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Decision for early hospital discharge after percutaneous coronary angioplasty: scoping review

Decisão para alta hospitalar precoce após angioplastia coronariana percutânea: revisão de escopo

Decisión para el alta hospitalaria precoz después de angioplastia coronaria percutánea: revisión de alcance

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ABSTRACT

Objective: to map the clinical and angiographic characteristics that classify the patient as low cardiovascular risk and suitable for early discharge after coronary angioplasty. **Method:** scoping review guided by the recommendations of the Joanna Briggs Institute, carried out in December 2022 and updated in 2024, in the electronic databases: BVS, Cinahl, Cochrane, Embase, Pubmed, Scopus and Web off Science for publications from 2017 to 2022, without idiomatic limitation. **Results:** 33 publications were selected, which divided the care process into three phases: pre-, trans- and post-procedure. Clinical findings and immediate results of angioplasty guided early discharge in a systematic and safe way. **Conclusion:** Patient characteristics and clinical findings make it possible to classify low-risk patients who are suitable for early hospital discharge. As well as being effective, this practice benefits both the patient, with lower infection rates and greater satisfaction, and the institution, promoting better bed management and lower hospital costs.

Descriptors: Percutaneous Coronary Intervention; Angioplasty; Patient Discharge.

RESUMO

Objetivo: mapear as características clínicas e angiográficas que classificam o paciente como baixo risco cardiovascular e apto para alta precoce após angioplastia coronariana. **Método:** revisão de escopo orientada pelas recomendações do Instituto Joanna Briggs, realizada em dezembro de 2022 e atualizada em 2024, nas bases eletrônicas de dado: BVS, Cinahl, Cochrane, Embase, Pubmed, Scopus e Web off Science para publicações de 2017 a 2022, sem limitação idiomática. **Resultados:** selecionadas 33 publicações, que dividiram o processo assistencial em três fases: pré, trans e pós-procedimento. Achados clínicos e resultados imediatos da angioplastia nortearam a alta precoce de forma sistemática e segura. **Conclusão:** características do paciente e achados clínicos possibilitam a classificação de pacientes de baixo risco e aptos à alta hospitalar precoce. Além de efetiva, esta prática beneficia tanto o paciente, com menores taxas de infecções e maior satisfação, como a instituição, promovendo melhor gestão de leitos e diminuição dos custos hospitalares.

Descritores: Intervenção Coronária Percutânea; Angioplastia; Alta do Paciente.

RESUMEN

Objetivo: mapear las características clínicas y angiográficas que clasifican al paciente como de bajo riesgo cardiovascular y apto para el alta precoz después de una angioplastia coronaria. **Método:** revisión de alcance orientada por las recomendaciones del Instituto Joanna Briggs, realizada en diciembre de 2022 y actualizada en 2024, en las bases electrónicas de datos: BVS, Cinahl, Cochrane, Embase, Pubmed, Scopus y Web of Science para publicaciones de 2017 a 2022, sin limitación idiomática. **Resultados:** se seleccionaron 33 publicaciones, que dividieron el proceso asistencial en tres fases: pre, trans y post-procedimiento. Los hallazgos clínicos y los resultados inmediatos de la angioplastia guiaron el alta precoz de forma sistemática y segura. **Conclusión:** las características del paciente y los hallazgos clínicos permiten la clasificación de pacientes de bajo riesgo y aptos para el alta hospitalaria precoz. Además de ser efectiva, esta práctica beneficia tanto al paciente, con menores tasas de infecciones y mayor satisfacción, como a la institución, promoviendo mejor gestión de camas y reducción de costos hospitalarios.

Descriptores: Intervención Coronaria Percutánea; Angioplastia; Alta del Paciente.

INTRODUCTION

Cardiac catheterisation associated with coronary angioplasty has a major impact on the lives of patients with heart disease, and these procedures are crucial for the diagnosis and treatment of acute coronary syndromes (ACS)[1]. According to the 2021 report by the Brazilian Society of Cardiology, 30 per cent of deaths from chronic non-communicable diseases in Brazil are due to cardiovascular diseases, and acute myocardial infarction (AMI) is their main representative [2].

In 2022, coronary angioplasty turned 45 years old3 and has undergone progress that has resulted in a reduction in complications and an increase in success rates. These advances go hand in hand with pharmacological and technological modernisation and the training of healthcare teams[4]. As well as improving clinical results, there was a reduction in hospitalisation time and overall hospital costs[5]. However, standardising the in-hospital period

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is a challenge due to numerous variables, such as the characteristics of the patient and the procedure, post-procedure conditions and institutional support[6]. The costs associated with post-procedure hospitalisation also put pressure on healthcare systems, highlighting the need to optimise hospital beds and expenditure[7]. The concern with reducing these costs is gaining momentum these days, without neglecting the maintenance of quality service, safety and user satisfaction[8].

Uncomplicated percutaneous coronary intervention (PCI) is described in the Brazilian guideline as the intervention where clinical success, without clinical complications and the presence of haemodynamic stability, and angiographic success, without complaints of chest pain, normal coronary flow after grade 3 stent implantation, according to the TIMI score - Thrombolysis in Myocardial Infarction, were obtained after this procedure[9]. As such, the latest Society for Cardiovascular Angiography Intervention consensus on the subject, issued in 2018, already indicates a selection of patients for same-day discharge, since factors such as age and other comorbidities should not play a role in the discharge decision, unless there is a clear need for prolonged hospitalisation[10].

Same-day hospital discharge for these patients, in a setting that has already been trained and has well-established guidelines - in other words, positive results from this clinical practice, developed and proven to be safe for the American reality - is in the process of evolving over time[7]. Facilitating factors include basic concepts, positive and approved experiences in this context; in other words, we have a consolidated implementation process for this practice. On the other hand, it is necessary to move forward on this issue of hindering factors, considering the Brazilian reality, considering the health network and the entire network of out-of-hospital care necessary to guarantee patient safety.

The 2017 guidelines of the European Society of Cardiology (ESC) outlined criteria for identifying patients at low cardiovascular risk, i.e. those who, after undergoing an interventional procedure, have a low probability of clinical complications resulting from that intervention, allowing for early hospital discharge. The length of hospitalisation varies according to comorbidities, risk factors and individual contexts. Patients who have TIMI 3 flow at reperfusion, no significant residual disease in other coronary arteries, preserved systolic function and rhythmic stability, reducing the likelihood of complications after discharge would be eligible for this practice[11].

Hospitalisation after uncomplicated angioplasty aims to detect and manage possible complications that were not evident during the procedure. Early hospital discharge, which takes place between 24 and 72 hours after PCI, when applied to appropriately selected patients (low risk), is safe and efficient, facilitating the provision of services, reducing the risk of hospital infections and being well accepted by patients. Although this practice is promoted in several European countries and the USA, in Brazil there is still no national guideline to guide us[8-10].

This early hospital discharge, if safe and thought out in an integral way, connected to the Brazilian health system, from primary to tertiary care, could make a positive contribution not only to the patient involved, but to the whole system, since it could optimise the resources allocated to health. Likewise, having a Brazilian guideline, which takes into account the particularities of our health system, would be important for implementation throughout the country, since simply importing a care practice developed and tested in another reality does not seem to be the way forward.

A preliminary search for previous reviews on this subject was carried out in the databases Systematic Reviews Database and Implementation Reports of the Joanna Briggs Institute, BVS, Medline (Pubmed), The Cochrane Database of Systematic Reviews, Campbell Library and PROSPERO International prospective register of systematic reviews was carried out and not found, thus highlighting a gap on the subject, so we proceeded with this scoping review.

Thinking about hospital discharge, whether early or not, would mean thinking responsibly about the necessary continuity of care. Which low-risk patients could benefit from this practice? In other words, patients who are less likely to suffer cardiovascular complications after undergoing coronary angioplasty, situations that could justify a longer hospital stay or a high risk of discharging the patient, such as vascular complications, a new heart attack or stroke[10].

To this end, the aim of this scoping review was to map the clinical and angiographic characteristics that classify patients as low cardiovascular risk and suitable for early discharge after coronary angioplasty.

METHOD

This is a scoping review study, guided by the methodological guidelines of the Joanna Briggs Institute (JBI) and complying with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), filed on the Open Science Framework platform, in the website https://osf.io/6v48y/?view_only=2e9d5278eb334cdbab57aeaf564e7f0f.

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To develop the review question, we used the mnemonics P (population), C (concept) and C (context), which influence the inclusion criteria and the mapping of terms to define the search strategy. In this study we defined P 'patient: adults and elderly undergoing PCI', C 'early discharge' and C 'PCI'. The research question was: 'What are the clinical and angiographic characteristics that elect adult/elderly patients undergoing PCI for early discharge?'

The search was carried out between September and December 2022, and updated on 26 February 2024 by the researcher and a second reviewer, independently, in the LILACS, MEDLINE via PubMed, Embase, Cochrane Library, Scopus, Web of Science and CINAHL databases. Initially, a search was carried out using the descriptors Angioplasty, Percutaneous Coronary Intervention, Early Discharge combined by the Boolean operators AND and OR, and no grey literature was used in this study.

In the VHL database we used the search strategy: (Angioplasty OR Angioplastie OR 'Intervenção Coronária Percutânea' OR 'Percutaneous Coronary Intervention' OR 'Intervención Coronaria Percutánea' OR 'Intervention coronarienne percutanée' OR 'Intervenções Coronárias Interventions' OR "Percutaneous Coronary Interventions") AND ('Patient Discharge' OR "Patient Discharge" OR "Alta del Paciente" OR "Sortie du patient" OR "Hospital Discharge" OR "Early Discharge" OR "Early Patient Discharge"). PubMed and other international databases (Angioplasty OR 'Percutaneous Coronary Intervention' OR 'Percutaneous Coronary Interventions') AND ('Patient Discharge' OR 'Early Discharge' OR 'Early Patient Discharge').

Primary studies that addressed early hospital discharge after PCI were included, without language limitation, available in full and published from 2017 onwards. The time cut-off is justified due to the interval between the latest Brazilian guidelines on PCI, the National Guideline of the Brazilian Society of Cardiology and the Brazilian Society of Haemodynamics and Interventional Cardiology on Percutaneous Coronary Intervention (2017), and the 2022 update, the Brazilian Society of Cardiology's Guideline on Perioperative Cardiovascular Evaluation: Focus on Management of Patients with Coronary Intervention.[2.]

Publications that dealt with coronary angioplasty and did not mention the practice of early discharge for these patients, secondary studies that were outside the time frame established in this study, and productions that did not answer the guiding question of this review were excluded.

To select the files, the Endnote manager was used to identify duplicates and the Rayyan[13] application was used to screen published studies. Two independent reviewers analysed the titles and abstracts. Studies that met the research objectives and the inclusion and exclusion criteria were read in full. Cases of disagreement were resolved by discussion between the reviewers, without the need for a third part mediator.

After this stage, the titles, abstracts and descriptions were analysed. The studies that met the research objectives, took place within the planned period and were primary studies were read in full and their assessments were evaluated by two independent reviewers

The selected studies were analysed in their entirety and categorised with reference to the clinical and angiographic criteria used to assess the feasibility of early discharge in the selected patients, within the three operative periods: pre-, trans- and post-procedure. In addition to these aspects, the time dedicated to implementing this practice and the main associated concerns were also considered.

RESULTS

After removing duplicates, 3,081 publications were identified, totalling 2,954 records. After reading the titles and abstracts, 2,786 were excluded because they did not meet the established inclusion criteria, resulting in 33 studies, all in English and most published in the United States of America, according to the Flowchart shown in Figure 1.

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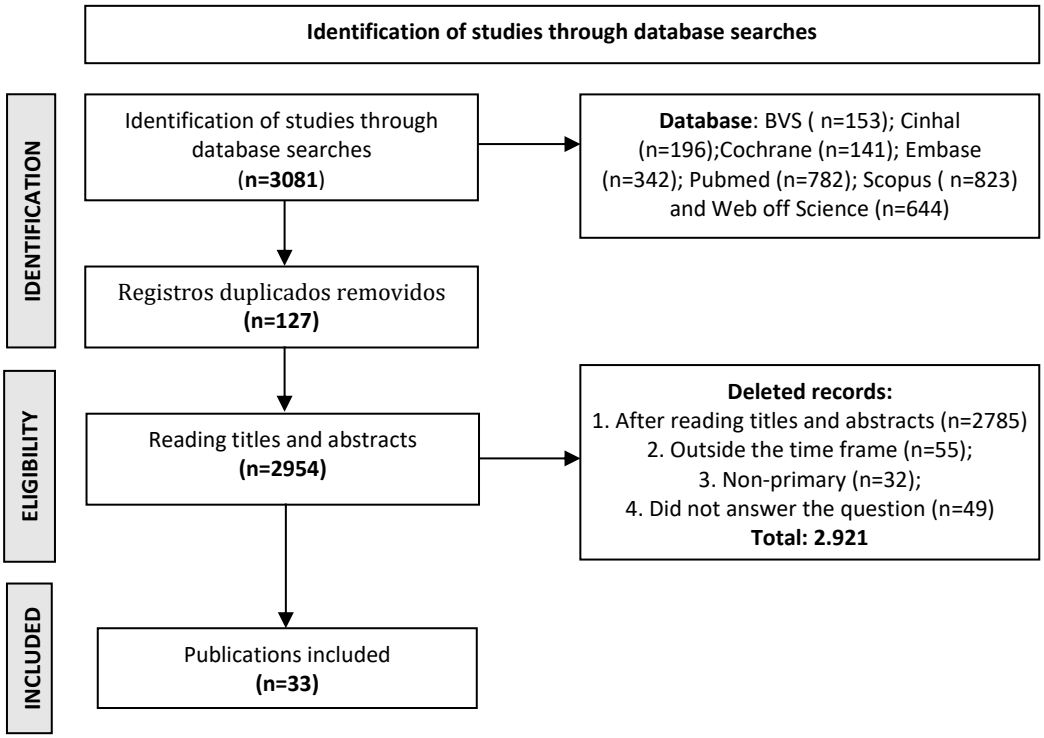

Figure 1: Document search and selection flowchart. Rio de Janeiro, RJ, Brazil, 2024.

Figures 2 and 3 show the findings according to the clinical and angiographic variables eligible for early discharge.

Study/Type (ST)/Sample (n)	Clinical and angiographic variables eligible for early discharge after PCI	Discharge*	Major concerns
E1[14] **ST: Cohort**; **n**=301	Preserved systolic function (LVEF >50%) after successful PCI	48	Death, AMI, readmission
E2[15]**; ST: Cohort**; **n**=74	Haemodynamic stability (Killip I score) and TIMI 3	48	--
E3[6]**; ST: Cohort; n**=249	Zwolle score < 3; LVEF > 50%	72	MACE
E4[16]**; ST:**Randomized**; n**=151	Successful primary PCI; age ≤ 75 years; LVEF ≥ 45%; 1- or 2-vessel disease; Killip I and TIMI 3; no comorbidities; no contraindication to antiplatelet drugs; cooperation, adherence to measures	72	MACE
E5[17]**; ST:** Cohort**; n**=557	Successful PCI; ≤ 75 years; Killip I, TIMI 3; absence of: comorbidities, contraindication to antiplatelet drugs; co-operation and adherence to treatment	72	MACE
E6[18]**; ST:** Cohort**; n**=549	Zwolle score <3	48	MACE
E7[19]**; ST:** Cohort**; n**=4399	Low risk patients and successful PCI	36	MACE
E8[20]**; ST:** Cohort**; n**=8092	Age, Killip class, diabetes, previous AMI, left bundle branch block	48	MACE
E9[21]**; ST:** Cohort**; n**=3054	Use of high-sensitivity troponin (<5ng/l)	48	MACE
E10[22]**; ST:** Cohort**; n**=932	<80 years; LVEF >50%; No CPR, Killip I; haemoglobin >110 g/L; successful PCI; TIMI 3, no TBI disease and no triple vessel disease.	48	Death/ recurrent ACS
E11[11]**; TP:**Randomized**; n**=471	LVEF >40%; successful PCI; absence of multivessel disease; Killip I; appropriate social situation.	24	MACE
E12[23]**; ST:** Cohort**; n**=73	PAMI-II criteria: non-ST-elevation AMI, age <70 years, 1- to 2-vessel disease effectively treated with PCI, LVEF >45%, no persistent arrhythmia.	48	MACE
E13[24]**; ST:** Cohort**; n**=276	Zwolle score <3	72	MACE
E14[25]**; ST:** Cohort**; n**=691	Low-risk and elective patients	24	MACE

Notes: *in hours; LVEF - left ventricular ejection fraction; Killip - classification proposed by Thomas Killip III and John T. Kimball (1967); TIMI - thrombolysis in myocardial infarction; MACE - major adverse cardiovascular events; PAMI-II - Primary Angioplasty in Myocardial Infarction; Zwolle score - Zwolle cardiovascular risk score; ACS - acute coronary syndrome.
Figure 2: Characteristics of the scoping review studies, according to death, MACE, ACS outcomes. Rio de Janeiro, RJ, Brazil, 2024.

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Study/Type (ST)/Sample (n)	Clinical and angiographic variables eligible for early discharge after PCI	Discharge*	Major concerns
E15 [26]**; ST:** Cohort**; n=**123	Age, Killip class, post-ICP TIMI flow, baseline LVEF, anaemia, triple vessel disease, renal failure. Cadillac risk score	72	Cadillac Risk Score
E16 [27]**; ST:** Cohort**; n=**1752	Low risk patients and individual assessment	24	MACE
E17 [08]**; ST:** Cohort**; n=**6119	Successful PCI; absence of TBI disease; Killip I, TIMI 3, absence of serious comorbidities and adequate social circumstances.	24	MACE
E18 [07]**; ST:** Cohort**; n=**21.261	Elective PCI	24	Readmission, mortality
E19 [28]**; ST:** Cohort**; n=**1385	Patients with unstable angina and non-ST elevation AMI	24	Complications
E20[29]**; ST:** Cohort**; n=**1242	*Killip I*	72	MACE
E21 [30]**; ST:** Randomized**; n=**21	*Killip* I, *TIMI* 3 e ausência de comorbidades graves ou circunstâncias sociais adversas.	24	MACE
E22 [31]**; ST:** Cohort**; n=**3322	Low risk classified by FASTEST score = 0 (Facial droop, Arm weakness, Speech difficulties, Time, Emergency treatment for stroke) or Zwolle ≤ 3	24	MACE
E23 [32]**; ST:** Randomized**; n=**517	Elective PCI with radial access	24	MACE
E24 [33]**; ST:** Cohort**; n=**1449	Patients with non-supra low-risk AMI treated with primary PCI	48	MACE
E25 [34]**; ST:** Cross-sectional**; n=**114.461	Patients eligible for elective PCI	24	MACE
E26 [35]**; ST:** Cohort**; n=**6452	Elective cases; Age between 18 and 100; Uncomplicated PCI	24	MACE
E27 [36]**; ST:** Cohort**; n=**3502	Hyperlipidaemia, atrial fibrillation, CHF, coronary artery bypass grafting and radial access.	24	MACE
E28 [37]**; ST:** Cohort**; n=**645	Age > 75 years	24	MACE
E29 [38]**; ST:** Cohort**; n=**7181	CHF, chronic lung disease or anaemia, radial access	24	MACE
E30 [39]**; ST:** Cohort**; n=**6119	Age, heart rate and chronic obstructive pulmonary disease	24	Morte
E31 [40]**; ST:** Cohort**; n=**106	≤70 years, one- or two-vessel disease within 12 hours of symptom onset, TIMI 3 flow with LVEF ≥45% after 24 hours	48	MACE
E32 [41]**; ST:** Cohort**; n=**220	Zwolle score	48	MACE
E33 [42]**; ST:** Cohort**; n=**570	Zwolle score	48	MACE

Notes: *in hours; LVEF - left ventricular ejection fraction; Killip - classification proposed by Thomas Killip III and John T. Kimball (1967); TIMI - thrombolysis in myocardial infarction; MACE - major adverse cardiovascular events; Cadillac risk score - Controlled Abciximab and Device Investigation to Lower Late Angioplasty Complications; LCT - left main coronary artery; ACS - acute coronary syndrome; FASTEST score - stroke risk score; AMI - acute myocardial infarction; CHF - congestive heart failure.
Figure 3: Characteristics of the scoping review studies, according to Killip. MACE, readmission, complications and mortality outcomes. Rio de Janeiro, RJ, Brazil, 2024.

Regarding to methodological approach, we found: cohort studies (85.7%), randomised studies (11.4%), cross-sectional studies (2.8%). With regard to the database, we found: Scopus (48.5%), Medline (42.8%), Web of Science (8.5%).

Figure 4, 5 and 6 show the tabulated publications listing the characteristics considered eligible for early discharge of these patients.

Pre-Operative
LVEF: >40%[11,22]; >45 %[4,12] e >50%[3,6,8,10,24]
Age <70 years[12,30,31]; <75 years [3-9,13,15,24,26,28,32,33] and <80 years[10]
AMI time < 4 hours[3] and other specified time window[6,22,31-33]
Previous history of AMI and/or CPR[3,4, 7,8,10,12-14,17,22]
1- or 2-vessel disease[3,4,6,8,12,13,22,24,31]
Absence of comorbidities requiring continued hospitalisation[4,5,8,12,14,17,21,27,29,30]
Co-operation and absence of contraindications with the therapeutic regime (dual platelet antiaggregation)[4,5]
Normal laboratory tests: hb, ht, creatinine (creatinine clearance >60ml/min) and haemoglobin >11mg/dl[7,10,14,15]
Geography (living near the hospital and/or having a carer) <96.5 km or 60 miles[14]
Presumed co-operation, adherence to medical measures and social context[11,17,21]
Procedimento eletivo[18,19,23,25,26]
Haemodynamic and rhythmic stability (Killip I)[3-8,10-15,17,20,23,24,27,32,33]

Notes: AMI - acute myocardial infarction; CPR - cardiopulmonary resuscitation; hb - haemoglobin; ht - haematocrit.
Figure 4: Pre-operative conditions for early discharge eligibility of post-PCI patients. Rio de Janeiro, RJ, Brazil, 2024.

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Transoperative
Angiographic success (TIMI 3 FLOW)[2,3,5-7,10,11,13-15,21,22,26,31-33]
No LCT involvement or tri-arterial disease[6,10,11,13,15,17,32,33]
Radial carriageway[14,25,27,29]

Notes: TIMI - *thrombolysis in myocardial infarction*; LCT - left main coronary artery.
Figure 5: Trans-operative conditions for early discharge eligibility of post-PCI patients. Rio de Janeiro, RJ, Brazil, 2024.

Post-surgery
Preserved systolic function in the postoperative period: >45%[31] , >50%[1,15]
No symptoms of ischaemia[2,7,9,11,17]
Haemodynamic and rhythmic stability (Killip I)[2-8,10-15,17,20,21,27]
No increase in cardiac enzymes[9]
No need for vasoactive drugs or intra-aortic balloon (IAB)[7]

Note: Killip - classification proposed by Thomas Killip III and John T. Kimball (1967).
Figure 3: Post-operative conditions for early discharge eligibility of post-PCI patients. Rio de Janeiro, RJ, Brazil, 2024.

Analysing the studies included in this scoping review reveals a pattern for determining a patient's eligibility for early discharge after angioplasty, in which the care process was divided into the three operative periods: pre-, trans- and post-operative. These clinical, social and angiographic conditions were decisive in analysing whether or not the patient was suitable for early discharge.

With regard to major concerns, most of the studies dealt with the occurrence of major adverse cardiovascular events (MACE), events consisting of: Non-fatal AMI, myocardial revascularisation (performed more than 30 days after PCI), cardiovascular death, hospitalisation for heart failure (HF) and reversed sudden death or non-fatal arrhythmias.

As for the time of early hospital discharge, there was no unanimity regarding the period, which ranged from 24 to 72 hours, with the highest prevalence, 39.2% suggesting 24 hours for hospital discharge.

DISCUSSION

This study catalogued the main conditions reported in the literature to determine eligibility for early discharge of patients after percutaneous coronary intervention (PCI), covering the pre-, trans- and post-operative periods. Early discharge after myocardial infarction is recommended for low-risk patients, but the establishment of well-defined criteria to guarantee the safety of this practice is necessary. A randomised study of 471 patients and four additional early discharge studies, along with a meta-analysis of 1,575 randomised patients, confirmed that early discharge of low-risk individuals within two to three days is safe[17].

Considering the average length of hospitalisation and, consequently, hospital discharge after coronary angioplasty, several studies in recent years have addressed this issue, with the main concern being patient safety. The need for careful screening to select patients eligible or not for early discharge has always been emphasised. In a study of 151 patients affected by AMI and treated with successful coronary angioplasty, these patients met specific criteria, were admitted to a coronary unit and received standardised post-intervention care. The average length of hospitalisation was shorter than that observed in matched low-risk patients before the implementation of this strategy. During the initial follow-up period, no adverse events such as death, reinfarction or the need for new revascularisation were recorded[16].

The short length of stay implies the need for comprehensive education on cardiac rehabilitation and optimal drug titration before discharge, as well as adequate follow-up and the availability of a safety net for the patient. Studies have shown that early and late discharges after ST-segment elevation AMI (STEMI) do not show significant differences in mortality and readmission rates, with a low risk of complications after early discharge[8,10].

Patients considered low risk can benefit from this practice. In all the studies, safety is the central issue, as in this randomised trial with 151 patients, where there were no significant differences in the incidence of individual components of the primary endpoint at 90 days compared to those who were not discharged early[16].

It is therefore recommended to evaluate individual, angiographic or institutional factors that can significantly influence the clinical outcome. A sequential cross-sectional analysis involving 819,091 patients undergoing elective PCI in 1,716 US hospitals, carried out by the National Cardiovascular Data Registry CathPCI Registry, concluded that early discharge is safe and economically viable. In addition, this approach offers several benefits, such as lower risk of infection, greater social support, reduced recovery time, reduced stress, economic benefits for the hospital, increased

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patient turnover, according to the British study Second Primary Angioplasty in Myocardial Infarction (PAMI-II)[23]. In addition to greater patient satisfaction, where remaining hospitalised after a heart attack episode is naturally stressful for the patient, various environmental factors interfere, a fact described in a qualitative study carried out with 25 patients hospitalised in an intensive care unit[43].

The intrinsic characteristics of the patient, such as comorbidities, current clinical conditions, access to educational information about health and disease, availability of support from health services and access to necessary prior medication, directly influence the clinical risk. On the other hand, the angiographic risk related to the condition of the coronary angiography must also be assessed, both before and after the procedure, and the effectiveness of the complete restoration of coronary flow during the intervention[31].

Analyses of the effectiveness of this proposal ranged from 24 to 72 hours, with a mean time to discharge of 40.5 hours for early discharge of patients after PCI, a much shorter period than that practised in the early days of coronary angioplasty, where hospitalisation times would exceed 72 hours. In Brazil, some institutions currently provide this practice, but in an isolated and uncoordinated way, justified by the lack of a national guideline that can guide this practice in our territory, considering the particularities of our health system.

MACE is an event made up of: non-fatal acute myocardial infarction, myocardial revascularisation performed 30 days after PCI, cardiovascular death, hospitalisations for heart failure (HF) and reversed sudden death or non-fatal arrhythmias. The main focus of concern in 94.5% of the publications analysed. Patients at low risk of MACEs can benefit from early rehabilitation without increasing the risk of death or a new acute myocardial infarction, as demonstrated in a cohort of 1420 patients, concluding that this approach is reliable[22].

In summary, pre-, trans- and post-procedure characteristics and conditions determine eligibility for early discharge. Pre-procedure aspects, such as the patient's clinical and social condition, were addressed in the publications analysed. During the procedure, angiographic success has a direct impact on the short- and medium-term prognosis of these patients. After the procedure, both pre-existing clinical conditions and angiographic success can have a positive influence on progress in the following hours, determining the possibility of early discharge.

However, early discharge requires specific care and guidance from a trained and dedicated team because, although rare, complications can occur. Therefore, it is the social responsibility of the institution that adopts this practice to be prepared to deal with possible complications, and readiness to respond to these events is an essential characteristic for successful development.

This emphasises the importance of a multidisciplinary approach to post-discharge care, with an emphasis on the role of nursing in this process. The nurse working in this cardiovascular area contributes to the promotion of health care in the in-hospital and out-of-hospital environment. Thus promoting the safety of selected patients, as observed in a cohort of 557 patients with AMI treated with PCI, of whom 310 (56%) were discharged safely and early[17].

Limitations of the study

A limitation of the study is the lack of publications by nurses specialising in cardiology and haemodynamics, which may be related to the specificity of the topic of early post-PCI discharge. Although the role of nursing is considered relevant in some studies, the participation of this professional category is still under-explored. Continuity of care, which is essential not only to select patients for early discharge, but also to guarantee a holistic approach that ensures the individual's complete safety, is also little explored.

In addition, a limitation observed was the lack of more detailed reports in the studies included on the process of implementing this practice in these different locations, considering the particularities of their population and health system, which could contribute to the dissemination and implementation of this practice in new locations.

CONCLUSION

Hospital discharge planning should begin even before the patient is admitted. Patients undergoing PCI can benefit from early discharge, with a length of stay of between 24 and 72 hours, as long as pre-, trans- and post-procedure issues are taken into account when making this decision. This approach is already adopted in other countries, supported by international guidelines, and its efficacy and clinical safety have been proven by numerous publications.

Selecting a patient for early discharge requires the correlation of information and conditions in the three operative periods. The patient's individual characteristics, such as comorbidities and a history of cardiovascular disease, must be weighed up alongside angiographic factors, such as the number and location of coronary lesions. A successful procedure,

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without complications and with angiographic success, can result in a post-procedure period free of intercurrences, thus allowing for a reduction in hospitalization time.

Evaluation and stratification are essential steps in this process. In addition to the aspects related to safety, the risks of cardiovascular complications such as stroke and reinfarction are no higher compared to conventional periods of hospitalization, the rates of infections related to the entire hospitalization process are lower, patient and family satisfaction levels are higher, for the institution there is a greater turnover of beds and lower costs related to hospitalization.

A multi-professional approach, with comprehensive and up-to-date protocols that address the three surgical periods (pre, trans and post), and which include planning and follow-up after discharge, should be planned, with complete patient safety in mind at all times. Thinking about the discharge of patients undergoing PCI even before they are hospitalized is necessary and proves to be a contemporary and viable practice.

As a contribution to clinical practice, this study could provide support for the scientific basis of advanced nursing practice. By knowing the clinical and angiographic characteristics of patients considered to be at low cardiovascular risk, nurses will be able to develop and promote comprehensive care for these patients, from the indication of the procedure, through preparation, execution, immediate post-operative care and, above all, guidance and monitoring during the transition of care to the out-of-hospital environment.

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Conceptualization, J.V.V. and P.V.P.F.; methodology, P.R.P.; software, J.V.V.; formal analysis, P.V.P.F.; investigation, J.V.V.; validation, J.V.V., P.V.P.F. and P.R.P.; resources, J.V.V.; data curation, P.V.P.F.; manuscript writing, J.V.V.; writing – review and editing, J.V.V. and P.V.P.F.; visualization: P.V.P.F. and P.R.P.; supervision, P.V.P.F.; project administration, P.V.P.F. All authors read and agreed with the published version of the manuscript.