



Safety criteria for contrast administration in computed tomography cardiac angiography: perception of nursing

Cr terios de seguran a na administra o de contraste na angiotomografia card aca:
percep o da enfermagem

Criterios de seguridad en la administraci n de contraste en la angiograf a cardiaca:
percepci n de la enfermer a

Laura Vargas Acauan¹, Maria Cristina Soares Rodrigues¹

Objective: to understand the perception of the nursing team about the safety criteria adopted in the use and administration of iodinated contrast media on computed tomography cardiac angiography. **Methods:** a descriptive study with a qualitative approach. The data were produced using the semi-structured interview with twelve participants from two diagnostic imaging centers. **Results:** two thematic categories emerged from the analysis: safe practices in the use and administration of iodinated contrast media and use of light technologies for safe care in the use of iodinated contrast media. **Conclusion:** it was surmised that safety criteria linked by light and hard technologies are used, but not standardized. To promote effective and quality care focused on patient safety, protocols and guidelines should be established to overcome possible barriers unsafe. **Descriptors:** Diagnostic Imaging; Tomography, X-Ray Computed; Contrast Media; Patient Safety; Nursing Care.

Objetivo: apreender a percep o da equipe de enfermagem sobre os cr terios de seguran a adotados no uso e administra o do meio de contraste iodado na angiotomografia card aca. **M todos:** estudo descritivo, com abordagem qualitativa. Os dados foram produzidos empregando-se a entrevista semiestruturada, com doze participantes de dois centros de diagn stico por imagem. **Resultados:** duas categorias tem ticas emergiram da an lise: pr ticas seguras no uso e administra o do meio de contraste iodado e utiliza o de tecnologias leves para assist ncia segura no uso do meio de contraste iodado. **Conclus o:** depreendeu-se que, cr terios de seguran a entrela ados por tecnologias leves e duras s o utilizados, embora n o padronizados. Para se promover cuidados efetivos e de qualidade centrados na seguran a do paciente, protocolos e orienta es devem ser estabelecidos para transpor poss veis barreiras inseguras. **Descritores:** Diagn stico por Imagem; Tomografia Computadorizada por Raios X; Meios de Contraste; Seguran a do Paciente; Cuidados de Enfermagem.

Objetivo: comprender la percepci n del equipo de enfermer a sobre los criterios de seguridad adoptadas en el uso y administraci n de medios de contraste yodado en la angiograf a cardiaca. **M todos:** estudio descriptivo, cualitativo. Los datos se produjeron utilizando la entrevista semiestructurada, con doce participantes de dos centros de diagn stico por im genes. **Resultados:** dos categor as surgieron del an lisis: pr ticas seguras en el uso y administraci n de medios de contraste yodado y uso de tecnolog as blandas para atenci n segura en el uso de medios de contraste yodado. **Conclusi n:** se deprendi  que, criterios de seguridad entrelazados por tecnolog as blandas y duras son utilizados, pero no estandarizados. Para promover efectiva atenci n y de calidad centrada en la seguridad del paciente, protocolos y directrices deben ser establecidos para superar posibles barreras inseguras. **Descriptor:** Diagn stico por Imagen; Tomograf a Computarizada por Rayos X; Medios de Contraste; Seguridad del Paciente; Atenci n de Enfermer a.

¹Universidade de Bras lia. Bras lia, DF, Brazil.

Corresponding author: Laura Vargas Acauan
Rua Augusto Ribas, 514 - CEP: 84.010-300. Ponta Grossa, PR, Brazil. E-mail: lacauan@uol.com.br

Introduction

Cardiovascular diseases are the main cause of morbidity and mortality worldwide. According to the World Health Organization, 300,000 people die each year in Brazil. Coronary artery disease is a leading cause of death among the cardiovascular diseases⁽¹⁾. The fundamental step to reduce cardiovascular event rates is by identifying individuals at higher risk of developing coronary artery disease⁽²⁾. Computed tomography of multiple detectors or Multislice allows different clinical applications in cardiology, such as the detection of coronary calcium score and heart angiography⁽³⁾.

When performing heart angiography, iodinated contrast media is administered, but there are potential risks for adverse reactions after a single administration or multiple radiological contrast. Reactions vary and can be mild, like nausea and vomiting, to more intense reactions, identified by laryngospasm and cardiopulmonary arrest⁽⁴⁾.

As the main purpose of the care team in health services is to promote benefit to the patient, considering the complexity of care in Imaging Diagnostic Center contributes to risk management, by the adoption of practices that promote safe care. Therefore, determining certain medical conditions that increase the risk for adverse reactions to iodinated contrast is of great importance. Therefore, it is necessary to follow careful assessment and filed management to reduce the possibility of complications. Questionnaires for nursing is a way to prevent, identify and treat possible adverse reactions to iodinated contrast media⁽⁴⁾.

Managing risks inherent to patient care that will undergo cardiac angiography is a function especially of the nursing team that plays an important role in the Diagnostic Imaging Center, preparing physically and emotionally to the patient examination or radiological procedure. The team acts before, during and after the

examinations and/or procedures, and then working on the *continuum* care for the safety in care, and contributing to the quality of image production⁽⁵⁾. Thus, for a safe care to patients undergoing imaging exams, scientific knowledge and skills are required in addition to the staff involved in the implementation of therapeutic protocols on prevention, treatment and rehabilitation of clients in Imaging Diagnostic Center⁽⁶⁾.

Considering the importance of this topic under discussion, the interest in investigating on the criteria adopted by the nursing staff in the administration of iodinated contrast media has emerged, focusing on the safety of patients undergoing cardiac angiography, becoming the object of this research.

The study is justified after finding that research on this subject by Brazilian nurses are still incomplete, as well as by the need to think about nursing practice in Diagnostic Imaging. To reflect on the subject based on technical and scientific advancement of nursing in the country, it is considered that the area of radiological nursing is in expansion.

Considering the practice of radiological nursing and its implications on the technological advancement of equipment emitting ionizing radiation, it is seen the possibility of radiological nursing consecrates as a specialization. However, there is still a long way to go, because in spite of nursing have expanded in this area, it is imperative to advance the discussion, especially about the emerging topic of patient safety and quality in imaging service.

In this understanding, the guiding question of the study was: what security criteria were adopted by the nursing staff in the administration of iodinated contrast media? From this, the objective of the study was defined as to understand the perception of nursing staff on security criteria adopted in the use and administration of iodinated contrast media in performing computed tomography cardiac angiography.

Method

Descriptive study with qualitative approach conducted in two Diagnostic Imaging Centers, in July and August 2012. In the selection of possible scenarios for research, it was sought to identify which of the health care network services of the Federal District that had the Multislice computed tomography scanner 64 channels, being found only in two private hospitals in the city of Brasilia.

The inclusion criteria established was: be a member of the nursing staff of the Diagnostic Imaging Center of the hospital organization, regardless of gender and age, with working time on more than 90 days, with experience term of contract termination and ideal period for the developer be inserted in service and able to act. Based on these criteria, there was a sample of 12 participants, represented by two nurses and 10 nursing techniques.

Data collection conducted through semi-structured interview recorded from organized script with four questions: a) What procedures are followed for you in performing computed tomography cardiac angiography?; b) What is the iodinated contrast media used in cardiac angiography in this Diagnostic Imaging Center?; c) Where and how this drug is stored in the area?; d) How this medicine is prepared and administered? Speeches were recorded on portable digital device IC Recorder[®] and transformed into text by Windows Media Player[®] program.

After content analysis, by being a set of analysis techniques of communication that uses systematic procedures and description of goals of message content, and points out three basic steps in the work that took place, that is pre-analysis, analytical description and interpretation inferential. From the responses, there was a brief reading, with four free readings across material to know the texts and realize its main ideas. Then, it was proceeded the encoding process performed by Arabic numerals to facilitate its location in the text.

The organization and coding of the material

were made by cut, enumeration, classification and aggregation of the reporting units present in the speeches of the participants. In this study, it was opted for thematic analysis, considering the record of units of semantic nature (topic) for the treatment of the material. They were highlighted, coded and systematically transferred to a spreadsheet operationalization of content analysis, enabling the enumeration rule by simple frequency⁽⁷⁾. After treatment of the results and interpretation of these originated two analytical categories: "Safe practices in the use and administration of iodinated contrast media" and "Use of light technologies for safe care in the use of iodinated contrast media".

Project approved by the Ethics Committee in Research on Human Beings under the number 006/12. To maintain the anonymity of the participants, the statements are identified by the letter "I" (interview), followed by the ordinal number from the order of the interviews, in addition to the professional category, indicated by the letter "N" for nurses and "NT" for Nursing Technicians.

Results

There were 12 subjects participating in the study, two Nurses and 10 Nursing Technicians, 50% (n=6) in the age group from 40 and 48 years old; and 75% (n=9) with training time between four and 15 years. The nursing technicians worked in the Diagnostic Imaging Centers between one and two years, and the two nurses worked in activities in their services for less than a year.

The following analytical categories were originated after thematic analysis of data: 1) Safe practices in the use and administration of iodinated contrast media, from the following units of meaning-topics: hand hygiene, iodinated contrast media used in computed tomography cardiac angiography, safe venipuncture and administration of iodinated contrast media, test venous access, treatment and storage of iodinated contrast media, safety equipment, nursing

staff training; and 2) use of light technologies for safe care in the use of iodinated contrast media, with the following units of meaning-topics: monitoring and overall evaluation of the patient (vital signs), clinical history of the patient (hypoglycemic medication suspension), guidelines for the patient.

Category 1- Safe practices in the use and administration of iodinated contrast media

Initially, hand hygiene as an important procedure from the basic actions in assistance in health services was mentioned as fundamental: *You have to wash your hands and very well washed mainly not to have any contamination to the patient* (I1-NT).

When the respondents were asked about the iodinated contrast media used in service, the answers show that they knew which drug should be administered to the patient to perform the computed tomography cardiac angiography: *It is the Optiray[®], the 350 (mg)* (I1-NT). *Iodinated, nonionic. It's what we use* (I2-NT). *Ioversol[®], 350 mg of 125 mL* (I7-N).

As for the procedures for use free of possible risks and damage to patients receiving intravenous dose of iodinated contrast media, it is worth highlighting the importance of the drug heating to lower its viscosity, so that the patient does not feel pain at the time of administration. However, some professionals have expressed doubts about the ideal temperature value, as shown in the following statements: *Storage (iodinated contrast media) is done in an oven to heat it, not to hurt in the patient's vein, that's why it is heated* (I1-NT). *This medication must be preheated in the oven at 39 degrees. Thus it is heated* (I3-NT).

Interviews demonstrated safety and tranquility in the use of iodized contrast media in the Diagnostic Imaging Centers, since it is the service option using the drug in sealed and individual packaging, thus reducing contamination risks, as expressed in the following lines: *they come ready in the syringe, all the procedure, the nipple we need, we uncover it, remove everything* (Saline), a

very safe process, the connector is completely sterile. We prepare all (procedure) with the techniques that we use and when injected in every patient, it is discarded (iodinated contrast media syringe) (N4-NT). *The medication is prepared, we do not manipulate anything, it comes in a syringe, isolated. We place the syringe in the injection pump and is connected to the access, the connector (spiral tube), so there is no manipulation, it (iodinated contrast media) comes ready* (N6-NT).

Testing the venous access with saline is considered a safe practice before administration of iodinated contrast media, to minimize the potential for harm to the patient if the catheter is inserted incorrectly or inappropriate for the procedure. This aspect has been realized in the following reports: *Puncture the vein safely, because the contrast cannot be injected outside the vein, which might cause harm to the patient* (I1-NT). *The more quiet you are, the better your exam, put into the examination room and do the test in his veins to see if it will have no leakage because it is with caliber Jelco, it will have a very fast flow* (I9-NT).

Another important aspect is the training of staff to handle the contrast injection pump. The staff is prepared to handle it appropriately, relying on the automation equipment and monitor its performance during the entire process of injection of the iodinated contrast media. Professional Technician or Technologist in Radiology, while making the imaging, knows the ideal time to undertake the injection command, calculating the input speed and amount of iodinated contrast media, according to protocol adopted by the radiologist. In this way, he collaborates securely and efficiently in carrying out this important phase of the examination, as expressed: *We have safety injection pump with two routes, one for serum and one for the contrast, to have better security when entering the contrast in the patient* (I3-NT). *Simply you have to open and put the connector tube into the aseptic technique and put in the peripheral access already punctured* (I7-N). *It (iodinated contrast media) is injected in the room during the exam. First, it is a sequence (images) without (iodinated contrast media) and then a sequence (images) with (iodinated contrast media), administered by injection pump* (I2-NT).

Regarding the location and ideal storage for

the iodinated contrast media, in accordance with the manufacturer's recommendations, the interviewees' statements express differences: *Inside the computed tomography room there is a balcony which is separated by syringe, 100, 125, inside the same room (E5-TE). It (contrast) can be stored, buy after taking it from the oven, you cannot return it there. What remains it keeps closed in the over, you cannot take it and then replace it again (contrast) because it (contrast) will lose ... other things, other components (I1-NT).*

Concerning the maintenance of equipment, one of the nurses interviewed highlighted this aspect: *I worry about the devices that we use, they are all calibrated, all with preventive maintenance (I7-N).* In addition, she highlights the importance of staff training for performing imaging: *I do a checklist of everything, team training, about this examination protocol (computed tomography coronary angiography), something new (I7-N).*

Category 2 - use of light technologies for safe care in the use of iodinated contrast media

The nursing staff systematically value and use the process of relationship with the patient and family/caregiver during all phases of the exam. In this regard, they recognize the importance of knowing the prior medical history of patients. However, it is clear they are satisfied with a minimum of information, as highlighted in the following statement: *We try to evaluate the whole, well ... is not everything, a minimum possible (of clinical history), we only have a base about the patient (clinical history) that come to us. We try to know if the patient is diabetic, if not, his condition at the time, if he is allergic (I2-NT).*

In the declarations, it is also seen that other relationships processes are established in order to secure assistance service: *I talk to him (the patient), I explain to him how he will be the whole procedure, talk to him, tell him to stay calm, to not get anxious. When a patient comes for an exam, especially coronary, he imagines a big deal; it is the first time he is doing, he is anxious and afraid of the exam, first because it is the contrast, the patient does not know the contrast, he is afraid and the*

pulse accelerates, there's no way to make a good examination with the beats high (I9-NT). When he (the patient) comes, we will guide how the examination is ... his breath as a contribution, we will guide that a certain time of the examination he'll have to hold his breath. If he cannot, we wear the apron (plumbic), holding the nose so he breathes right, all for safety and for the test to be good (I4-NT).

There is concern about certain medications that the patient may be taking and not reported in the written instrument, as can be noticed in the speeches: *...If using medication, if diabetic, hypoglycemia is suspended, using an inhaler medication for asthma or bronchitis (I10-N). I always ensure that the information supplied is true, I always like to supplement with a conversation with the patient to make sure that it is really safe to inject the contrast (I12-NT).*

To know potential risk factors present in the patient is considered a safe practice for the administration of iodinated contrast media, as can be seen in the following words: *We try to evaluate a minimum, we only have a base (about clinical history), in quotes, of patients coming to us. We try to know if the patient is diabetic, if not ... his condition at the time, if he is allergic (I2-NT). If he has any pathology that may influence the use of contrast such as heart disease, hypertension, diabetes, autoimmune diseases, asthma, bronchitis (I10-N).*

The patient's emotional state may interfere with their vital signs, bringing negative consequences for the realization of the images, which can incur the medical report unsafe execution. If there is need for a repeat examination, it would increase the risks for the patient, since more radiation would be emitted, as well as new administration of iodinated contrast media. This aspect was found in the following reports: *He (the patient) is anxious and afraid of the test, first because it is the contrast, the patient does not know the contrast, he is afraid and that quicken the pulse, there's no way to make a good examination with high rate. When it is too high, we talk to the radiologist to see what to do, he asks to take a medication that is usually propranolol (I9-NT). We check vital signs, because they have to have a heart beat not so high, if it is, we administer the medication (I10-N).*

Discussion

In Diagnostic Imaging Center, the need for specialized nursing care to accompany the important scientific and technological advances is unquestionable⁽⁶⁾. From this perspective, the study performed shows significant results, indicating some security criteria adopted by nursing teams of the imaging services research participants, which are addressed below.

The fast development of computed tomography technique of multiple detectors has allowed the production of images quickly, with a reduction of the radiation risks and the internal visualization of the arteries was possible with greater safety for the patient⁽⁸⁾. For this purpose, iodinated contrast media is used, which is a radiopaque substance capable of improving sharpness of images. The X-ray attenuation by that contrast agent depends on the concentration of iodine, thus, the higher the iodine concentration, the greater its ability to attenuate X-rays, which allows the production of quality images⁽⁸⁾. However, the risk of adverse reactions may also increase proportionally with the concentration of iodine, which requires greater attention of all professionals involved in the examination⁽⁹⁾.

Nursing realizes the specificity of care provided to patients undergoing computed tomography cardiac angiography exam and performs safe practices, as evident in this study. First, hand hygiene is a valued and held practice, as it is a primary measure recognized worldwide in infection control, as hands being the main route of transmission of microorganisms. An investigation into motivational factors for membership in hand hygiene, involving 135 nursing professionals from a public hospital in Londrina, showed that performing more complex procedures or hand hygiene has the same value, which requires recognition of the importance of aseptic technique in health services. Even assuming greater responsibilities, this does not exempt them to practice hand hygiene, because it is paramount to patient safety⁽¹⁰⁾.

In the follow-up, it is realized the concern of participants in the management of iodinated contrast media because, like any medicine, it presents contamination risks in its administration if not properly handled. The contrast media used is considered safe, to have their packaging presentation similar to a plastic syringe, sterile and sealed to be connected to the injection pump of contrast through sterile coiled tube to the venous access. Thus, it reduces the risk of contamination that occurs when a dose is removed from a bottle, being influenced by some factors such as: type of bottle; characteristics of the needle or other puncturing device used to remove the dose; number of perforations in the rubber; physical characteristics of the rubber; aseptic technique used by professional nursing; air injection in the bottle; and efficiency preservatives⁽¹¹⁾.

In the computed tomography cardiac angiography, in the study scenario, there are Optiray[®] 350 mg (iodine concentration) - ioversol, non-ionic iodinated way of contrast, low osmolality, due to its higher safety and tolerability, as well as significant efficacy for attenuation of X-rays. Therefore, there is a structural quality of images to be studied. Despite being the safest, there is controversy as to its use due to the high cost in Brazil, being three, four times larger than the ionic iodinated contrast media⁽¹²⁾.

There are significant pharmacological differences between low osmolality contrast (ioversol) and the high osmolality (iodixanol) which would be even safer for the patient. Randomized, controlled USA studies comparing the two of them, concluded that there are no significant reductions in nephrotoxicity and acute kidney injury, although more studies are needed. In the USA, as well as in the scenarios of this study, the contrast of choice has been the low osmolality, which were equally safe and effective, showing also significant cost reduction⁽¹²⁾.

Another relevant aspect refers to the knowledge of the iodinated contrast media characteristics. These agents have their basic structure formed by a benzene ring to which iodine atoms and complementary groups

were added which are acids and organic substitutes that directly influence the toxicity and excretion. They can be ionic or nonionic, but all have some properties that are related to its efficacy and safety, and include: density, that is the number of atoms of iodine per milliliter of solution; viscosity, which in practice means “strength” necessary to inject the substance through a catheter; and osmolality, which represents the number of particles per unit volume of solution⁽¹²⁾.

By the nephrotoxicity potential, acute renal injury induced by contrast is likely to occur following intravenous administration. As the population ages, the incidence of this type of injury is likely to increase, due to the increase of cardiac studies in radiology with contrast use, and risk factors for kidney damage, damage, such as chronic kidney disease, diabetes and blood dyscrasias⁽¹³⁾.

It is important that the iodinated contrast media is warmed to body temperature before administration, to be better tolerated, allowing it to be injected more easily, due to reduced viscosity. Using an oven at 37 °C, the ideal is to heat the expected number of bottles for a day of service in computed tomography angiography⁽¹⁴⁾. Furthermore, it is recommended that they are stored protected from light and X-ray, in room temperature between 15 °C and 30 °C according to the manufacturer’s recommendations, and can be preserved for a month in an oven and heater with circulating air temperature of 37 °C⁽¹³⁾.

The iodinated contrast media should preferably be administered in a peripheral vein large caliber, where blood flow is higher, which reduce its adverse side effects to the high osmolality, if necessary⁽¹²⁾. During the computed tomography procedure, heart rate, blood pressure and electrocardiogram are monitored. The heart rate must be less than 65 beats per minute, if there are higher values, intravenous beta-blocker should be administered to decrease heart rate values. Through peripheral venipuncture, 100 mL to 125 mL of iodinated contrast is used⁽¹⁴⁾.

The venipuncture process is a procedure characterized by inserting a catheter into a venous

vessel, and is one of the activities frequently performed by health professionals, especially by nurses. This catheter, as it involves different purposes and periods of time, may represent potential risk for various iatrogenic⁽¹¹⁾. Aseptic technique should be carried out to minimally traumatized site and be carried by and capable experienced professional to avoid consecutive punctures generating distress, anxiety and pain to the patient, and which may trigger reaction of vasomotor type (vasovagal); if combined, adverse reactions to iodinated contrast media may cause serious consequences. When possible, the patient’s arm should be elevated during the infusion of iodinated contrast media to prevent stasis agent in the shoulder region, which may lead to phlebitis. Another useful measure is the continuous maintenance isotonic solution after injection of the contrast media, which also reduces the risk of phlebitis⁽⁹⁾.

There are risks during venipuncture, such as infections, occupational accidents, loss or failure to maintain the puncture and leakage and infiltration⁽¹⁵⁾. Furthermore, there may be leakage of the contrast media considered adverse place at intravenous drug administration event and, in most cases, involves smaller volumes than 10mL evolved without complications. However, large amounts such as 50ml or more, can cause tissue damage to the puncture site adjacent to the compartment syndrome⁽¹⁶⁾.

The fast development of computed tomography technique of multiple detectors allows the production of images quickly, reducing the risks of radiation, allowing the internal visualization of the arteries⁽¹⁶⁾. For this, iodinated contrast media is used, which is a radiopaque substance capable of improving sharpness of images. The X-ray attenuation by that contrast agent depends on the concentration of iodine, thus, the higher the iodine concentration, the greater its ability to attenuate X-rays, allowing the production of safe and high quality images⁽¹²⁾.

The iodinated contrast media is not free from risks of adverse reactions, occurring at a frequency of 1% to 12%. Such reactions may be in the mild form,

such as nausea, vomiting, dizziness and pruritus, to more severe reactions that require drug and life support interventions, such as facial and laryngeal edema, and cardiac arrhythmias, renal failure, pulmonary edema and cardiopulmonary arrest⁽¹²⁾.

Certain patient's clinical condition increase the risk for adverse reactions, such as previous history of reaction to iodinated contrast media; multiple allergies; bronchitis and asthma; multiple myeloma, cardiovascular disease; kidney disease, pheochromocytoma; blood dyscrasias; anxiety, among others. Therefore, patients receiving iodinated contrast media for performing the imaging need security criteria to the management of these risks⁽¹³⁾.

As for combination therapy of medication with iodinated contrast media, thorough inquiry to identify those that may increase the risk of adverse reactions should be done. Among the drugs with potential risk, there are adrenergic blockers, calcium channel blockers, cardiac glycosides, oral anti-hyperglycemic (metformin hydrochloride), angiotensin-converting enzyme, interleukin-2⁽¹²⁾.

Preventive maintenance of the injection pump contrast and all the equipment in service is extremely important because they are used to carry out the tests, choice of treatments, production of images, organization of information created, in addition to the radiation protection of professionals and patients present in the service. In this way, it is ensured the patient's safety and professional image quality, thus a correct medical report that meets the needs of the patient and the referring physician of imaging test⁽⁶⁾.

The nursing staff that operates in Diagnostic Imaging Center plays a key role in assisting patients, since they perform evaluation guidelines, preparation for exams, positioning scanner and monitor the patient during the examination⁽⁸⁾. Also, they provide necessary materials and medicines, in addition to performing the contrast media administration. Therefore, they are professionals who need that safety criteria for contrast agent administration are clear and well defined and, thus, can recognize patients at risk,

preventing and treating possible adverse reactions⁽⁸⁾.

It is surmised by the answers of the participants about the importance of investigating risk factors that can determine an increase in adverse reactions. The literature points out as possible factors: hypersensitivity to iodinated contrast agent; hyperthyroidism and non-toxic nodular goiter; severe cardiovascular insufficiency; pulmonary failure of high-grade and asthma; kidney failure; nephropathy in diabetes mellitus patients; advanced age; anxiety disorders (fear)⁽¹⁴⁾, among others.

In the reflection of the testimony of participants in this study, it is evident that the process of the nursing team working in the daily service of diagnosis by imaging, using and radiological contrast administration in computed tomography coronary angiography, ongoing training is required, as well as maintenance preventive equipment used in the procedure, reflecting the promotion of safe care and quality of service.

Health technologies is another aspect that has been configured as key in the production of work in the health sector, which covers the field of diagnostic imaging. Research has shown that light technologies are used in order to provide safe care, regardless the place performed. At the Diagnostic Imaging Center, as a sector where high technology equipment is essential for the achievement tests, nursing plays a relevant role in this service, value and daily use the process of relationships with the safety and quality of care⁽⁶⁾.

Research conducted in the Diagnostic Imaging Centers of this study showed that the interaction with the patient create a speaking and listening space. The study shows that nursing contributes to the reduction of risks, and as a result of this living work in a process of relationships, performing a quality and safer examination⁽¹⁷⁾, reaffirming that the light technology in health has a relational character. However, the production of more and further studies are needed with a qualitative and quantitative approach, with the focus the safety of users and employees in the service, since nursing little investigated this topic.

Conclusion

Concern for patient safety and quality of health services has been remarkable, especially from the early twenty-first century as a worldwide movement. As a reference the World Alliance for Patient Safety by the World Health Organization was created in 2004, which presents measures to reduce risks and mitigate adverse events in health care. Since then, research has been conducted in several countries, including Brazil, initially on the situational diagnosis of the problem.

Investigating different aspects of the care process and managing the services in the health sector is crucial. However, it must be considered that the professionals are human beings, and therefore fallible. Moreover, there is a complex setting in health work for effective management. Therefore, it deserves to be explored, considering the magnitude of the problem of occurrence of incidents and adverse events in health, considered a serious public health problem.

The results of this study show that the practices carried out by the interviewees imaging services involve hand hygiene, knowledge of the radiologic contrast used in the service, as regards the procedure for making the drug, method of use and storage, and care in venipuncture. The training of staff in the management of contrast injection pump was also mentioned, as well as the relevance of the assessment of patients based on their medical history so that the examination could be carried out safely.

Thus, it can be inferred that the nursing staff of the Diagnostic Imaging Centers use some safety criteria, in which light and hard technologies are linked, however, they are not filed and standardized. In this sense, this research indicates the need for discussion and reflection on the performed practices, focus on patient safety, use and administration of iodinated contrast media in computed tomography angiography, and that potential risks are managed in order to incorporate possible unsafe barriers in this specialty care.

It should be noted as a limitation of this study the difficulty of comparisons with other research because the scientific literature on the subject of this research is embryonic. Thus, it is understood that this research contributes to scientific knowledge of Brazilian nursing, specializing in diagnostic imaging, which is still little known and studied.

It is also considered that the results of this research cannot be generalized, but they indicate that the nursing staff assisting patients who undergo the examination coronary angiography at the Diagnostic Imaging Centers need to perform their actions managing potential risks in conducting the procedure, and should be used safety criteria scientifically evidenced in order to produce a safe care in the use of radiographic contrast.

Collaborations

Acauan LV contributed to the elaboration of the work, analysis, data interpretation, article writing and final approval of the version to be published. Rodrigues MCS contributed to the guidance, job design, article writing, review and final approval of the version to be published.

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