE and TIMI risk scores and the in-hospital outcomes (death and discharge).

The majority of patients in this study showed a low to medium risk with scores of up to four points in the TIMI score or 140 points in the GRACE score. Regarding the outcome of death, the data on the table show that the majority of deaths – 27.8% and 33.3% – occurred in patient with a TIMI score higher than four points and a GRACE score higher than 140 points, confirming the relationship between these scores and a poorer in-hospital prognosis.

**Table 1 -** Relationship between TIMI and GRACE scores and in-hospital outcomes of patients with Acute Coronary Syndrome (ACS). Londrina, PR, Brazil, 2013

| Variable (N = 94) | n | Discharge (%) | Death (%) | *p* value* |
|---|---|---|---|---|
| TIMI score | | | | |
| Up to 4 | 76 | 70 (92,1) | 6 (7,9) | 0,033 |
| Higher than 4 | 18 | 13 (72,2) | 5 (27,8) | |
| GRACE score | | | | |
| Up to 140 | 70 | 67 (95,7) | 3 (4,3) | 0,001 |
| Higher than 140 | 24 | 16 (66,7) | 8 (33,3) | |

*Note: *Chi-square test.*

As the study population was characterized, Table 2 shows the quality indicators through frequency and percentage.

The quality indicator that reached the highest rate was the assessment of LV ejection fraction, performed in 83.0% of patients, followed by the administration of statins with 78.7%, ASA with 77.8%, and angiotensin receptor blocker and ACE inhibitor with 62.8%

The lowest rates were associated with timely reperfusion, totaling 62.5%; admission to ICU, 2.1%; and anti-smoking oral guidance, 53.3%. Only 12.0% of patients had a cinecoronarography in the first 24 hours after admission, while 50% had catheterization after three days of hospitalization.

**Table 2 -** Analysis of in-hospital quality indicators in patients admitted due to Acute Coronary Syndrome (ACS), Londrina, PR, Brazil, 2013

| Variables | n | % |
|---|---|---|
| Percentage of patients admitted to the ICU (n = 94) | 2 | 2.1 |
| Percentage of patients who received ASA in the first 24 hours after admission (n = 94) | 73 | 77.8 |
| Percentage of patients who received angiotensin receptor blocker or ACE inhibitor in the first 24 hours after admission (n = 94) | 59 | 62.8 |
| Percentage of patients who received statins in the first 24 hours after admission (n = 94) | 74 | 78.7 |
| Time until early invasive strategy was performed *(n = 50) | | |
| Until 24h | 6 | 12.0 |
| More than 24h until 72h | 19 | 38.0 |
| More than 72h | 25 | 50.0 |
| Patients who had LV ejection fraction assessed (echocardiogram) (n = 94) | 78 | 83.0 |
| Patients who received anti-smoking counseling/oral guidance **(n = 30) | 16 | 53.3 |
| In-hospital mortality (n = 94) | 11 | 11.7 |
| Eligible patients who received timely reperfusion***(n = 32) | 20 | 62.5 |

*Notes: *n related to the number of patients submitted to cinecoronarography;** n related to the number of smoking patients; *** n related to the number of patients with AMI and ST segment elevation*

Table 3 shows the four numerical quality indicators by sex, with mean, median, minimum, maximum and standard deviation values.

Both door-to-ECG time and door-to-balloon time were higher than recommended and only 7.4% of patients had an electrocardiogram (ECG) in the first ten minutes after arrival in the emergency room.

Length of hospitalization and length of stay in the emergency room were analyzed with Mann-Whitney test and they were significant. Females showed longer times with a $p < 0.05$. The remaining variables showed no statistical significance.

Table 4 shows the characteristics of service, treatment and outcome of patients admitted to a tertiary hospital.

Even with the high prevalence of patients victims of AMI, 92.6% of them received care out of the emergency room, i.e. in consultation rooms or emergency room corridors, where they waited for hospital or ICU beds. More than half of the patients transferred (60.6%) did not have a pre-hospital ECG or one at the health service of origin.

**Table 3 -** Numerical indicators of in-hospital quality in patients admitted, due to Acute Coronary Syndrome (ACS), Londrina, PR, Brazil, 2013

| Variables | Mean | | | Median | Minimum/ Maximum | SD | *p* value |
|---|---|---|---|---|---|---|---|
| | General | Female | Male | | | | |
| Door-to-ECG time (min) | 68.3 | 78.5 | 59.1 | 40.0 | 0/700.0 | 104.3 | 0.37* |
| <10 | 7.4 | | | | | | |
| 11 to 20 | 9.7 | | | | | | |
| 21 to 40 | 35.5 | | | | | | |
| 41 to 60 | 18.3 | | | | | | |
| >60 | 29.0 | | | | | | |
| Length of hospitalization (days) | 7.3 | 5.3 | 4.1 | 6.0 | 1.0/27.0 | 5.2 | 0.032** |
| Length of stay in emergency room (days) | 5.2 | 6.0 | 3.5 | 4.0 | 1.0/27.0 | 4.6 | 0.000** |

*Notas: *teste t-Student; **teste de Mann-Whitney; DP= Desvio padrão.*

**Table 4 –** Characteristics of service, treatment and outcome of patients with Acute Coronary Syndrome (ACS) admitted to an emergency room, Londrina, PR, Brazil, 2013

| Variables (N = 94) | n | % |
|---|---|---|
| Place of service in the hospital | | |
| Emergency room | 7 | 7.4 |
| Out of the emergency room | 87 | 92.6 |
| Professional who recorded the service | | |
| Internal Medicine resident | 50 | 53.2 |
| Medical intern | 42 | 44.7 |
| Cardiology resident | 2 | 2.1 |
| Patients admitted due to transfer | 65 | 69.7 |
| Pre-hospital ECG | | |
| Yes | 37 | 39.4 |
| No | 57 | 60.6 |
| Health care provided until 24 hours after admission | | |
| Cardiac monitoring | 39 | 41.5 |
| Oxygen therapy | 34 | 36.2 |
| Analgesia | 21 | 22.3 |
| Clopidogrel | 85 | 90.5 |
| Statin | 74 | 78.7 |
| ASA | 73 | 77.8 |
| Angiotensin receptor blocker and ACE inhibitor | 59 | 62.8 |
| Beta blocker | 57 | 60.7 |
| Clexane | 53 | 56.4 |
| Nitroglycerin (oral route) | 28 | 29.8 |
| Heparin | 18 | 19.2 |
| Calcium channel blockers | 10 | 10.7 |
| Vasoactive drugs | 18 | 19.1 |
| Mechanical ventilation | 7 | 7.4 |
| Treatment | | |
| PPCI | 20 | 21.3 |
| Invasive strategy | 50 | 53.2 |
| Non-invasive strategy | 24 | 25.5 |
| Outcomes | | |
| Discharge | 83 | 88.2 |
| Death | 11 | 11.7 |
| Waiting for ICU | | |
| Yes | 17 | 18.1 |
| No | 77 | 81.9 |

Regarding care provided upon admission, there was a higher prevalence of cardiac monitoring, totaling 41.5% of patients, followed by oxygen therapy with 36.2% and analgesia with 22.3%. The main drugs administered in the first 24 hours of treatment were clopidogrel with 90.5% and statins with 78.7%.

Of all patients admitted, 74.5% were submitted to cinecoronarography and only 18.1% had a medical referral to be transferred to an ICU and stayed in the waiting list for this unit. With regard to in-hospital outcomes, 11.7% of the patients who had been admitted died.

## DISCUSSION

Regarding socioeconomic characteristics, the results obtained confirmed the inverse relationship between the incidence of cardiovascular diseases and level of education/family income[13], as 74.4% had a monthly income of up to two minimum wages and 46.9% had up to four years of school.

Moreover, both AMI and unstable angina are highly vulnerable situations for patients and the use of scores upon admission to the emergency unit aims to categorize them in terms of risk of death and adverse events.

TIMI and GRACE scores help professionals to decide to follow a more non-invasive or invasive approach to patients. Nonetheless, upon admission, many patients did not have their risk scores noted down in the medical records as recommended by the guidelines[7-11]. In the present study, there were, proportionately, more cases of in-hospital death as outcome among the patients with higher scores, confirming the relationship of severity between both.

According to Donabedian's theoretical framework, quality can be assessed according to three areas or aspects: structure, process and result. Among the indicators of processes assessed in Table 2, the following obtained the highest rates: assessment of LV ejection fraction, followed by statin and ASA administration indicators. In contrast, the lowest rates were obtained by the rate of admission to the ICU, length of time to perform invasive strategies, anti-smoking counseling, timely reperfusion and ACE inhibitor.

In the present study, the rate of administration of statins was higher than that found in other studies, which found a value below 70%[14]. In contrast, ASA obtained a rate of administration of 77.8%, not totaling 100% of patients, lower than the values found in other studies, 95.5%[14] and 94.6%[15].

The fact that the rate of administration of ASA did not reach 100% is justified by the previous administration of this drug at the location of the first service, a practice which is considered to be beneficial to patients, although not measured in this study.

Among the indicators with the lowest rates, the admission of patients to an ICU or coronary care unit was 2.1% and it was associated with the small percentage of patients who had been referred to an ICU, 18.1%, despite the 34.0% who had STEMI.

Another indicator was anti-smoking counseling, which did not reach the total number of smokers. Estimates from the SCORE study indicate that the fatal cardiovascular risk in ten years is approximately double the value of smokers, while the risk of individuals aged less than 50 years is five times higher than that of non-smokers[16]. This could be associated with the high number of patients, lack of supporting materials and health team's difficulty of communication.

The rate of timely reperfusion in patients who had STEMI totaled 65% and it was also another indicator that did not reach the total number of eligible patients. It was associated with the fact that 69.7% of patients had been admitted due to transfers, when the time of beginning of pain could be more than 12 hours, longer than the time when the benefits from reperfusion appeared. Better results were obtained by a Brazilian study that achieved 93.5% of primary coronary angioplasty[17] among the patients cared for.

This process indicator was found to have been influenced by structural indicators such as health care network organization and transference of patients eligible for reperfusion.

The last indicator assessed was the time until invasive strategy was performed, which occurred in the first 24 hours in only 12% of patients with AMI without ST segment elevation or unstable angina; 50% of them had to wait for three or more days to have this procedure, due to the physical structure of the hemodynamics service. A similar situation is found in the rest of the country, where the average time to perform an elective percutaneous coronary intervention is 8.4 days[17].

Even with the high prevalence of patients victims of AMI, 92.6% of them received care out of emergency rooms, as these were busy with patients from other clinics, such as polytraumatized victims. Another fact is that, as the place of study was a university hospital, 97.3% cases of emergency care were provided by medical interns and internal medicine residents and, subsequently, by cardiology residents, after request for a consultation with a specialist. These situations can be responsible for health care delaying, decision-making and subsequent procedures.

Other process indicators are those that measure time of service and in-hospital treatment. Due to time being a predictor of quality, it is known that a fast diagnosis can guarantee golden-hour treatment, increasing patients' survival rate[7]. In the present study, door-to-ECG time, door-to-balloon time and length of stay in the emergency room were higher than the recommendations[7-10], while length of hospitalization was in accordance with the mean value set for patients with AMI[12].

Door-to-ECG time represents the interval between the moment the health service form is completed in the emergency room and that when the first ECG is performed. The ECG performed at the place where care is provided and interpreted by a physician qualified for ambulance service or remote location was found to be a method that reduces door-to-needle time by 34% and door-to-balloon time by 18%, thus representing a trend in reduction in in-hospital mortality among patients with STEMI[18].

Likewise, the guidelines recommend that hospitals prepared for PPCI perform a door-to-balloon time of up to 90 minutes from the first medical contact[8,11] or up to 60 minutes, according to the European guidelines[7].

Door-to-balloon time is a term that has been replaced by first-medical-contact-to-balloon time, when this time begins with the first medical contact. Such indicator characterizes the inner organization to manage patients with STEMI and this, by itself, cannot be an aspect that represents quality of care as a whole [7-8].

However, one characteristic of the place of study was the patients' length of stay in the emergency room while waiting for available hospital beds. This time accounted for 70% of the total length of hospitalization and shows how well the AMI care network is organized, apart from revealing the lack of hospital beds and coronary care units to support such patients.

The door-to-ECG time found was higher than the recommendation, due to tests depending on medical requests and to the lack of equipment and human resources in the unit. Although the ECG sector is next to the emergency room, only 7.4% of patients performed ECG in up to ten minutes after arrival at the hospital, emphasizing the need for changes in health care for those suspected to have ACS.

The length of hospitalization found, 7.3 days, was lower than that recorded in a general hospital, whose mean time was 14 days[19], while the door-to-balloon time, 122 minutes, was similar to the mean time of PPCI performed in Brazil[17].

Among the procedures performed upon admission, continuous cardiac monitoring was the most frequent one, followed by oxygen therapy. Of all drugs recommended, clopidogrel was the only one administered in more than 90% of patients in the first 24 hours after admission. This rate of administration, higher than that of ASA, is due to clopidogrel not being available in primary health services, being exclusively administered in the place of study.

With regard to treatment, the majority of patients had a cinecoronarography and only a fourth of them received non-invasive treatment. As an indicator of results, there was the in-hospital mortality rate, higher than that found in Brazilian hospitals[12,14,17], when the most prevalent outcome was hospital discharge.

The present study had some limitations: the time set for data collection, the lack of information and records of procedures performed and drugs given to patients admitted due to external transfers, and the adoption of medical records.

As a contribution to nursing, the use of quality indicators is required, as they are rarely used to assess the quality of an action or work in the area of health. In a globalized world, it is increasingly necessary to present the results obtained in a clear and objective way and indicators provide important means to achieve this. With the data collected, health care protocols are expected to be implemented to meet the ACS quality indicators, as analyzed in this study. Both the health service structure on the city and state levels and treatment units specialized in patients with ACS must be developed.

## CONCLUSION

The study population was comprised of low-to-medium-risk patients according to the GRACE and TIMI scores. However, it should be emphasized that 60.6% of them were diagnosed

with AMI, a condition characterized by its severity and need for intensive care.

Patients were not provided care in the emergency room, although this location has adequate material and human resources for such situations. Of all high-risk patients treated with invasive strategies, the majority had such procedures after 24 hours of admission. Regarding outcomes, 11.7% were in-hospital deaths, 7.4% required mechanical ventilation, and 19.1%, vasoactive drugs. However, only 18.1% had a medical recommendation for ICU and 2.1% were admitted to this unit, as it does not have a coronary unit.

The worst process quality indicators in this study were: rate of timely reperfusion, door-to-ECG time, rate of admission to ICU and anti-smoking counseling. Among pharmacological indicators, the administration of ACE inhibitor was the indicator showing the lowest value according to what was expected.

Aiming to minimize the time of service in the hospital environment, it is recommended that the emergency unit should have emergency beds for patients victims of ACS, who should receive early care from a resident of this specific clinic (cardiology), in addition to the availability of professionals qualified to perform an ECG immediately, before the medical assessment. This behavior can be applied to any hospital that does not have a hospitalization unit for cardiac patients, aiming to adapt health care so it is more similar to what is expected from quality indicators.

It can be concluded that, according to Donabedian's theoretical framework, process indicators associated with actions that promote health care results require interventions aimed at improving those that were not satisfactory. Furthermore, many process indicators such as door-to-balloon time, timely reperfusion and admission to the ICU were influenced by structural aspects – health care network organization, human and material resources and the population's level of education, among others – thus requiring an improvement in indicators as well. Mortality rate was the only indicator of result analyzed by this study and it achieved the worst results, compared to the rest of the country.

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