

Evidence level of nursing care technologies in angioplasty of the lower limbs

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ABSTRACT

The objective of this study was to describe the scientific work on nursing care technologies to adult patients undergoing angioplasty of the lower limbs. Systematic review of the literature followed the electronic databases: LILACS, PubMed, Web of Science, SciELO, and Google Scholar. Twelve articles were analyzed and classified according to the levels of evidence. All qualitative studies were classified with a low degree of recommendation, and as for the quantitative studies only one showed a high degree of recommendation. The research showed studies with the lowest level of scientific evidence, aside from a lack of research and poor scientific background in which nursing preoperative care to patients undergoing angioplasty of the lower limbs have been developed. Consequently, there is a lack of information and hence poor training, culminating in unpreparedness in providing care to patients, and in understanding and leading this high complexity service according to the safety principles of patient care.

Descriptors: Hemodynamics; Perioperative Care; Evidence-Based Nursing.

INTRODUCTION

In the hemodynamics sector, therapeutic procedures are carried out in the circulatory system serving medical specialties such as vascular surgery, cardiology, and gastroenterology. It is common in this service

to provide treatment for peripheral vascular diseases, disorders characterized by the reduction in blood flow resulting from obstruction caused by atherosclerotic plaques, thrombi, emboli, incompetent venous valves,

or a decrease in pumping action of surrounding muscles⁽¹⁾.

Vascular diseases are specially treated by a percutaneous transluminal angioplasty procedure, which has some advantages compared to conventional surgery, including reduced hospital stay, lower risk of complications, a lesser intensity of pain, and lower cost⁽²⁾. Studies have shown treatment efficacy and advantages in recovery for patients undergoing this kind of procedure⁽³⁾.

Severe ischemia, for instance, is a vascular disease that can lead to lower-extremity amputation and is a major cause of mortality⁽⁴⁻⁵⁾. In these cases, a growing number of health centers are adopting the endovascular approach, that is, angioplasty treatment, and achieving major success, such as the study conducted by the Davis Medical Center at the University of California, which evaluated patients undergoing endovascular procedures to treat severe ischemia between 2006 and 2012, with favorable rates in saving the compromised limb⁽⁶⁾.

The hemodynamics sector is considered a high complexity service and requires an active, trained, competent, efficient, agile, and updated nursing team. In addition to care activities, the nurse working with hemodynamics carries out leadership, as well as material and personnel duties, which require flexibility and prompt decision making. During this process, the nurse's responsibility includes staffing, team training and supervision, and control of equipment for clinical use, as well as knowledge of the practice related to reprocessing used materials⁽⁷⁾.

Taking into account the high technology that the angioplasty procedure involves, the nursing staff must rely on methodological instruments to support the care provided. For this purpose, nursing care based on relevant scientific evidence provides efficiency and safety, because it is attained through research and studies based on reliable data⁽⁸⁾.

The identification of these care technologies based on scientific evidence is necessary for implementing nursing care in conformity with the population's needs. Currently, cardiovascular diseases have been a highly discussed theme due to the increase in morbidity and mortality rates and because of their avoidable and treatable nature. In addition, they are the focus of specific public policies in the Brazilian territory, such as the National Policy of High Complexity Cardiovascular Care, the National Primary Health Care Policy, and the National Policy for Integral Attention to Systemic Arterial Hypertension and Diabetes Mellitus. Accordingly, care technologies must be linked to this care network so that patients with cardiovascular diseases can be better assisted, and ensured access, coverage, and service in a care network organized at all levels of the healthcare system.

In this context, what levels of evidence are based on care technologies that nursing has been carried out in patients undergoing angioplasty of the lower limbs during the perioperative period should be determined. The need for research on these types of care is still based on the clinical and empirical experience of professionals that provide assistance to this kind of patient. These types of care are not often based on scientific evidence and it was exactly this gap that motivated the search for scientific arguments that justify the care provided, with a focus on this procedure.

Thus, the objective of this present study were: to describe the scientific works available in the literature that involves nursing care technologies to adult patients undergoing angioplasty of the lower limbs.

METHOD

This is a systematic literature review of a descriptive nature⁽⁹⁾. Prior to this study, the existence of a systematic review on the proposed topic was searched in the Cochrane Library (The Cochrane Database of Systematic Reviews), but there were no such reviews that could be found in this area.

The research question that gave rise to this review was: “Which are the scientific works currently available on nursing care technologies to patients undergoing angioplasty of the lower limbs?”

The search for primary studies was carried out in the following databases: PubMed/MEDLINE (Public MEDLINE), Web of Science, Scientific Electronic Library Online (SciELO), and the Latin American and the Caribbean Health Sciences Literature (LILACS). In addition to these databases, Google Scholar® was used for research.

For each database a search strategy based on the research question was established, as shown in Chart 1. To compose the search strategy, terms from MeSH (*Medical Subject Heading Terms*) were used and then applied on the PubMed/MEDLINE search. Boolean operators (delimiters) were also used, represented by the terms AND, OR, and NOT. Keywords were researched in Portuguese and English. The research period was from August 2014 to May 2016, by two authors working independently.

Chart 1: Strategies for database search

Database	Search strategy
PUBMED	("angioplasty"[MeSH Terms] OR "angioplasty"[All Fields] OR "Endovascular treatment"[All Fields] OR "endovascular procedures"[MeSH Terms] OR "endovascular procedures"[All Fields] OR "endovascular procedure"[All Fields] AND ("nursing"[Subheading] OR "nursing"[Title/Abstract] OR "nursing"[MeSH Terms] OR "nursing care"[All Fields] OR "nursing care"[MeSH Terms] OR "nurses"[MeSH Terms] OR "nurses"[All Fields] OR "nurse"[All Fields]) AND (English[lang] OR Portuguese[lang] OR Spanish[lang])
Web of Science	Topic: (angioplasty OR Endovascular treatment OR endovascular procedure) AND Topic: (nursing OR nursing care OR nurse OR nurses)
SciELO	(angioplasty OR endovascular OR "tratamento endovascular" OR "tratamentos endovasculares" OR "procedimento endovascular" OR "procedimentos endovasculares" OR "Endovascular treatment" OR "endovascular procedures" OR "endovascular procedure") AND (nursing OR enfermagem OR enfermeir OR nurse\$)
LILACS	(mh:(“Angioplastia” OR “Procedimentos Endovasculares”) OR tw:(“Angioplastia” OR “Procedimentos Endovasculares”) OR “tratamento endovascular” OR “tratamentos endovasculares”) AND (mh:(“enfermagem” OR “enfermeiras” OR “enfermeiros” OR “cuidados de enfermagem” OR “Avaliação em Enfermagem” OR “Diagnóstico de Enfermagem” OR “Enfermagem Baseada em Evidências” OR “Enfermagem Cardiovascular” OR “Enfermagem Perioperatória”) OR tw:(“enfermagem” OR enfermeir\$ OR “cuidados de enfermagem” OR “Avaliação em Enfermagem” OR “Diagnóstico de Enfermagem” OR “Enfermagem Baseada em Evidências” OR “Enfermagem Cardiovascular” OR “Enfermagem Perioperatória”))

The following inclusion criteria were studied: a) quantitative, qualitative, or quali-quantitative that would show in the title or in the abstract the topic related to nursing care technologies during the perioperative period for angioplasty of the lower limbs; b) with human beings who were 18 years of age or

over, undergoing angioplasty of the lower limbs; c) available in English, Portuguese, or Spanish language. The included studies did not have the year of publication as a filter, since it is a systematic review and the topic has not yet been the subject of major studies in the field of nursing.

The exclusion criteria were: technical standards; manuals; laws; resolutions; editorials; letters; comments; summaries of annals; and replicated publications.

The selection of the studies was based on the inclusion criteria and the research question applying the PICO acronym format⁽¹⁰⁾, where: P=Population/Participants: Adult patients undergoing angioplasty of the lower limbs; I=Interventions: Nursing care in angioplasty of the lower limbs and use of nursing care technologies in patients undergoing angioplasty of the lower limbs; C=Comparisons: not available; O=Outcomes: Efficient nursing care technologies and cares during the perioperative period of the angioplasty of the lower limbs.

In this systematic review (SR) 3,824 studies were initially identified. Figure 1 represents the selection and inclusion process of the scientific works.

For data extraction, a table with the characteristics of the included studies was elaborated, which allowed comparability of their variables, the country/year and source of publication, the objective, and the methods employed. The results were presented in a descriptive format, and the studies were classified according to the level of evidence⁽¹¹⁾.

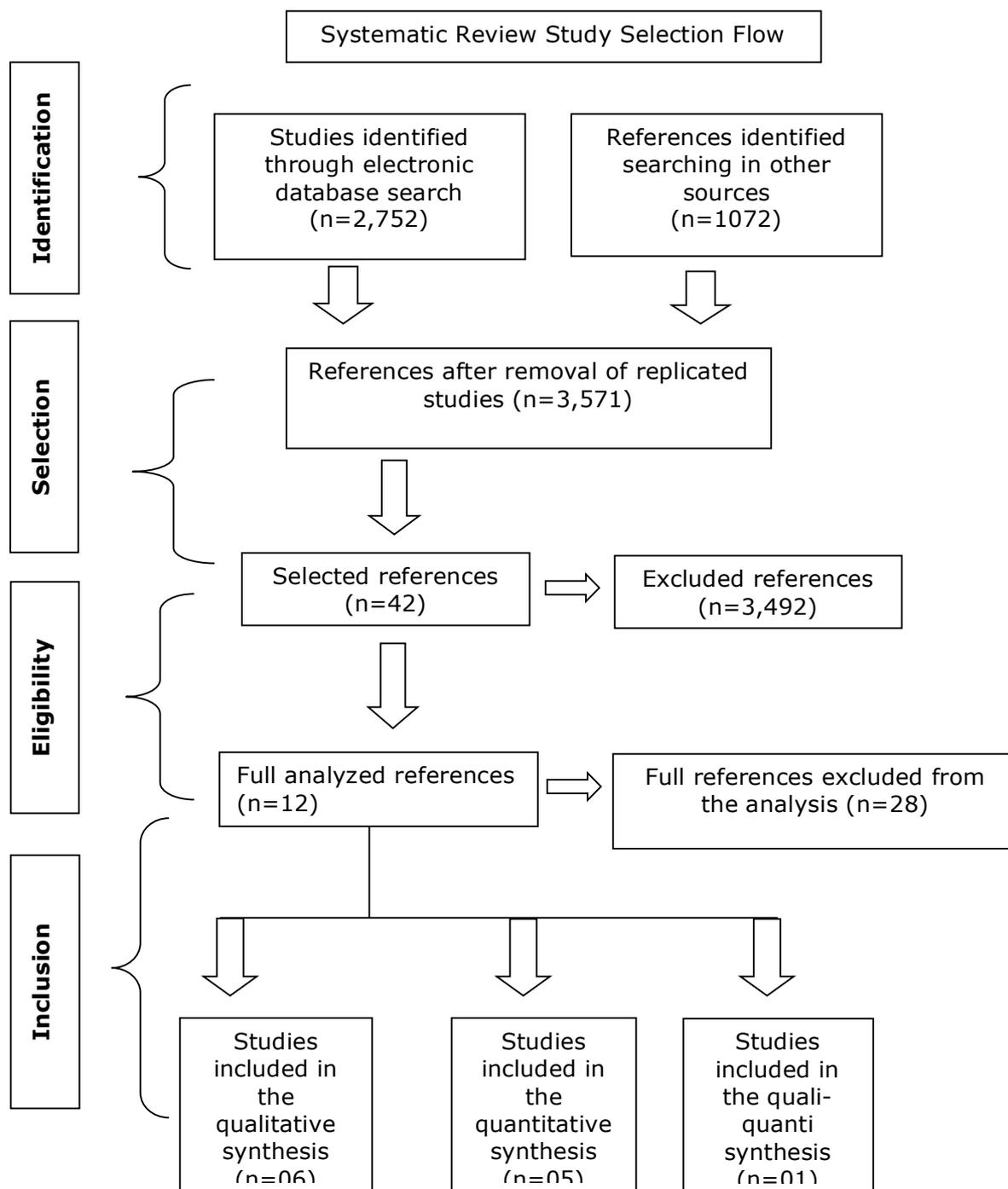


Figure 1: Flowchart of the selection of the studies according to predefined criteria.

RESULTS

In this SR, 12 studies that met the research protocol inclusion and exclusion criteria were analyzed. Chart 2 shows the characterization and the classification of the levels of evidence, where it becomes clear that most of the publications took place between 2006 and 2016, with a greater number from 2011 onwards. The earliest publication identified on the topic is from 2006 and the most recent from 2016.

Chart 2: Synthesis of the articles according to identification, country of origin of publication, objective, results, method, results and level of evidence.

Author/Year	Database	Country of origin of publication	Objective	Results	Level of Evidence
STUDIES WITH QUALITATIVE METHOD					
⁽¹²⁾ Kasthuri R, Karunaratne D, Andrew H, Sumner J, Chalmers N. 2007.	PubMed/MEDLINE	United Kingdom	To audit the safety of peripheral artery intervention of peripheral angioplasty cases by nurses for advice, care, and follow-up of these post-hospital discharge patients	Patients were referred for elective, peripheral vascular intervention; post-procedure hemostasis was achieved using manual compression. After 3 hours' bed-rest, patients were mobilized and discharged after 5 hours. Patients were contacted by telephone the next working day to audit complications. Out of 183 elective surgeries conducted in two years, five patients (2%) returned to the department due to complications in the groin area, and one of them had a false aneurysm. The four remaining required no further treatment.	VI
⁽¹³⁾ Vieira LC, Contrin LM, Rol JL, Conte HD, Lima ARS, Castro EDR, et al. 2009.	Google Scholar	Brazil	To identify the difficulties and needs of nursing teams in hemodynamics and angioplasty care in the country	The study identified the difficulty the nurse has in the managerial and leadership process in the hemodynamics sector. This difficulty was noticed during the performance of several activities, from the easiest to the most complex. The nurse's responsibility in supervising the hemodynamics is broad, from managing high-cost materials to leading the team.	VI
⁽¹⁴⁾ Krauzer IM, Brocardo D, Scarsi T. 2011.	Google Scholar	Brazil	To identify the health profile of clients assisted in the hemodynamics center and to apply the nursing process according to Callista Roy	The study identified the profile of 52 clients assisted in the hemodynamics center of a private Brazilian hospital. The results obtained were the health profile of the assisted clients, in a manner to provide the characteristics of the type of clientele through identification by age group; place of residence; marital status; education; occupation; risk factors for cardiovascular diseases; body mass index; and the most frequent types of surgical interventions. Later, the nursing process was delineated, wherein the nursing diagnostic in postoperative period and incidence rate in the clients were listed: anxiety related to death (100%); risk of acute pain (85%); integrity of damaged skin (75%); ineffective tissue perfusion (42%); risk of infection (24%); and risk of coagulation cascade inhibition (16%).	VI

Author/Year	Database	Country of origin of publication	Objective	Results	Level of Evidence
⁽¹⁵⁾ Bomfim FMTS, Lima SG, Victor EG. 2013.	Google Scholar	Brazil	To assess the prevalence and conditions for reprocessing hemodynamic catheters in the city of Recife, PE, Brazil	The study evaluated four government hospitals and six private hospitals in a Brazilian capital. Only one handled all of the reprocessing stages in-house. At most of these hospitals, catheters are reused four times on average. Significant differences in the replies provided by study participants were noted, reflecting a lack of standardization in the reprocessing techniques. Most of these professionals had already detected fractures and twists in reprocessed catheters. Enzyme preparation is the product most used for cleaning the catheters. As for cleaning the lumens of these devices, no uniformity was provided in the replies. Although most of the professionals use tap water to rinse the catheters, the techniques used varied greatly. Tests to check pyrogenic materials were not performed in all of the reprocessed materials.	VI
⁽¹⁶⁾ Maher P. J Vasc Nurs. 2014.	PubMed/MEDLINE	Ireland	To examine the viability of same-day discharge after angioplasty, with emphasis on obtaining safe results for the patient	The study explores how advances in endovascular technologies and techniques contributed to same-day discharge becoming a viable option. The clinical pre-admission of patients developed by specialized nurses enables a more appropriate and safer patient selection, in which patients with post-procedure risks can be efficiently identified based on predefined clinical criteria. Based on these conducts, same-day discharge after angioplasty for peripheral vascular disease is a safe and viable option.	VI
⁽¹⁷⁾ Wann-Hansson C, Wennick A. BMC Nurs. 2016.	PubMed/MEDLINE	Sweden	To elucidate how patients with peripheral arterial disease communicate their understanding regarding their disease and treatments	The research identified that the short time spent with patients with peripheral arterial disease requires innovating guidance in clinical practice to meet individuals' needs, regardless of whether the patients understand their peripheral arterial disease or not. During the discussion on risk factors, smoking as an important risk factor was what unleashed the feeling of guilt. It is necessary for patients to consult sources of information to manage their daily lives. In this process, the nurse plays an important role in developing health education actions.	VI

Author/Year	Database	Country of origin of publication	Objective	Results	Level of Evidence
STUDIES WITH QUANTITATIVE METHOD					
⁽¹⁸⁾ Akopian G, Katz SG. 2006.	PubMed/MEDLINE	United States	To evaluate the possibility of same-day hospital discharge after peripheral angioplasty	In 97 patients undergoing peripheral angioplasty, the superficial femoral artery was the most frequent area for intervention (47%), and these patients were discharged from the hospital on the same day of the procedure. In this studied population, one patient was admitted with a great hematoma at the puncture site and needed blood transfusion. Two patients were admitted for monitoring of minor hematomas at the puncture site, one with chest pain, and one for monitoring transient bradycardia. The average time for discharge was 2.8 hours post-intervention. No deaths or unplanned hospitalizations occurred in a period similar to or above 30 days of intervention in the hospital.	VI
⁽¹⁹⁾ Gioppato S, Castello HJ Jr, Conforti TB, Gonçalves SLP, Morais FGS, Cantarelli MJC. 2011.	Google Scholar	Brazil	To assess the cost-effectiveness of immediate femoral sheath removal with the vascular occlusion device versus hemostasis by manual and/or mechanical compression after endovascular interventions	Compared to hemostasis techniques in endovascular therapeutic procedures, the Angioseal™ device did not show specific differences in relation to the success of hemostasis without complications. Individual costs for treating complications related to hemostasis by compression were higher than the cost of the occlusion device.	VI
⁽²⁰⁾ Covello CM. 2011.	Google Scholar	Brazil	To compare the rates of vascular complications at the femoral access site in elderly patients undergoing mechanical or classical femoral arterial hemostasis after percutaneous procedures	One-hundred ten patients were randomized, where 54 underwent manual compression and 56 mechanical compression. The rates of vascular complications were higher in the hospital phase and seven follow-up days. During clinical follow-up, the total rate of vascular complications was higher in the manual compression group (64%), as well as the rates of patients with vascular complications using this technique (48%). The rate of minor vascular complications was not different for either group in the two periods.	II
⁽²¹⁾ Albayati MA, Gohel MS, Patel SR, Riga CV, Cheshire NJW, Bicknell CD. 2011.	Web of Science	United Kingdom	To investigate failures in patient safety for patients undergoing vascular and endovascular procedures to guide future quality and safety interventions	In 66 vascular procedures observed 1,145 failures that compromised patient safety during the procedures were identified. 23.5% of these failures were related to equipment, 21% were related to team communication, 3.6% to technical failures, and 5.4% were psychomotor failures	VI

Author/Year	Database	Country of origin of publication	Objective	Results	Level of Evidence
⁽²²⁾ Eufrásio S, Sousa P, Oliveira N, Gonçalves F, Alves G, Rodrigues H, et al. 2013.	SciELO	Portugal	To record, assess, and quantify radiation dose distributed to the surgical team by exposure to scattered radiation emitted by a portable radiography device by a surgical arc (C arc), during usage in the operating room	The study concluded that a height of 120 cm from the ground was the maximum level of exposure to scattered radiation by the assisting team. The radiation levels were lower when radiological protection equipment was used.	VI
STUDIES WITH HYBRID METHOD					
⁽²³⁾ Lundén M, Lundgren SM, Persson LO, Lepp M. 2013.	PubMed/MEDLINE	United States	To identify patients who are predominantly anxious or calm before treatment with percutaneous transluminal angioplasty and to explore the reasons for these feelings	The study measured the emotional status of pre-percutaneous angioplasty patients and showed that the majority (69%) felt really calm before the angioplasty. This feeling was related to trust in their caregivers, as well as their ability to foresee upcoming events. Patients who felt anxious before the procedure showed that this cause was related to fear of a negative outcome and being unsure of treatment options.	VI

Out of the 12 works, most them were concentrated in Brazil (five), followed by the United States (two), the United Kingdom (two), Portugal (one), Ireland (one), and Sweden (one).

Regarding the research source, one article was found in the SciELO database, one in the Web of Science database, five on PubMed, and five using the Google Scholar® tool. The LILACS database did not have any relevant work. Thus, most publications were in Portuguese (six), followed by English (five). There were no articles found in Spanish.

DISCUSSION

The 12 studies selected for this systematic review were comprehensively explored according to the proposed topic. Drawn from the findings in the studies, the option was to create categories for a better discussion. These categories were based on a study methodology that resulted in three groups: a) qualitative studies; b) quantitative studies; c) quali-quantitative study (hybrid method).

Qualitative studies

Four scientific works were found in this category⁽¹²⁻¹⁷⁾.

First was a descriptive study conducted in 2007 with 183 patients that underwent peripheral arterial intervention procedure with an aim to assess the safety of the performed procedure. A contact by telephone was made by the nurses during the perioperative period, when most of the patients considered the strategy important. This contact by the nurses was carried out in the pre-operative period by telephone, when they provided information on the procedure that would be performed. In addition, the patient also received a flyer by mail with information related to the intervention. At the moment of hospital discharge, patients receive the relevant information from the nurses in person, including the telephone contact of the service and the nurse on duty for the necessary contacts. During the postoperative period, via telephone contact, out of 183 cases, only two patients (1%) had complications and five had edema in the inguinal region the day after hospital discharge and returned for evaluation. The study shows that the follow-up of the cases by the nurses is important, since in addition to satisfying the patient, it helps to reduce hospital costs and avoid problems with lack of beds for admission in case of elective procedures⁽¹²⁾.

Another qualitative research study was the exploratory descriptive study carried out in 2009 in 30 Brazilian cities, which encompassed 17 states, to identify the problems and needs of the nursing team that works with hemodynamics and angioplasty in these places. Among the difficulties found were: lack of experience in the field; shortage of literature for the nursing area; unit management; weakness of the permanent education programs; and difficulty managing time for assessing material reprocessing. There was also a reference to the assistance tasks developed by the nurses. It showed that the problems with information exchange and deficient training led to lack of preparation in providing care to patients, and in understanding and leading this highly complex service⁽¹³⁾.

Corroborating this finding, another study shows that nursing must substantiate the care in the nursing

process in order to identify risk factors and engage in prevention of the complications resulting from endovascular procedures. Studying 52 patients in a private hospital in Chapecó, SC, the risk factors identified were: systemic arterial hypertension; age over 60 years; obesity; and sedentary lifestyle. From the risk factors identified in this sample the following were the nursing diagnoses: anxiety related to death (100%); risk of acute pain (85%); integrity of damaged skin (75%); risk of renal type ineffective tissue perfusion (42%); risk of infection (24%); and risk of coagulation cascade inhibition (16%)⁽¹⁴⁾. Therefore, the implementation of the nursing process in the care of these patients is an essential precondition for providing a safe and quality care.

Regarding reprocessing hemodynamic catheters, 92 nursing professionals working in 10 services in the city of Recife, PE were interviewed. It was found that all of these services reprocessed the catheters used in hemodynamic procedures on average for at least five years. Seventy percent of the institutions reprocessed approximately 20 devices daily and these catheters were reused an average of four times. The study showed that there was no standardization of techniques for reprocessing hemodynamic catheters and none of the services researched followed a validated protocol to guide the reprocessing stages. This also indicated that the supervision of the reprocessing quality must not be limited to the devices used, but to recording the adverse occurrences to the patient⁽¹⁵⁾.

In general, the scientific evidence of the qualitative studies covered the activities developed by the nurses, ranging from care activities to managerial, health education, and supervision. This range of activities was emphasized, while the main duties of the nurse were: planned and systematizes patient pre-assessment⁽¹⁶⁾; information/guidance provision during the perioperative period, in addition to early detection of post-procedure complications, through previous identification of surgical risks and implementation of nursing procedure. To carry out such duties the emerging care technologies were: patient follow-up and monitoring by telephone contact⁽¹²⁾; elaboration and application of the nursing process during the care provided in the angioplasty perioperative period⁽¹³⁾; pre-admission clinical evaluation carried out by the nurse for early detection of surgical risks and early hospital discharge⁽¹⁶⁾; health education based on the patient's need⁽¹⁷⁾; monitoring the quality of reprocessing catheters used in hemodynamics; and follow-up of adverse outcomes⁽¹²⁻¹⁵⁾. Adding to the major nursing care technologies, the qualitative studies that composed the SR sample were classified as level VI of evidence, demonstrating that the studies are considered of a low degree of recommendation.

The various care technologies complement the duty of the nurses in hemodynamics, with an emphasis on their responsibility for full assistance to the patient and development of managerial, training, and research activities⁽²²⁻²⁶⁾. Regarding the education of patients undergoing percutaneous transluminal angioplasty, nurses must become real experts in the lifestyle of the patient in order to implement an individualized care planning during pre- and post-intervention⁽²⁷⁾.

Quantitative studies

This category was composed of five studies⁽¹⁸⁻²²⁾, wherein four of them matched classification VI, or

studies with a low degree of recommendation. Just one study matched level II of evidence because it was a randomized controlled clinical trial, that is, an experimental study conducted with human beings aimed at finding out the effect of post-angioplasty hemostasis techniques, as one of the most powerful tools for obtaining clinical evidence for the practice.

In 2013, a simulated study recorded, assessed, and quantified the radiation dose, reproducing the normal conditions under which endovascular procedures affect surgical teams and patients exposed to scattered radiation. It was identified in patients that lengthy procedures using electronic magnification can cause skin burns and considerably increase the radiation dose rate to the patient. As a means to reduce the amount of radiation to the patient and subsequent scattered radiation, it was recommended to set the image intensifier closer to the patient, in addition to efficient procedure duration control, fluoroscopy, and magnification mode. It is also important to monitor the radiation values. Adequate use of radiological protection equipment can allow safety conditions for the healthcare team and the patient⁽¹⁶⁾.

A study conducted in 2011 examined 66 endovascular procedures during nine months and found 1,847 adverse events and 1,145 identified failures, applying the World Health Organization's surgical safety checklist. The most common failures identified were: 23.5% in equipment (unavailable, configuration failures, space management, and device failures); 21% in communication between surgeon and anesthesiologist; and 9% in techniques. The research described that few serious failures were identified, but there was an accumulation of minor failures that took place during the most critical moments of the procedure. It is important to emphasize that the vascular operating room is a complex and dynamic environment and holds a multidisciplinary team involving a great amount of information and highly complex surgical tasks. Therefore, surgical error prevention represents a great challenge⁽¹⁷⁾.

A publication from 2006 describes the use of protocols for hospital discharge on the same day of elective post-angioplasty in 97 patients during a period of 27 months. The research showed that peripheral angioplasty in patients with claudication can be carried out with safety in the ambulatory, with significant cost reduction. The conclusion indicates that hospital discharge on the same day of the peripheral post-angioplasty is safe and effective; it is considered a gold standard procedure. To reach this outcome, regardless of its being the result of a medical protocol application, the article points to some inherent aspects in relation to nursing care, such as: use of pre- and trans-procedure medications; post-procedure mobilization time; and manual compression time at the site where the intervention is taking place⁽¹⁸⁾. However, in the Brazilian context, most endovascular procedures require a hospital stay until the day after the procedure, because most of them involve clinical and/or complex anatomical situations⁽¹⁹⁾.

Two studies in this category assessed the issue of post-angioplasty hemostasis techniques. One of them studied the results, complications, and costs involving the use of a vascular occlusion device compared to post-intervention endovascular mechanical/manual compression. It analyzed 407 patients undergoing endovascular interventions from 2006 to 2009 in a hospital in Campinas, SP. The conclusion was that the hemostasis technique by manual and/or mechanical compression, when successfully conducted, is as

efficient as hemostasis using vascular occlusion, but with a relatively lower cost. Therefore, the vascular occlusion device was not as safe and did not show a better cost effectiveness when compared to manual or mechanical compression⁽¹⁹⁾. The second study compared the rates of vascular complications in the femoral access site in 110 elderly patients, regarding mechanical (with type “C” clamp device) or classical hemostasis after percutaneous procedures. The research concluded that there was no difference between the rates of vascular complications and the hemostatic technique⁽²⁰⁾.

In this category, the scientific evidence points to emerging care technologies such as adopting strategies for reducing the amount of incident radiation exposure to the patient during the angioplasty procedure⁽¹⁶⁾; monitoring the radiation values and the adjustment of the radiological protection equipment⁽¹⁶⁾; implementing an endovascular pre-procedure safety protocol⁽¹⁷⁾; implementing a surgical safety checklist⁽¹⁷⁾; and standardizing the angioplasty post-procedure hemostatic compression technique⁽¹⁹⁻²⁰⁾.

Quali-quantitative study (hybrid method)

In this category only one American study was covered, in which, applying the Likert scale, 42 patients undergoing endovascular procedures were interviewed to identify whether they were anxious or calm prior to the procedure and to explore the reasons for these feelings. The reasons indicating why they were calm were feeling secure, having good expectations regarding the procedure, and trust in their caregivers (physicians and nurses). In contrast, the anxiety was related to the despair and apprehension regarding the procedure, fear of a negative outcome, and insecurity regarding treatment options. The research showed that studies on the feelings of pre-angioplasty patients are insufficient.

Despite being classified as level VI of evidence, the study brings some important care technologies to be employed in this context, and they are: to learn the perceptions of pre-procedure patients; to be open to dialogue and to listen carefully; to provide pre-procedure orientations (written, spoken, and by video) regarding the procedure, risk factors, the place where the intervention will occur, and treatments; to use appropriate terminology during orientations; to apply music therapy before the procedure; to motivate the creation of groups of patients; to use an individualized and friendly approach before the procedure⁽²¹⁾.

CONCLUSION

The review showed studies with low levels of scientific evidence, a lack of studies, and poor scientific background in which perioperative nursing care to patients undergoing angioplasty of the lower limbs has been developed. Therefore, there is lack of information and poor training, resulting in a lack of preparedness to assist patients in nurses understanding and leading this highly complex service.

As limitations, this study points out the heterogeneity among the researched articles, mainly regarding the examined research subjects and interventions; this hindered a comparative analysis among the findings.

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